

CRANFIELD UNIVERSITY

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UNRAVELLING THE ROUTINES IN NEW PRODUCT
DEVELOPMENT PORTFOLIO MANAGEMENT

CRANFIELD SCHOOL OF MANAGEMENT
Management

PhD

Academic Year: 2013 - 2016

Supervisor: Professor Keith Goffin

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ABSTRACT

Product innovation is a key driver of growth. One of the biggest challenges facing an organisation in managing product innovation is determining the most promising new product development (NPD) projects from the many ideas generated. This selection process is known as *NPD portfolio management*, which is a strategic decision-making process.

Despite its significance in terms of management practice, portfolio management is still not well understood, either by practitioners or academics. For example, much of what has been written focuses mainly on individual project selection rather than managing the entire process; at the same time, it is unclear how to manage the link between the portfolio decisions and business strategy.

A systematic review was carried out of the different streams of literature addressing portfolio management, strategic decision-making, the strategy process and organisational routines. The review showed that the theoretical perspective of organisational routines has not been adopted in previous studies of portfolio decision-making. This is a significant omission, as organisational routines constitute an important theoretical perspective, able to uncover not only the formal but also the informal ways in which portfolio decisions are made. Based on the gaps identified in the systematic literature review, three research questions were adopted: 1) *How is new product development portfolio management conducted?*; 2) *What organisational routines can be identified in the new product development portfolio management in companies?*; 3) *Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

These questions were addressed by case study research conducted in four manufacturing firms based in Indonesia, from the cosmetics, food, consumer and automotive sectors. The study focused on how the firms conduct portfolio management. It used multiple sources of data: semi-structured interviews with directors and managers; inspection of portfolio management process documentation; attendance at a

product development meeting; and a simulation exercise which involved observing the approach managers took in selecting a product portfolio.

The findings show that across the four companies, a total of 12 routines could be identified that are connected to portfolio management. These routines were termed a ‘palette’ of routines connected to portfolio management, from which the routines relevant to a particular organisation can be selected. Further analysis refined these 12 routines into eight key routines. Five of the eight routines were identified to be ‘core’ (Market and Industry Analysis, Concept Selection and Development, Build Business Case, Portfolio Management Review and Product Development), as all four case companies used them. Two additional routines were found to be ‘essential’ (Business Planning and Project Prioritisation); one is ‘optional’ (New Product Research). While in the literature, portfolio management is centred solely upon making decisions about which projects will be selected, the palette of routines unveils the entire process of portfolio management as more wide-reaching and complex. Surprisingly, the study also discovered that a linkage between the routines and business strategy – something that the literature claims is missing – existed in all four case companies (albeit in largely informal routines rather than as part of formal processes).

From a practical point of view, the study generated a generic framework for portfolio management. This enables a company to build its portfolio management on the seven routines that were identified as “core” and “essential”, supplemented with an extra routine if required, depending on the business strategy. This framework can help managers to design an effective NPD portfolio management process.

Overall, portfolio management is an under-researched area, despite its strategic importance. This study has demonstrated that portfolio management is wider-reaching than previously thought; it is dependent on both formal processes but also undocumented routines, and it links much more closely to company strategy than previously thought. However, more research is needed.

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LIST OF ABBREVIATIONS

AP	Affordable product
APP	Affordable premium product
BD	Senior brand development
BOD	Board of director
BU	Business unit
CEO	Chief executive officer
CF	Checking fixtures
COGM	Cost of good manufactured
COO	Chief operating officer
CPD	Coordinator, product development
CR	Coordinator, registration
DCB	Director, consumer business
DCMBS	Director, corporate marketing and business service
DDFA	Deputy director, finance and administration
DDSM	Deputy director, sales and marketing
DE1	Design engineer #1
DE2	Design engineer #2
DF	Director, finance
DHEM	Division head, engineering and marketing
DHP	Division head, plant
DHQ	Division head, QC and HSE
DIC	Director, innovation centre
DM	Director, manufacturing
DOC	Document
DSM1	Director, sales and marketing #1
DSM2	Director, sales and marketing #2
DSP	Director, strategic procurement
DSub	Director, foodco's subsidiary company
DTRD	Director, technical and R&D
EBIT	Earnings before interest and taxes
EP	Engineer, process
FA1	Finance and accounting #1
FA2	Finance and accounting #2
FC	Finance, counsel
FDA	Food and drug administration
FGD	Focus group discussion
FS	Feasibility study

GMM1	General manager, marketing, product group #1
GMM2	General manager, marketing, product group #2
GMMI	General manager, marketing insight
GP	Gross profit
HBD	Head, business divisions
HD	Head, division
HM2	Head, manufacturing, product group #2
HPD	Head, packaging development
HSE	Health, safety and environment
HVPT	High volume production trial
INT	Interview
IRR	Internal rate of return
ITD	Innovation technology development
KPI	Key performance indicator
LEP	Leader, engineering project
LoA	Letter of acceptance
LOI	Letter of intent
LVPT	Low volume production trial
MAR	Manager, applied research
MB2	Manager, brand, product group #2
MBM1	Manager, brand marketing #1
MBM2	Manager, brand marketing #2
MBM3	Manager, brand marketing #3
MBM4	Manager, brand marketing #4
MCC	Manager, cost control
MCNI	Manager, consumer insight
MCTI	Manager, customer insight
MD	Manager, distribution
MEPC	Manager, engineering process
MEPJ	Manager, engineering project
MF	Manager, finance
MFA	Manager, finance and accounting
MFWP	Marketing, 4-wheel products
MGB	Manager, group brand
MM	Manager, marketing
MMT	Manager, marketing and technical
MO	Marketing officer
MP	Manager, plant
MP1	Manager, production #1
MP2	Manager, production #2
MPD	Manager, product development
MPG	Manager, product group

MPI	Manager, productivity improvement
MPPIC	Manager, production planning and inventory control
MPR	Manager, purchasing
MR	Manager, research
MRD	Manager, research and development
MRD2	Manager, research and development, product group #2
MS	Manager, sales
MSC	Manager, supply chain
MT	Manager, technical
MTE	Manager, technical engineer
MTM	Manager, trade marketing
NID	New idea development
NPD	New product development
NPL	New product launch
NPV	Net present value
OBS	Meeting observation
OI	Operating income
P&L	Profit and loss
PCPD	Project controller, product development
PD	Product designer
PE	Process engineer
PEX	Product executive
PPIC	Production planning and inventory control
QC	Quality control
R&D	Research and Development
RDDP	Request for design and development parts
RFQ	Request for quotation
ROI	Return on investment
RPM	Robust portfolio modelling
RQ	Research question
RWW	Real win world
SF	Supervisor, formulation
SHL	Section head, laboratory
SHP	Section head, procurement
SIM	Simulation
SKU	Stock keeping unit
SLR	Systematic literature review
SLR	Systematic literature review
SOP	Standard operating procedure
SpF	Specialist, formulation
SpPL	Specialist, planner
SpPUR	Specialist, purchasing, packaging material

SRD	Supervisor, R&D
StE	Staff member, engineering
StF1	Staff member, finance #1
StF2	Staff member, finance #2
StPD	Staff member, packaging development
StPPIC	Staff, production planning and inventory control
StPRO	Staff, procurement
StR	Staff member, regulation
StSD	Staff, supplier development
VOC	Voice of customer
VOM	Voice of market

CHAPTER 1 INTRODUCTION

1.1 INTRODUCTION

This thesis reports a study on new product development (NPD) portfolio management from the perspective of organisational routines. The study was guided by three research questions (RQs) based on the results of a systematic literature review: (1) *How is new product development portfolio management conducted?* (2) *What organisational routines can be identified in the new product development portfolio management in companies?* and (3) *Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* It employed case study methodology, involving four manufacturing companies from different industries based in Indonesia: cosmetics, food, consumer products and automotive components. Apart from these, one pilot study was conducted of a UK-based footwear manufacturing company¹.

Portfolio management is defined as “a dynamic decision process, whereby a business's list of active new products (and R&D) projects is constantly updated and revised” (Cooper et al., 1999, p. 335). Besides making the right decisions in selecting and prioritising projects, portfolio management also deals with reviewing these decisions regularly and changing or even terminating projects if necessary (Cooper et al., 1999; Goffin and Mitchell, 2010; Kester et al., 2011).

This Introduction chapter starts the discussion with the following subjects: Portfolio Management: An Overview, Portfolio Management Conceptual Framework, Portfolio Management Issues, Alternative Perspectives on Portfolio Management, Key Findings, Potential Contributions and Thesis Structure. Throughout this thesis, the term 'new product development portfolio management' (hereafter shortened to or used interchangeably with 'portfolio management') refers to the portfolio management of new product development projects.

¹ The pilot case study is presented in Appendix B.

1.2 PORTFOLIO MANAGEMENT: AN OVERVIEW

In today's dynamic business environment, companies need to strive continuously for *corporate renewal*, that is, creating new wealth through new combinations of resources (Guth and Ginsberg, 1990) in order to survive and grow (Danneels, 2002). Some authors have recognised that the primary means of corporate renewal is product innovation (Bowen et al., 1994; Danneels, 2002; Dougherty, 1992). The *Economist* (2007), in its Special Report on Innovation, noted that, "...the biggest thoughts emerging from innovation research in recent years: [are that] neither idea generation nor execution is as important or as tricky as the filtering process that links the two" (p. 14). As Goffin and Mitchell (2010) indicated, this implies that the biggest challenge companies face in managing product innovation is determining the most promising NPD projects from the many ideas generated. This process of selecting which set of new products will be developed is known as *portfolio management*.

The choice of projects should be determined largely by an organisation's business strategy (Cooper, 1984). In other words, the decisions concerning the management of the pipeline of new products should be aligned with and guided by business strategy (Cooper, 2005; Cooper et al., 2001; Kester et al., 2011). Kester et al. (2011) argued that with an appropriate mix of product improvements and product line extensions, as well as entirely new products, companies could secure their long-term success.

1.3 PORTFOLIO MANAGEMENT CONCEPTUAL FRAMEWORK

Figure 1.1 presents an introductory conceptual framework of NPD portfolio management, which is built based on the frameworks suggested by Cooper (1984, 2005), Terwiesch and Ulrich (2008) and Goffin and Mitchell (2010). As shown on the left-hand side of the framework, a number of ideas which emerged from market research (customer groups and informants), internal company brainstorming or external organisations, are filtered out, whereas others are considered to be *new product concepts* (Goffin and Mitchell, 2010). The product concept, which is the "approximate description of the technology, working principles and form of the product", concisely describes how the product will satisfy customer needs (Ulrich and Eppinger, 2004, p. 98).

New product concepts flow into a product portfolio decision-making process involving two-steps: firstly, they are screened to be a considered portfolio of products which then enter the development process; and secondly, these products under development are reviewed to determine which are to be continued, postponed or terminated (Cooper, 2005; Goffin and Mitchell, 2010). To conduct effective selection processes in both steps, Cooper (2005) suggested applying two methods: the *stage-gate* process and *portfolio review*. The former includes decision points or *gates* to evaluate the individual projects and make *go/kill*, prioritisation and resource allocation decisions. The latter undertakes a periodic review of the portfolio of all projects under development and makes *go/kill* and prioritisation decisions.

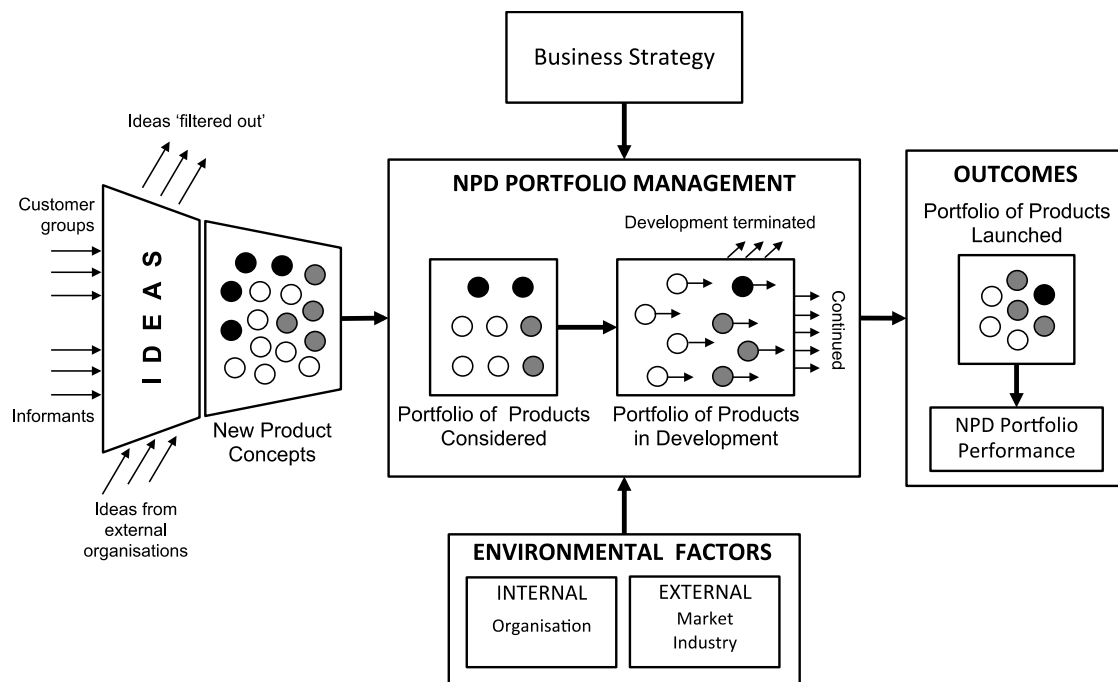


Figure 1.1: Preliminary Conceptual Framework of NPD Portfolio Management

Adapted from Cooper (1984), Goffin and Mitchell (2010) and Terwiesch and Ulrich (2008)

On the right-hand side of the framework, the *outcomes* (that is, the portfolio of products launched) are generated from the decision processes. The end results of NPD portfolio management are reflected in the *NPD portfolio performance* (Cooper, 1984), and are considered to be the *economic metrics* and *non-economic metrics* (Nagji and Tuff, 2012). The economic metrics consist of the financial return and market share

(Brown and Eisenhardt, 1995; Krishnan and Ulrich, 2001); the non-economic metrics include how the products fit with the market (Brown and Eisenhardt, 1995; Krishnan and Ulrich, 2001), the organisation's competencies (Brown and Eisenhardt, 1995) and the future technology capability (Anderson Jr. and Joglekar, 2005).

At the top of the framework, it is indicated that *business strategy* should guide portfolio management decisions, ensuring the process delivers products which reflect the strategy. At the bottom of the framework, the *environmental factors* – organisation, industry and market factors – influence the relationship between the decision processes and the outcomes (Cooper, 1984).

Clearly, the framework shows that portfolio management should be viewed as an integrated process, ranging from considering new product concepts to launching a portfolio of products. The success of the portfolio management process is measured by the performance of the overall portfolio rather than solely that of the individual projects. Portfolio management success impacts on both the short-term and long-term wealth of companies.

1.4 PORTFOLIO MANAGEMENT ISSUES

Despite its immense significance in terms of management practice, portfolio management is still not well understood. For example, much of what has been written focuses mainly on individual project selection rather than managing the entire process; still unclear is how to manage the link between the process and business strategy, and the lack of formal process.

Cooper et al. (1997a) and Kandybin (2009) indicated that despite most managers being aware of the strategic role which portfolio management should assume, in practice its link to business strategy is often vague or missing. Frequently therefore, organisations discover that their allocation of resources is mismatched with their espoused strategies (Anthony et al., 2008). Furthermore, a number of scholars including Cooper (1984), Goffin and Mitchell (2010) and Terwiesch and Ulrich (2008) (see Figure 1.1) suggested an innovation framework which implies the formal and systematic process of a portfolio management system. This system represents one of the best practices in portfolio management (Cooper et al., 2004). However, in many

companies the elements of the process are not necessarily clearly defined; as Cooper (2009), Cooper et al. (2004) and Khurana and Rosenthal (1997) reported, most of the firms they studied lacked a complete formal process for portfolio management.

Many studies have been conducted; these, however, have centred on the individual product as the unit of analysis rather than on the company's overall product portfolio (Cooper, 1984; Cooper and Kleinschmidt, 1995; Kester et al., 2011). The focus has been on the selection and termination of individual products rather than the examination of the entire process (Kester et al., 2011). The emphasis of these studies has thus mostly centred on developing portfolio selection models (Adams et al., 2006).

Portfolio selection models seek the right allocation of resources to obtain the optimal balance in the NPD portfolio, that is, a portfolio which optimises the trade-off between returns and risks (Adams et al., 2006; Dickinson et al., 2001). These are largely based on quantitative models designed to maximise the portfolio's value (Cooper et al., 1999; Kester et al., 2011). They include optimisation models (maximising the output from a subset of available inputs), cost-benefit analysis and financial-based models (internal rate of return, net present value, return on investment and real options) (Adams et al., 2006; Cooper et al., 1998, 1999; Goffin and Mitchell, 2010). Recently, non-financial models have been incorporated into the models, including scoring models, peer reviews and mental checklists (Adams et al., 2006; Cooper et al., 1998, 1999; Goffin and Mitchell, 2010).

Even though these models are conceptually comprehensive and largely promising, it has been claimed that in practice they have not been widely utilised (Adams et al., 2006; Cooper et al., 1999; Hall and Nauda, 1990). Some may be too complex to be implemented or suffer from a lack of context in their organisational aspects, such as the organisational decision and communication processes (Adams et al., 2006).

It has thus been shown that an emphasis on quantitative models and the lack of an integrative perspective of the process, the vague link with business strategy, and the lack of formal process are the main issues in existing portfolio management research. It is possible that these issues have impeded the widespread utilisation of portfolio management approaches.

1.5 RESEARCH GAPS AND ALTERNATIVE PERSPECTIVES OF PORTFOLIO MANAGEMENT

The majority of authors writing on portfolio management have done so through an innovation management lens. To complement these studies, this research has considered it necessary to apply other perspectives, including those which involve the organisational aspects of portfolio management, namely strategic decision-making and organisational routines.

Portfolio management deals with *dynamic decision-making process* (Cooper et al., 1999; Kester et al., 2011), which involves uncertain and evolving information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects and multiple decision-makers (Cooper et al., 1999, 2001). This process can be categorised as strategic decision-making (Harrison, 1981; Thomas, 1984). It deals with *unstructured processes*, referring to the processes which “have not been encountered in quite the same form and for which no predetermined and explicit set of ordered responses exists in the organisation” (Mintzberg et al., 1976, p. 246). Allison (1971), in his seminal study, identified that strategic decision-making processes are constituted by *rational*, *political* and *organisational* elements. This framework was adopted was adopted in a number of important studies by, for example, Mazzolini (1981), Fahey (1981), Schwenk (1988, 1989), Dean and Sharfman (1993), Rajagopalan et al. (1993), and Royer and Langley (2008)

This view of portfolio management as dynamic and involving unstructured processes shows that investigation of portfolio management requires the incorporation of the decision-making process perspective. Kester et al. (2011), in their important study, proposed a portfolio management model that includes decision-making process elements – *evidence*, *power* and *opinion* – and *cultural factors* as components of the process. Referring to Allison’s (1971) tenet, evidence- and opinion-based processes can be related to the rational element, while power-based processes can be associated with the political element. The organisational element (or organisational routines), however, appears to have been under-represented in the framework. Moreover, the links between the portfolio decision-making process and strategy are not shown clearly. To address these issues, an incorporation of organisational routines and strategy perspectives in the process could complement Kester et al.’s (2011) model.

Another consideration is the indication by some studies that top-performing organisations employ a formal and systematic approach to portfolio management, guided by clear decision criteria, as opposed to an ad hoc process (Cooper et al., 1999, 2001; Kandybin, 2009). This view accords with the perspective that the systematic processes which companies use for strategic decision-making can be regarded as *routines* (Dosi et al., 2000; Eisenhardt and Martin, 2000). Routines refer to “all regular and predictable behavioural patterns of firm” (Nelson and Winter, 1982, p. 14).

It has been shown that although there has been extensive study of portfolio management, there has been too little investigation into the entire decision-making process. Further study was thus needed, using an integrated perspective incorporating an organisational context, such as one which includes strategy and organisational routines. An examination of the organisational perspective led to the following research questions (RQs):

1. *How is new product development portfolio management conducted?*
2. *What organisational routines can be identified in the new product development portfolio management in companies?*
3. *Is the company’s espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

1.6 RESEARCH METHODOLOGY

The research questions refer to the emerging and complex phenomenon of portfolio management which requires a detailed exploration, as there is little theory available to explain it. In addition, these enquiries also need investigation appropriate to the context of the problem. It thus was deemed appropriate to investigate RQ 1, RQ 2 and RQ 3 using the *case study* method. Exploratory case studies were conducted of four manufacturing companies of different industries in Indonesia (cosmetics, food, office and homecare, and automotive components).

The study focused on revealing how each case company conducted its portfolio management and what its organisational routines entailed. The data collection process employed multiple methods, which aimed at strengthening *qualitative validity*. It carried out triangulation of data, involving four sources: (1) semi-structured interviews with

directors and managers involved in portfolio management processes; (2) inspection of portfolio management process documentation; (3) attendance at a portfolio management meeting, and (4) a simulation exercise which involved observing the approach that managers took in selecting a product portfolio (to understand their decision-making in a controlled situation). The data collection took place from January 2015 to April 2015.

Data analysis was conducted using a grounded theory approach which was applied to each case. The coding process was carried out in two stages: open and axial coding. Cross-case analysis then was conducted to reveal the similarities and distinctions across the case cases. Finally, these findings were synthesised to obtain new constructs.

1.7 KEY FINDINGS

This study identified a palette of eight key portfolio management routines², categorised as core, essential and optional routines. Core routines were found in all case companies; additional essential routines need to be included in order to provide a comprehensive portfolio management process. In particular, an optional routine is required if a company is committed to introducing pioneering innovation. The investigation of routines also led to uncovering their connections.

This study found links between portfolio management activities and business strategy. These linkages were not formalised; instead they were formed inherently as the routines were carried out. The core routines have the strongest links to business strategy and are also the most connected.

1.8 POTENTIAL CONTRIBUTIONS

This study has the potential to contribute both to theory and practice. In terms of contribution to theory, it provides an understanding of portfolio decision-making processes from the organisational process perspective by illuminating the palette of routines. This network shows the entirety of the activities involved in portfolio management which goes beyond sole project selection. In addition, using an

² A palette of routines is analogous to a palette of colours, from which managers can select a set of routines for composing the required portfolio management capability.

organisation routines perspective allows the link between portfolio management and business strategy to be identified. Finally, this study has shown the advantages of simulation as a research method able to enhance the supporting evidence.

From a practical point of view, this study provides a generic NPD portfolio management framework, useful for managers when designing a comprehensive NPD portfolio management process. In addition, the study also provides feedback to the case companies, including new insights into their NPD portfolio management practices which have emerged from the research.

1.9 STRUCTURE OF THE THESIS

This thesis is organised as follows:

- Chapter 2: New Product Development Portfolio Management presents an overview of portfolio management including the conceptual framework, and a systematic literature review exploring portfolio management from a strategic decision-making perspective.
- Chapter 3: Organisational Routines presents the scope of the organisational routines knowledge domain. It further discusses a systematic literature review, examining the relationships between portfolio management and organisational routines.
- Chapter 4: Synthesis of the Literature integrates the conceptual findings of the systematic literature review in chapters two and three, aiming to reveal the research gaps and finally translating them into research questions.
- Chapter 5: Research Design describes the philosophical position of this study, followed by the determination of the research methodology and methods.
- Chapter 6: Case Study 1 discusses the within-case analysis of the first case company, i.e., CosmeticsCo.
- Chapter 7: Case Study 2 discusses the within-case analysis of the second case company, i.e., FoodCo.
- Chapter 8: Case Study 3 discusses the within-case analysis of the third case company, i.e., MultiproductCo.
- Chapter 9: Case Study 4 discusses the within-case analysis of the fourth case company, i.e., AutocompCo.

- Chapter 10: Cross-Case Analysis discusses a comparison of the answers to the RQs across the case companies, exploring the similarities and distinctions among those answers.
- Chapter 11: Discussion and Conclusions presents the syntheses of the cross-case analysis results and introduces a generic framework for NPD portfolio management.

1.10 SUMMARY

This chapter has presented the background and rationale for conducting a study of NPD portfolio management using an organisational perspective, and the key results of the study. It has shown that:

- Portfolio management deals with decisions in selecting, reviewing and revising or terminating projects, and has been recognised as a challenging area for companies.
- Portfolio decisions need to be aligned with the right business strategy in order to ensure an NPD portfolio performance which fits with corporate goals.
- Previous studies have focused on the selection criteria for individual projects rather than paying attention to the management of the overall product portfolio.
- Previous portfolio management studies have examined the process from a decision-making theoretical perspective; however, the organisational element of decision-making has been overlooked. Hence, in this further study, besides decision-making, different theoretical perspectives, such as organisational routines and strategy, need to be incorporated in order to comprehend the NPD portfolio management process.

CHAPTER 2 NEW PRODUCT DEVELOPMENT PORTFOLIO MANAGEMENT

2.1 INTRODUCTION

It was mentioned in Chapter 1 that NPD portfolio management is an area related to various knowledge domains: NPD portfolio management, strategy process, decision-making and organisational routines. This chapter presents the systematic literature review (SLR)³ which shows the relationships between NPD portfolio management, decision-making and strategy process domains. The review of organisational routines literature will be presented in Chapter 3.

The chapter starts with an overview of NPD portfolio management. It is followed with a discussion of portfolio management from a decision-making perspective and the relationship between portfolio management and the strategy process. The chapter closes with a summary

2.2 NEW PRODUCT DEVELOPMENT PORTFOLIO MANAGEMENT

Success at company level or business unit level may be different from success at project level (Cooper and Kleinschmidt, 1996). Similarly, a successful single new product may have very little impact on the overall portfolio performance (Cooper, 1984). In order to capture an accurate view of a company's performance, any analysis should therefore go beyond looking at individual projects and examine the whole NPD portfolio (Cooper and Kleinschmidt, 1995). In a recent study, Barczak et al. (2009) showed that companies have progressed from managing individual projects to focusing on management of the entire portfolio, that is, a collection of projects which contribute to an organisation's overall goals. To have a better understanding of what NPD portfolio management entails, the following sections present a definition of NPD portfolio management, its conceptual framework, and the particular characteristics of a product portfolio.

³ The systematic literature review framework is presented in Appendix A.

2.2.1 Portfolio Management Definition

Portfolio management is defined as “a dynamic decision process, whereby a business’s list of active new products (and R&D) projects is constantly updated and revised” (Cooper et al., 1999, p. 335). Kester et al. (2011) stated that the process refers to “the set of activities that allows a firm to select, develop, and commercialize a pipeline of new products aligned with the firm’s strategy that will enable it to continue to grow profitably over the long term” (p.641). It is a dynamic decision-making process that not only deals with selection and termination decisions, but also includes decisions to delay or continue the projects (Cooper et al., 1999; Kester et al., 2011). Moreover, Holt (1983) suggested that, besides concerning new projects, the decisions are also about the withdrawal of unprofitable existing products.

Similarly, McDonough III and Spital (2003) stated that whereas portfolio selection is mainly concerned with the processes of including or excluding projects in the portfolio, portfolio management goes beyond this; it should entail as well the ‘day-to-day management’ of the portfolio (p.40). In carrying out project selection, managers should emphasise selection criteria, assessment, decision-making and governance (Kandybin, 2009), while in day-to-day management of the portfolio the managers deal with ‘policies, practices, procedures, tools and actions’ in allocating the resources. (McDonough III and Spital, 2003, p.40). These processes involve “uncertain and changing information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects, and multiple decision makers and locations” (Cooper et al., 1997a, p.16; Cooper et al., 1999, p.335).

Portfolio management results in strategic choices about the products which will be developed, are under development, and are already in the market. It in turn will dictate a company’s business performance in the future (Cooper et al., 1999).

2.2.2 Conceptual Framework of Portfolio Management

Figure 2.1 depicts a portfolio management conceptual framework. It shows that new product concepts flow into a product portfolio decision process and come out as launched portfolio products. The quality of this portfolio will be determined by the NPD portfolio performance.

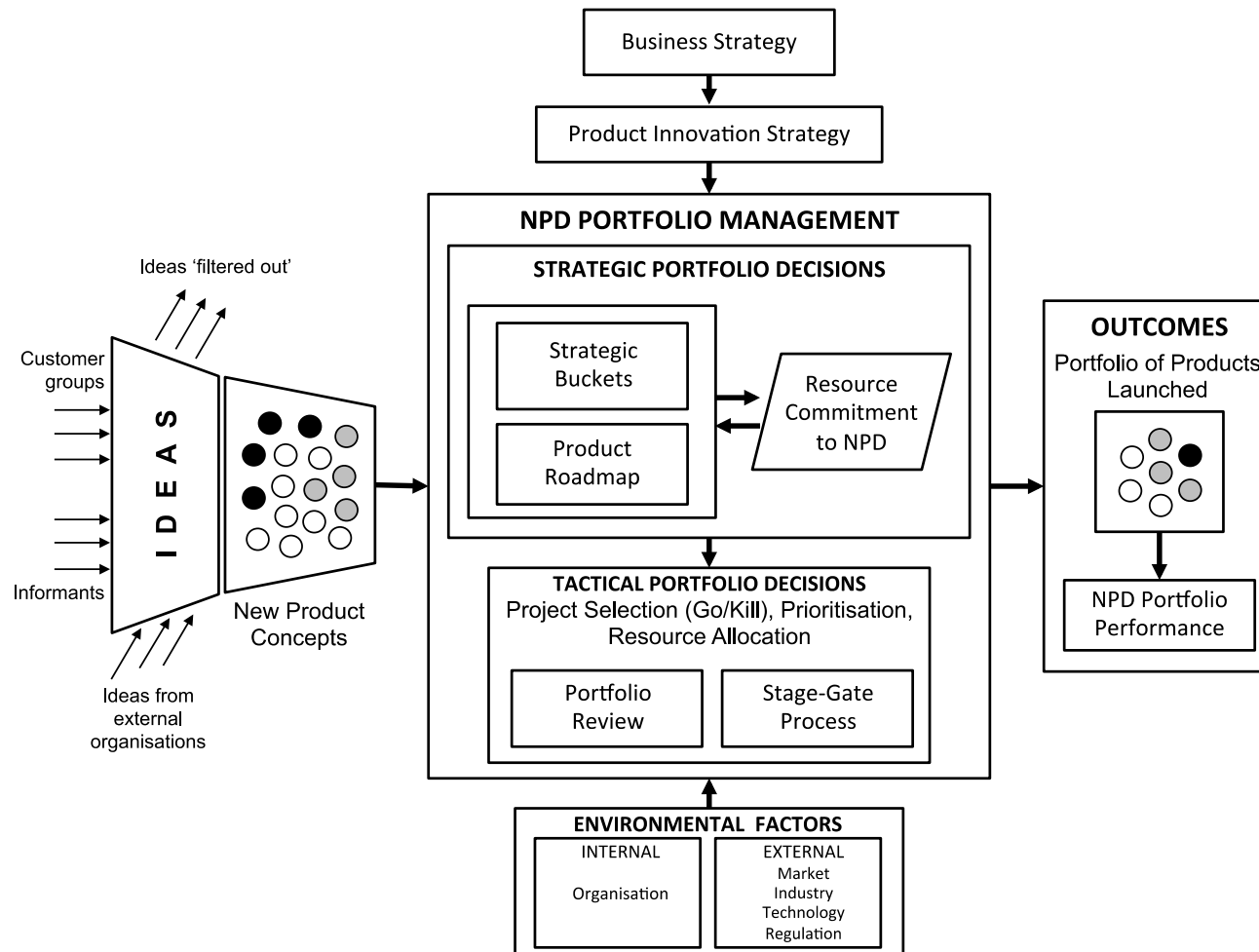


Figure 2.1: Conceptual Framework of Portfolio Management

Adapted from Cooper (1984, 2005), Goffin and Mitchell (2010) and Terwiesch and Ulrich (2008)

At the top of the framework, business strategy is derived into its subset, *product innovation strategy* (Durmuşoğlu et al., 2008), that links business strategy with the company's product development processes (Cooper, 2005). Product innovation strategy is referred to as “a strategic master plan that guides your business's new product war efforts” (Cooper, 2005, p. 53). A product innovation strategy must therefore show how new products and product innovation fit into the business strategy (Cooper and Edgett, 2010). It defines the target markets, products offered and technologies applied (Cooper, 1984, 2005). Furthermore, Terwiesch and Ulrich (2008) suggested that a product innovation strategy embodies the company's *value proposition*, which addresses the issues of what differentiates the company from its competitors, the process for creating its products, the company's competitive advantage and the *contingency plan* if a specific change in the competitive environment occurs. These strategies should be in place; the absence of them makes portfolio management almost unworkable (Cooper et al., 1997b).

At the centre of the framework, the decision-making process in *portfolio management* can be considered as a hierarchical process, which results in two levels of decision: *strategic portfolio* and *tactical portfolio decisions* (Cooper, 2005). The former determine the commitment of resources to NPD projects, whereas the latter focus on the selection and prioritisation of projects and the allocation of the resources required. Portfolio decisions seek the right allocation of a company's limited resources for executing new product ideas (Dickinson et al., 2001) in order to achieve the fundamental portfolio management goals:

- (1) *Value maximisation* (Cooper et al., 1997a, 2001), i.e., “the optimal ratio between resource input and return” (Kester et al., 2014, p.1201; Kester et al., 2009, p. 329)
- (2) *Balanced portfolio* (Cooper et al., 1997a, 2001), i.e., “a harmonious portfolio with respect to specific parameter” (Kester et al., 2014, p.1201; Kester et al., 2009, p. 329) (for example, incremental versus radical innovation, risk versus reward (Dickinson et al., 2001; Kester et al., 2009) and market versus product line goals, or short term versus long term (Dickinson et al., 2001).

(3) *Strategic alignment* (Cooper et al., 1997a, 2001), i.e., the alignment between NPD portfolio decisions and the business's strategy.

At the strategic level of decision-making, the process to allocate the committed resources employs a number of tools, including: *strategic buckets* and a *product roadmap* (Cooper, 2005; Cooper and Edgett, 2010). The former method distributes resources into separate 'buckets' to ensure that any resource allocation reflects the company's strategic priorities (Cooper and Edgett, 2010). The latter maps major new product plans, including the platform developments required for the new products (Cooper, 2005; Cooper and Edgett, 2010). With this roadmap, a company is able to translate its strategy into resource commitments. In addition, using a technology roadmap, the development or acquisition of new technologies required can be planned (Cooper and Edgett, 2010).

At the tactical level of decision-making, the process of project selection, prioritisation and allocation of the required resources employs a *stage-gate system* and *portfolio reviews* (Cooper, 2005). The stage-gate process provides a thorough review of individual projects, and determines go/kill, prioritisation and resource allocation decisions. The subsequent decision-making process is the portfolio review, which is a periodic review of the portfolio of all the projects. In this review process, senior management considers all the projects together and makes go/kill and prioritisation decisions (Cooper, 2005). In making decisions, Cooper (2005) suggested examining a number of key issues:

- The alignment of the projects with the business's strategy
- Right priorities among projects
- The status of some projects, e.g. killed, delayed or accelerated
- The right balance of projects
- Resources sufficiency
- Managing the projects in order to achieve the business goals

At the bottom of the framework, in addition to organisation, industry and market, technology (MacCormack and Verganti, 2003) and regulation (Duncan, 1972) are considered to be the elements of environmental factors. These factors induce environmental dynamics which influence the NPD portfolio decision-making process.

On the right-hand-side of the framework, the result of product portfolio decisions is the product portfolio itself, which ultimately determines NPD portfolio performance. The cumulative performance of NPD projects determines the corporate performance (Anderson Jr. and Joglekar, 2005). Anderson Jr. and Joglekar (2005), furthermore, pointed out that product portfolio decisions affect not only short-term financial objectives, but also the company's *future market position* and *technological capability*.

Despite this framework showing a good representation of the portfolio management process, it contains some limitations. It seems to refer to a *process flow concept* (input-process-output), in which new product concepts represent the input, portfolio management represents the process, and product portfolio and its performance represent the output. This perspective views portfolio management as a straightforward and one-way process; whereas, in contrast, it entails interplays and back and forth processes between its elements.

Furthermore, this framework does not show the underlying process of how decisions are made. The absence of this element causes the framework to overlook the organisational contexts of portfolio management. As indicated in the introduction, this is a significant issue.

2.2.3 Product Portfolio Characteristics

One challenge presented by portfolio management is the need for resources to be allocated between innovation projects, while each project may represent conflicting strategic directions (Chao and Kavadias, 2008; Cooper et al., 1999). In addition, complexity is also caused by the occurrence of a "*combinatorial state*", meaning that products with different economic return functions interact with each other, utilising shared resources (Loch and Kavadias, 2002, p. 1227). This indicates the existence of interdependencies among NPD projects, in which an individual product outcome depends on the outcome of other products in the portfolio (Dickinson et al., 2001; Roberts, 1999). Researchers indicate four types of frequently occurring interdependency:

- (1) *Resource* (Verma and Sinha, 2002), i.e. the effects of the learning curve cause the development times for similar types of products to be shortened.

- (2) *Development cost*, i.e., the combined cost of a development activity for two products is not equal to the sum of the individual costs because of resource sharing (Blau et al., 2004).
- (3) *Financial return*, i.e., synergism or cannibalism of products in the marketplace (Blau et al., 2004; Roberts, 1999; Terwiesch and Ulrich, 2009).
- (4) *Technical success*, i.e., the technical performance of a preceding product affects the probability of technical performance of the succeeding products (Blau et al., 2004).

Portfolio management is largely about managing interdependencies among NPD projects (Terwiesch and Ulrich, 2009) and this must be conducted on a regular basis. Too often, interdependencies in the product portfolio have been inadequately considered (Ali et al., 1993).

2.2.4 Conclusions

Portfolio management is an integrated process, ranging from considering new product concepts to launching a portfolio of products, aiming for value maximisation, balanced portfolio and strategic alignment. It involves two levels of decisions: strategic portfolio decisions and tactical portfolio decisions. These decisions deal with selecting or terminating, and delaying or continuing the projects.

Previous studies have focused only on the rational aspects of decision-making, either in strategic portfolio decisions or tactical portfolio decisions. They have paid less attention to the behavioural aspect of decision-making (how decision-making processes occur). Consequently, the organisational contexts, such as the rational factors of decision makers, organisational structure, and power and politics, have not been sufficiently considered. Among others, only Kester et al. (2011) specifically studied portfolio decision-making from an integrated perspective. The study proposed a general framework of portfolio decision-making.

2.2.4.1 Critique

The extant literature lacks attention in terms of a number of important issues. Firstly, previous studies have focused only on the rational aspects of decision-making, as they apply to both strategic and tactical portfolio decisions, and paid less attention to the

behavioural aspect of decision-making (how decision-making processes occur). Consequently, the organisational factors have not been sufficiently considered.

Secondly, NPD performance as described in the literature mostly represents the performance of a single NPD project, whereas the overall performance of the NPD portfolio is still not clearly addressed. The performance of a portfolio is not equal to the aggregate of the performance of each NPD project; this is because of the presence of interdependencies among NPD projects. To measure the success of an NPD portfolio, therefore, the analysis must move from only looking at the product level to looking at its impact on the business unit or at the corporate level.

2.3 PORTFOLIO MANAGEMENT: A DECISION-MAKING PERSPECTIVE

As stated earlier, NPD portfolio management is a *decision-making process* (Cooper et al., 1999, 2001; Goffin and Mitchell, 2010; Kester et al., 2011) for determining resource allocation decisions (Adams et al., 2006; Dickinson et al., 2001). In this section, the issues concerning strategic decision-making in NPD portfolio management are addressed in four literature themes⁴: Portfolio Management (T₁), Strategic Decision-Making (T₂), Strategic Decision-Making in Innovation (T₃), and Portfolio Decision-Making (T₄). Each theme will be discussed in detail, and the relationship between these themes will be shown in a *Subject Relevance Tree*⁵ in Appendix A.4.1.

2.3.1 Portfolio Management (T₁)

The objective of portfolio management is to allocate resources to achieve the optimal balance between returns and risks of the product portfolio in uncertain situations (Cooper et al., 1999; Goffin and Mitchell, 2010; Kester et al., 2011). Studies on portfolio management have been mainly focused on portfolio selection rather than on portfolio management as a whole (Adams et al., 2006). Among these studies, this literature review identified different streams of study, centring on the development of *prescriptive tools* (Adams et al., 2006; Cooper et al., 1999), and *integrated frameworks* (Archer and Ghasemzadeh, 1999; Cooper, 2008) for supporting decision makers in selecting a product portfolio. In addition, studies on the implementation of portfolio

⁴ The literature themes refer to the systematic literature framework exhibited in Appendix A.

⁵ A tree depicting a major topic and its related literature (Hart, 1998).

management in practice have also drawn the interest of some scholars (Cooper et al., 1999, 2000; Nagji and Tuff, 2012). These three streams of study are discussed further in this section.

Various tools have been developed to perform the portfolio selection process. The development of project selection tools began with a model using *return on investment* as the primary decision criterion (Adams et al., 2006), e.g. financial model and financial indices, probabilistic financial models, options pricing theory (Cooper et al., 1999). Development further advanced to build models such as mathematical tools, and economic and benefit analysis. These models are categorised as quantitative models that use financial criteria as their performance measures. Cardozo and Wind (1985) argued that financial-based models offer advantages as they emphasise the main objective of the corporate level, which is maximising the level of return for any level of risk and minimising risk for any level of return.

Furthermore, development has recently progressed towards portfolio models which incorporate qualitative factors in the decision-making process, such as *mapping approaches* or *bubble diagram*, *scoring models* and *checklists*, *analytical hierarchy approaches*, and *behavioural approaches*, which include subjective perceptions selection (Adams et al., 2006; Cooper et al., 1999). The empirical research, however, shows that merely financial-based models do not yield the best results; rather, a combination of methods tends to result in better portfolios in different performance metrics (Cooper et al., 1999).

Subsequently, while previous development focused on building mathematical models, other scholars have paid attention to integrated frameworks (Archer and Ghasemzadeh, 1999; Cooper, 2005, 2008). Conceptual framework development is mainly addressed in project portfolio management studies, among others those conducted by Archer and Ghasemzadeh (1999), Meskendahl (2010), Petit (2012) and Petit and Hobbs (2010). The framework developed by Archer and Ghasemzadeh (1999), shown in Figure 2.2, is considered to contribute significantly to the field (cited by 760 other articles⁶). It breaks down the portfolio project selection process into a flexible and

⁶ Source: Google Scholar (accessed 12th August 2016).

logical series of activities that move from initial strategy issues towards the final result. The framework is conceived in terms of pre-process stages, portfolio selection process and post-process stages. This approach offers flexibility which allows users to utilise the advantages of a combination of existing tools.

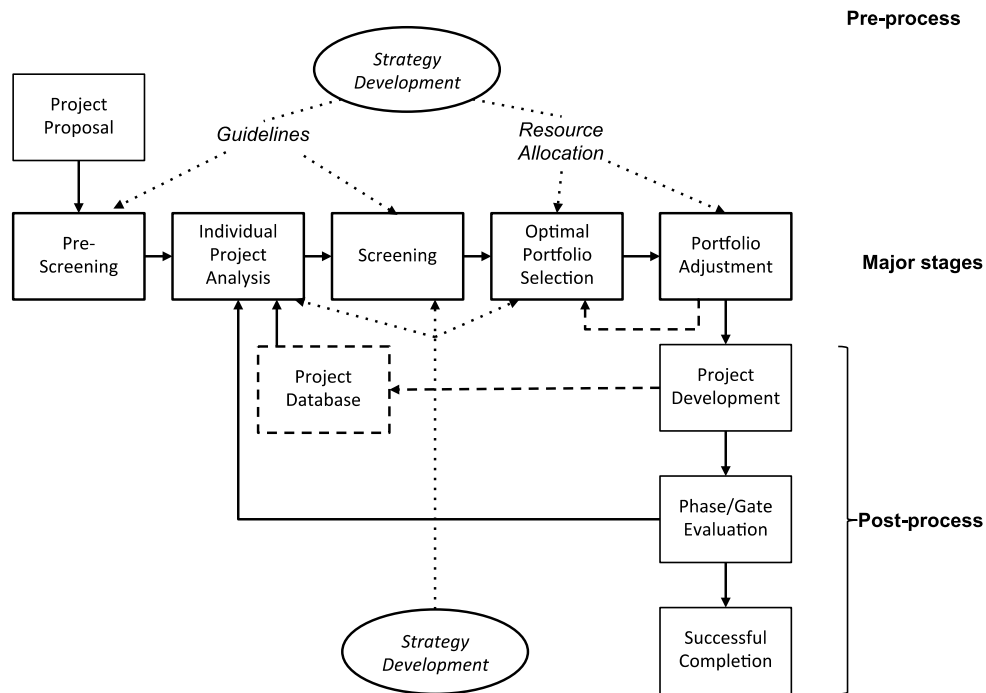


Figure 2.2: Framework for Project Portfolio Selection

Source: Archer and Ghasemzadeh (1999)

Finally, the third stream of studies examines how companies select their product portfolio (Cooper et al. (1999, 2000); Nagji and Tuff (2012)). For example, Cooper et al. (1999) investigated the portfolio management practices in 205 business units from various industries. Their study suggests that the best-performing companies apply established and formal portfolio management methods along with the use of a combination of multiple methods.

In summary, the review of the portfolio management theme identified three streams of study: prescriptive tools, integrative framework and implementation of portfolio management methods in practice. These studies, however, have largely focused on portfolio selection aspects rather than on integrated portfolio management. Moreover, how portfolio decisions are made has not been examined sufficiently in these

studies. This issue will be discussed in the following sections by considering strategic decision-making perspectives in portfolio management.

2.3.2 Strategic Decision-Making (T₂)

As mentioned previously, portfolio management involves complex decision-making processes. The previous models developed, however, disregard the role of the organisational decision process (Adams et al., 2006). Accordingly, the following section discuss the recent studies on portfolio management which involve a decision-making process perspective. Prior to that, this section provides an insight into the perspectives of strategic decision-making.

In his seminal study, Allison (1971) identified that strategic decision-making processes are constituted by *rational*, *political* and *organisational* elements. This framework was adopted either entirely or partly in a number of important studies by, for example, Mazzolini (1981), Fahey (1981), Schwenk (1988, 1989), Dean and Sharfman (1993), Rajagopalan et al. (1993), and Royer and Langley (2008).

The rational perspective is based on an *individual* or *micro perspective* (Rajagopalan et al., 1993) which pertains to a *psychological* approach (Rowe, 1989). It refers to *procedural rationality*, which is associated with the process of information search and analysis which uses *rational* or *logical behaviour* in selecting alternatives (March and Simon, 1963; Royer and Langley, 2008).

The political perspective refers to *socio-political processes*, which are “social interactions between people around organisational issues” (Royer and Langley, 2008, p. 251). The key assumption here is that organisations are a coalition of individuals from varying levels with conflicting interests (Eisenhardt and Zbaracki, 1992; Rowe, 1989). According to this perspective, decisions are thus viewed as the result of the process of making choices conducted by a coalition of decisions-makers who have different goals (Eisenhardt and Zbaracki, 1992).

Mazzolini (1981) argued that a strategic decision-making process should be viewed as an *organisational process* rather than an *individual process*, because organisations are not “monoliths behaving as unitary agents” but rather aggregations of sub-organisations which are loosely-knit and connected by already-settled on

procedures (p. 87). From this perspective, organisational processes result in strategic behaviour, which is the output of a set of processes and *routines*. In contrast, Rajagopalan et al. (1993) indicated that those strategic decision-making frameworks which solely employ an *organisational* or *macro perspective* have some shortcomings, as they ignore the role of the *individual* or *micro perspective* (based on *cognitive* factors) in the process.

The decision-making process is characterised by the level of *rationality* and degree of *political activity* present in the actors (Rajagopalan et al., 1993). Fahey (1981) and Thomas (1984) therefore suggested collectively involving both the rational and political dimensions when viewing the decision-making process. This is understandable, as neither individuals nor organisations really behave rationally (Mazzolini, 1981); in addition, political processes can critically impact on any stage of a decision-making process (Fahey, 1981).

Whereas Dean and Sharfman (1993) indicated that the rational and political elements evolve independently during the decision-making process, Royer and Langley (2008) deemed them to be interdependent. Moreover, Royer and Langley (2008) suggested that the organisational element, which is constituted by explicit or implicit rules (Zhou, 1997), or *organisational routines* (Royer and Langley, 2008), is one which probably shapes the dynamics of both the rational and political elements of the process. Royer and Langley's (2008) notion, however, is still based on conceptual studies rather empirical ones.

In summary, scholars have different views on how strategic decision-making processes are effectively conducted. Their views lead to three fundamental perspectives of the decision-making process: organisational, individual (rational) and political. However, empirical studies which investigate the extent to which each perspective influences the decision-making process is still not apparent.

2.3.3 Strategic Decision-Making in Innovation (T₃)

This theme is represented by just one article which discusses the key factors that managers considers when evaluating innovation projects (Moenaert et al. (2010)). This study identifies four key factors which it calls 'strategic market options criteria' and which are used to evaluate innovation projects: *business opportunity*, *feasibility*,

competitiveness and *leverage* (the expected possibility of positive spillover effects). It determines that managers consider business opportunity and feasibility to be the most important factors when selecting projects, whereas business opportunity and competitiveness factors which influence the success of innovation projects.

2.3.4 Portfolio Decision-Making (T4)

Portfolio management is a process which entails decisions regarding the updating and continuous revision of an active list of new product development projects. These decisions ultimately lead to the project selection and resource allocation decisions (Cooper et al., 2000; Lindstedt et al., 2008). Accordingly, exploring studies on how these decisions are made is needed. This section discusses the portfolio decision-making theme that covers a wide range of subjects, divided into three main parts: (1) key portfolio management decision types, (2) decision-making processes in portfolio management, and (3) the role of information in portfolio management.

2.3.4.1 Key Portfolio Management Decision Types

Decision-making processes are dynamic; throughout, the portfolio is dynamically restructured in response to new information, new market opportunities, new progress of preceding projects, or changes in available resources (Lindstedt et al., 2008). While new projects are evaluated, selected and prioritised, existing projects may be accelerated, terminated or postponed (Cooper et al., 1999; Goffin and Mitchell, 2010; Kester et al., 2011). As a consequence, resources need to be allocated, and re-allocated to ongoing projects (Cooper et al., 2001). These traits of portfolio management imply different but complementary decision-making situations which increase the complexity of the process. This section discusses three decision types identified in this review, faced when managing NPD portfolio projects: (1) *portfolio changes*, (2) *product portfolio complexity*, and (3) *inter-functional integration* (the linkage between the project and portfolio levels).

Firstly, situations caused by the uncertainty of the environment drive changes to customer needs, technologies (MacCormack and Verganti, 2003) and competitors' capabilities (Ali et al., 1993). These changes can lead to the acceleration, postponement or termination of NPD projects, implying a situation in which managers should make

portfolio change decisions (Steffens et al., 2007). What sort of decision is made will impact on a firm's technology roadmap, resource dependencies, and development of other products (Steffens et al., 2007), as a consequence of the interdependence among the NPD projects within a portfolio (Dickinson et al., 2001; Roberts, 1999).

Steffens et al. (2007) indicated that decisions made in responding to changes consider three criteria: *project efficiency*, *customer impact* and *project portfolio*, whereas *business success* and *preparing for the future* are considered less frequently. In their study, Steffens et al. (2007) identified that a structured and systematic approach is likely to be adopted by managers when making change decisions. In contrast, MacCormack and Verganti (2003) argued that systematic processes are less useful in such a situation; rather, a flexible approach based on an iterative process, which emphasises learning and adaptation, is more suitable.

The second decision-making situation is one of product portfolio complexity, a situation which arises from "... a multiplicity of, and relatedness among, product architectural design elements" (Closs et al., 2008, p. 591). In a different way, Martinsuo and Poskela (2011) considered that product portfolio complexity is created by "... the technical configuration of the product, its unfamiliarity to the firm and the market, and its requirements for the product development work" (p. 901). In addition, Martinsuo and Poskela (2011) argued that this notion is concerned with the complexity of the *product concept* and its *novelty* to the organisation. While these two definitions refer to somewhat different concepts, both point out that the complexity stems at the product level rather than the portfolio level. Despite originating at the product level, it affects the decision-making process at the portfolio level because, as will be shown in the next section, both levels are linked.

On the one hand, product portfolio complexity plays a role as mediator between external business environments and the firm's profitability (Closs et al., 2008), meaning it can enable a firm to gain earning in dynamic environments. On the other hand, complexity of its product portfolio compels a firm to deal with a large number of decisions made in various functional fields over prolonged time periods (Closs et al., 2008). This tension can be dealt with by means of a company's *management competencies*, which refers to three factors: (1) product/technology portfolio strategy;

(2) governance and organisational structure, and (3) design information and decision support systems (Closs et al., 2008).

Thirdly, whereas recent studies have suggested extending the analysis of NPD from the project level to the portfolio level, the inherence of intrinsic links between project and portfolio level resource allocation decision-making is recognised (Perks, 2007). These linkages are known as *inter-functional integration*, defined as “a high intensity of cross-functional linkages, whereby multiple departments work together towards common goals” (Perks, 2007, p. 154). Perks’ (2007) study at a steel manufacturing company demonstrated evidence that inter-functional integration impacts on the portfolio decision-making process.

Perks (2007) pointed out two critical dimensions which explain this relationship: *functional domination* and *nature of dominant evaluation criteria*. Functional domination is the domination of single functions, playing a role as “functional champion”, which can cause bias and functional resentment. As a result, this leads to the exclusion of appropriate functional involvement in decision-making (Perks, 2007, p. 159). On the other hand, the nature of dominant evaluation criteria refers to the relationship between inter-functional behaviour and the nature of evaluation criteria in portfolio decision-making. Perks suggested that formal evaluation criteria, which promote multi-functional input, should be implemented, particularly when the new product portfolio includes radical projects. This report, however, does not provide findings on either the direction or the extent of the impacts on the portfolio performance.

2.3.4.2 Decision-Making Process in Portfolio Management

Portfolio management covers a pervasive process beyond simply portfolio selection which solely requires tough go/kill decisions at the *stage-gate* process; instead it involves an entire decision-making process (Cooper et al., 2000; Nagji and Tuff, 2012). This section looks at an important study conducted by Kester et al. (2011) which investigated decision-making from an integrative perspective. The point of the discussion is centred on Kester et al.’s (2011) general framework of portfolio decision-making in addition to one other perspective, i.e. the role of the manager’s personality traits (McNally et al., 2009).

Managing the NPD portfolio requires companies to make effective portfolio decisions; thus, understanding how these decisions are made is vital (Kester et al., 2011). Most NPD research, however, has focused only on decisions regarding individual projects (Cooper, 1984; Cooper and Kleinschmidt, 1995; Kester et al., 2011), whereas empirical research addressing the decision-making in relation to overall portfolio performance remains limited (Kester et al., 2011). A case study conducted by Kester et al. (2011) tried to fill this knowledge gap by investigating how decisions are made simultaneously across the full set of NPD projects in development. The result of the study was expressed in a general framework which is shown in Figure 2.3.

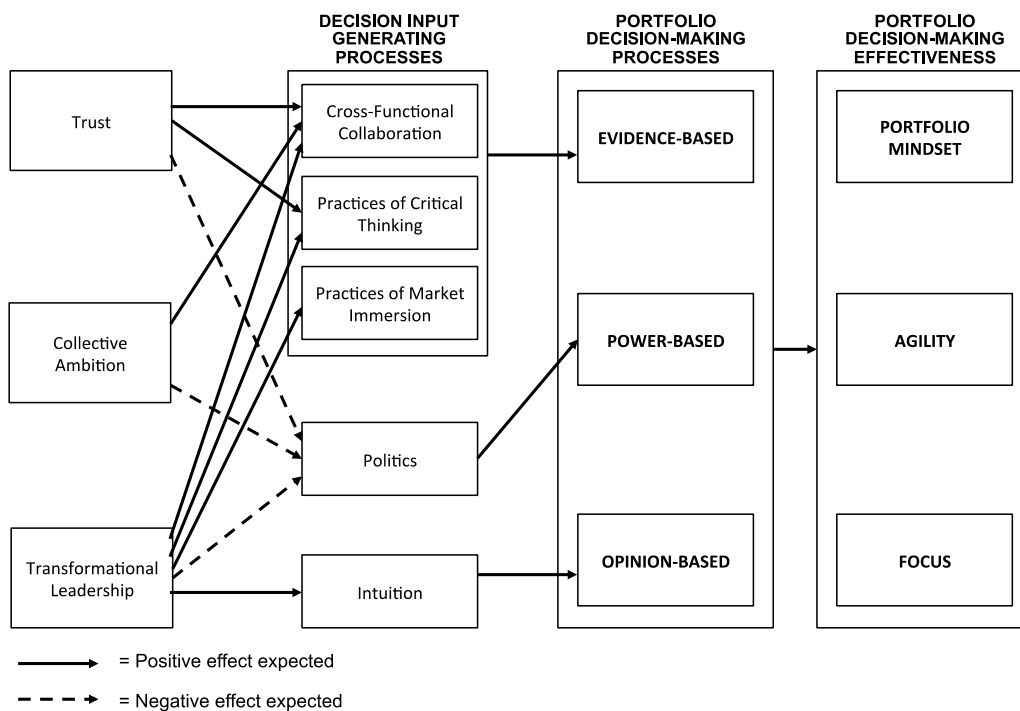


Figure 2.3: General Framework of Portfolio Decision Making

Source: Kester et al. (2011)

In this study, Kester et al. (2011) defined that the organisational objective is to produce effective decisions concerning the firm's NPD portfolio. The right-hand side of the framework shows that the output of the system is portfolio decision-making effectiveness, which resulted from the interaction between *evidence*, *power* and *opinion-based* processes. The portfolio decision-making effectiveness is measured along three

dimensions of organisational outcomes: the extent to which the decision-making system generates a *portfolio mindset*, enables decision-making agility, and creates focused development efforts.

Kester et al. (2011), further found that effective portfolio decision-making can be gained by having a portfolio mindset, referred to as “a complete understanding of all of the projects in the NPD portfolio and how each is aligned to the firm’s strategy” (p. 647). A portfolio mindset provides managers with an ability to know the exact position of each evolved project in the development pipeline, enabling them to immediately identify and sort out potential problems. Further, Kester et al. (2011) posited that while agility contributes to portfolio maximisation, and focus is associated with strategic alignment, a portfolio mindset facilitates firms in attaining all three objectives of portfolio management: strategic alignment, maximum portfolio value and a balanced portfolio.

In addition to decision-making effectiveness, managers’ dispositional traits also influence the achievement of the portfolio management objectives (McNally et al., 2009). McNally et al.’s (2009) study identified that *ambiguity tolerance* (an individual’s ability to accept the lack of information about the uncertain possibility of outcomes) is associated positively with strategic alignment; *analytic cognitive* (the way an individual undertakes “perceptual and intellectual activities”) is positively associated with portfolio balance; and *leadership style* (the degree to which leaders act democratically or autocratically) is associated positively with the amount of importance the managers give to each objective (p. 134). In contrast, these three types of disposition are not related to the objective of achieving maximum portfolio value.

Furthermore, the portfolio decision-making processes are considered to be constituted by the interaction between evidence, power and opinion-based processes, implying that Kester et al. (2011) viewed the processes from a rational perspective (involving evidence and opinion-based processes) (Rajagopalan et al., 1993; Schwenk, 1988, 1989) and a political perspective (power-based processes) (Schwenk, 1988, 1989); the organisational perspective appears to be excluded.

2.3.4.3 *The Role of Information in Portfolio Management*

Innovation scholars deem that the roles of information and communication are vital in determining the performance of innovation projects (Moenaert et al., 2010). Dean and Sharfman (1996) indicated that a manager who manages the information and applied analytical techniques in the decision-making process makes more effective decisions than those who do not. In addition, Cooper (2008) reiterated that effective portfolio management is enabled by the availability of high quality information. In real cases, however, comprehensive information is difficult to obtain. This lack of information brings uncertainty to decision makers concerning the future success of the products (Lindstedt et al., 2008). Many systems have been introduced to cope with managing information-related problems; three examples of these decision-making support systems are described in the following section.

Cooper (2008) asserted that in the *stage-gate* process, information is required to be gathered for comparing and ranking projects; in order to provide such information, Cooper et al. (2001) had suggested utilising *portfolio displays*, such as *bubble diagrams*, *pie charts* and *prioritised lists of projects* at the gate meetings to assist gatekeepers by having ready information about the entire portfolio rather than only individual projects.

The complexity of the decision-making process together with a large number of products evaluated has led to the necessity of employing information and decision-making support systems (Archer and Ghasemzadeh, 1999; Closs et al., 2008; Kester et al., 2011; Killen and Kjaer, 2012; Lindstedt et al., 2008). Killen and Kjaer (2012) also suggested using a *network mapping* approach for visualisation of NPD portfolio interdependencies. This system, while providing support for making strategic decisions, also functions as a communications tool. Furthermore, Lindstedt et al. (2008) proposed a system called *robust portfolio modelling* (RPM), a model that is able to evaluate products using several criteria. This system is particularly useful when dealing with portfolios which consist of a large number of products.

However, the study conducted by Bentzen et al. (2011) suggested a contrary view. This study was underpinned by the notion that in complex decision-making situations, the amount of attention paid, rather than deliberate analytical behaviour, determines the effectiveness of decision-making processes. It investigated the role of quality

information in attracting the attention of managers on different NPD projects. The results of the study show that quality of information cannot differentiate decision makers' attention among the projects, which is impacted rather by new projects entering the corporate portfolio. A regular evaluation of the allocation of managers' attention to different projects therefore has a substantial role rather than being merely one of providing information.

In summary, the strategic decision-making process is viewed from three perspectives: rational, organisational and political, while Kester et al. (2011) considered portfolio decision-making processes as the interaction between evidence, power and opinion-based processes, which are associated only with the rational (or cognitive) and political factors of decision-making. Furthermore, Kester et al.'s (2011) integrated framework has not involved discussion of portfolio changes, portfolio complexity and inter-functional integration as influential circumstances in the decision-making process.

2.3.5 Discussion of the Findings

In the literature reviewed, the proportion of articles addressing the topic of the decision-making process in portfolio management are the largest; however, Kester et al.'s (2011) article is the only one which reports the study of portfolio decision-making from an integrated perspective. Thus, to arrive at how strategic decision-making is conducted in NPD portfolio management, the discussion will centre on Kester et al.'s (2011) framework.

Kester et al.'s (2011) report appears to present the most comprehensive framework which incorporates the entire portfolio decision-making process. The main elements constituting Kester et al.'s (2011) framework are aligned with those of Rajagopalan et al.'s (1993) strategic decision-making process framework, i.e. *decision input generating process* represents *antecedent*; *portfolio decision-making process* represents *decision process*; and *portfolio decision-making effectiveness* is related to *outcomes*. It does not, however, clearly show the environmental factors (which are part of the antecedent factors). This limitation impedes the framework's recognition of the impact of environmental factors on decision-making effectiveness (Dean and Sharfman, 1996), not only at the strategic level, but also the tactical level (Lant and Hewlin, 2002).

In the portfolio management context particularly, the dynamic business environment is a driver of portfolio complexity (Closs et al., 2008) and of portfolio changes in the ongoing NPD projects (Steffens et al., 2007). In addition, Müller et al. (2008) showed that environmental factors moderate the relationship between portfolio control – portfolio selection, portfolio reporting and portfolio decision-making – and portfolio management performance. Excluding environmental factors in the NPD portfolio management framework is thus likely to diminish the comprehensiveness of the framework.

Individual (cognitive) perspectives in decision-making have received significant attention from scholars. Lant and Hewlin (2002) pointed out that NPD portfolio management involves group decisions that are associated with the cognition of the decision makers, rather than with factors such as organisational structure or implementation issues. McNally et al. (2009) specified this view by identifying that the analytic cognitive style of decision makers is related positively to the product portfolio balance. Further, Bentzen et al. (2011) asserted that the decision makers' attention determines the effectiveness of the decision-making process.

Christiansen and Varnes (2008), in contrast, suggested that portfolio management is shaped through *appropriate* decision-making processes, ones which involve self-awareness, recognition and search and recall processes rather than following normative rational approaches. They are built by different elements: among others are rules and formal systems (Christiansen and Varnes, 2008).

At the same time, Kester et al. (2011) looked at the portfolio decision-making process not only from a rational perspective, but also from a political perspective. An organisational perspective (Mazzolini, 1981; Schwenk, 1988, 1989), however, appears to have been disregarded; this views decisions as a result of standard operating procedures, in which the search for decisions follows specific patterns influenced by organisational routines (Schwenk, 1988, 1989). As a result, while Kester et al.'s (2011) framework has significantly enhanced the previous models, incorporating organisational perspectives and considering environmental factors in the framework has the potential to bring about a better understanding of the dynamics of the portfolio management process.

According to several authors, portfolio management involves two levels of decision: strategic portfolio decisions and tactical portfolio decisions (Cooper, 2005; Steffens et al., 2007). Strategic decisions relate to unstructured (Mintzberg et al., 1976; Schwenk, 1988), non-routine and complex situations (Fahey, 1981; Schwenk, 1988; Thomas, 1984), as opposed to tactical decisions that are structured, repetitive and less complex.

Changes in the product portfolio impact on both strategic and tactical decisions (Steffens et al., 2007). When changes take place, strategic decisions are made by the upper management with less systematic approaches, whereas tactical decisions are made by following a systematic change management process (Steffens et al., 2007). These findings corroborate the notion that a deliberately explicit analytical decision-making process gives the best results for simple problems, whereas complex problems take advantage of an *unconscious unstructured* decision-making process (Dijksterhuis, 2004; Dijksterhuis and van Olden, 2006). Accordingly, in investigating the NPD portfolio management process, employing *normative (analytical) approaches* and *judgemental approaches* together is suggested to gain a more transparent phenomenon (Lindstedt et al., 2008; Moenaert et al., 2010).

2.3.6 Conclusions

Among the limited number of articles addressing the topic of the strategic decision-making process in portfolio management, only one article by Kester et al. (2011) specifically reports the study of portfolio decision-making from an integrated perspective. This study proposes a general framework of portfolio decision-making.

The strategic decision-making process in NPD portfolio management involves three interrelated factors: rational, organisational and political. While rational and political factors are manifested in Kester et al.'s (2011) framework, the organisational factor is not clearly identified.

Environmental dynamics lead to circumstances in which managers need to deal with various decision types; this review identified portfolio changes and portfolio complexity. In the existing integrated framework, these environmental factors appear not to have been considered explicitly.

There are two levels of decision-making in portfolio management, i.e. tactical and strategic. These decisions are made by involving two approaches: systematic (analytical) approaches for tactical decisions and unconscious unstructured approaches for strategic decisions.

2.4 PORTFOLIO MANAGEMENT AND STRATEGY PROCESS

As mentioned earlier, decisions concerning NPD portfolio management should be aligned with the company's strategy. This implies that there should be links between the NPD portfolio management process and the company's strategy. The issues concerned with how NPD portfolio management link to the strategy process are addressed in three literature themes⁷: Strategy Process (T₅), Strategic Decision-Making and Strategy Process (T₆), and Front-End NPD and Strategy (T₇). In this section, each theme will be discussed in detail, and the relationship between these themes will be shown in the Subject Relevance Tree in Appendix A.4.2.

2.4.1 Strategy Process (T₅)

The strategy process theme comprises two theoretical articles by Hutzschenreuter and Kleindienst (2006) and Johnson et al. (2003). The former reported a literature review, while the latter presented a conceptual article. Hutzschenreuter and Kleindienst (2006) proposed an integrative framework that maps the extant streams of studies in on the strategy process. In addition, it suggests the research opportunities within each stream.

In their article, Johnson et al. (2003) discussed that despite the fact that process perspectives are regarded to have revealed "the black box of organisations", they still leave some limitations (p. 10). From the limitations they identified, those most closely related to the systematic review questions⁸ are that firstly, process perspectives disregard the role of managerial agency (Pettigrew, 1985). Secondly, the process paradigm has been more prescriptive, focusing merely on the design of strategic change or decision-making process and ignoring the day-to-day activities of managers. The third limitation is caused by its detachment from strategy content, leading to the fourth

⁷ The literature themes refer to the systematic literature framework exhibited in Appendix A.

⁸ How does the portfolio management process relate to organisational routines? (See Appendix A. Systematic Literature Review)

limitation that it lacks explicit connections to strategy outcomes. Johnson et al. (2003) thus suggested advancing understanding further to take an *activity-based (micro strategy)* view. This view is concerned with the detailed process and practices which constitute the day-to-day activities of an organisation and which relate to strategic outcomes.

To sum up, the strategy process perspective bears a number of limitations. It fails to regard the role of managers in the process, tends to be prescriptive rather than descriptive, and ignores day-to-day activities while detaching them from strategy content and outcomes. To enhance the understanding of strategy, an *activity-based* view of strategy that centres on the detailed process is proposed.

2.4.2 Strategic Decision-Making and Strategy Process (T6)

Strategy process is the way in which strategies emerge and evolve (de Wit and Meyer, 2004), aiming at achieving and maintaining a firm's strategic position (Chakravarthy and Doz, 1992). This section views the strategy process from the perspective of the decision-making process.

Chakravarthy and White (2002) stated that strategy process is a decision-making process, and that the decisions made are not single or discrete decisions but a stream of decisions and actions with specific patterns (Chakravarthy and White, 2002; Mintzberg and McHugh, 1985). These decisions evolve over long periods of time and cross multiple levels, bridging three different decision-making processes: the cognitive process of individual decision makers, the organisational rules and routines (as part of an organisational process) and political processes within groups or individuals (Chakravarthy and White, 2002). These patterns of decisions are the core element of the strategy process (Chakravarthy and White, 2002; Noda and Bower, 1996), which are attributable to changes in the organisational and environmental context.

In their study of two large telecommunication companies, Noda and Bower (1996) identified "*intra organisational dynamics*" by which managers at multiple levels relate to external and internal forces and deal with the cognitive, political and organisational impacts of their actions (p. 188).

In summary, the strategy process is concerned with decision-making processes that involve interaction between cognitive, organisational and political processes, resulting in a stream of decisions with a specific pattern.

2.4.3 Front-End NPD and Strategy (T7)

Poskela (2007) conducted research focused on the integration of *strategic level* and *operative level* innovation processes in the front-end phase. Figure 2.4 shows the conceptual framework of the linkages between strategic and operative level innovation activities. Each level of process is constituted by three sequential activities: *exploration* (what should be done), *execution* (how it should be done) and *exploitation* (how to take advantage of previous activities) (Poskela, 2007, p. 434).

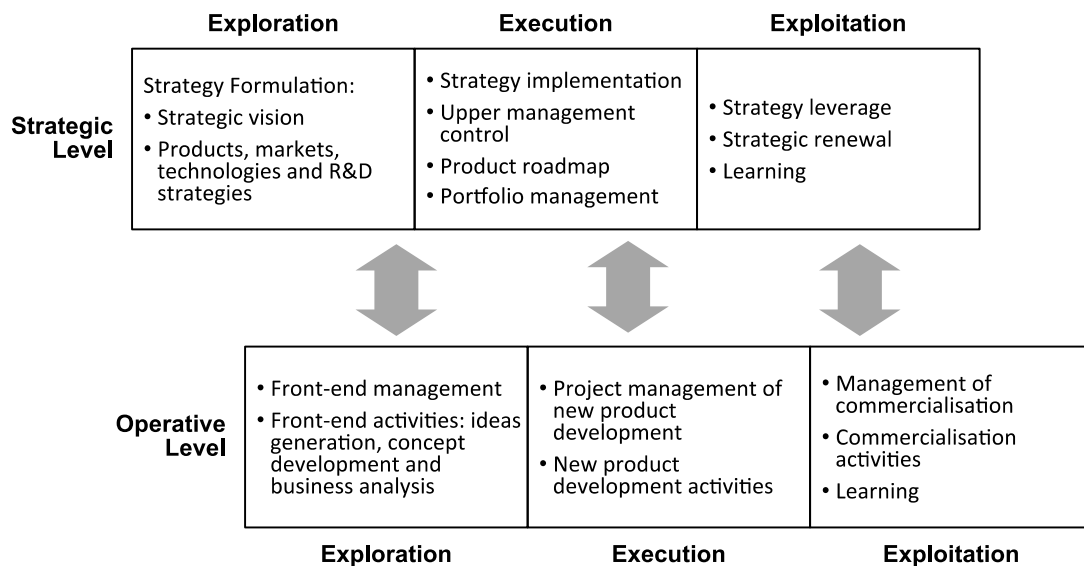


Figure 2.4: Integration of Strategic and Operative Level Innovation Activities

Source: Poskela (2007)

Poskela (2007) suggested that the integration of the strategic and operative levels necessitates both top-down and bottom-up processing. From the top-level management's point of view, Poskela (2007) extracted three factors that influence the effectiveness of the integration of the strategic level and operative level front-ends: (1) the level of concreteness of business strategies; (2) the emphasis on business-minded decision-making, and (3) the balance between control and creativity.

In summary, the linkages between strategic and operative level activities are apparent, and the effectiveness of the integration requires both top-down and bottom-up processing.

2.4.4 Discussion of the Findings

The literature reviewed presents only vague information concerning the link between NPD portfolio management and the strategy process. Poskela's (2007) framework, which aims to demonstrate the integration process in the front-end phase of the innovation process, is the only concept which can be adopted to understand the link between the two. The following discussion therefore uses this framework as its basis.

Linking business strategy and product innovation strategy with the NPD portfolio management process (Cooper, 2005) is essential to ensure that the new products developed fit the business strategy (Cooper and Edgett, 2010). In NPD portfolio management, companies deal with decision-making processes that produce strategic portfolio decisions and tactical portfolio decisions (Cooper, 2005). While the former determine where the firm should spend their NPD resources (people and funds), the latter, which follow from the strategic decisions, focus on individual projects in terms of the selection and prioritisation of projects and allocation of the resources required (Cooper, 2005).

In order to portray these interactions, Poskela's (2007) framework addressing the integration of strategic and operative level was modified (see Figure 2.5). This modified framework shows that the process elements in NPD portfolio management, represented in the Conceptual Framework of NPD Portfolio Management (Figure 2.1), can be categorised accordingly. As shown in the area within the dashed line, business strategy and product innovation strategy formulation are considered as *strategic level* activities in the *exploration* stage, while ideas generation and new product concepts development are regarded as *operative level* activities in the *exploration stage*. Furthermore, strategic portfolio decision-making processes can be classified as *strategic level* activities in the *execution* stage, whereas tactical portfolio decision-making processes can be categorised as *operative level* activities in the *execution* stage.

Poskela's (2007) initial framework has distinguished between *exploration* activities, representing *strategy content* formulation, and *execution* activities, which are

contained in the *strategy process* part. This feature eliminates the shortcomings pointed out by Johnson et al. (2003) regarding the detachment between strategy process and strategy content. However, Poskela's (2007) initial framework does not show the links between activities within one level – exploration, execution and exploitation. In the modified framework (Figure 2.5), the interactions between these three activities are in place. These interactions in the strategic and operative level are parts of the phenomenon of interest for this review.

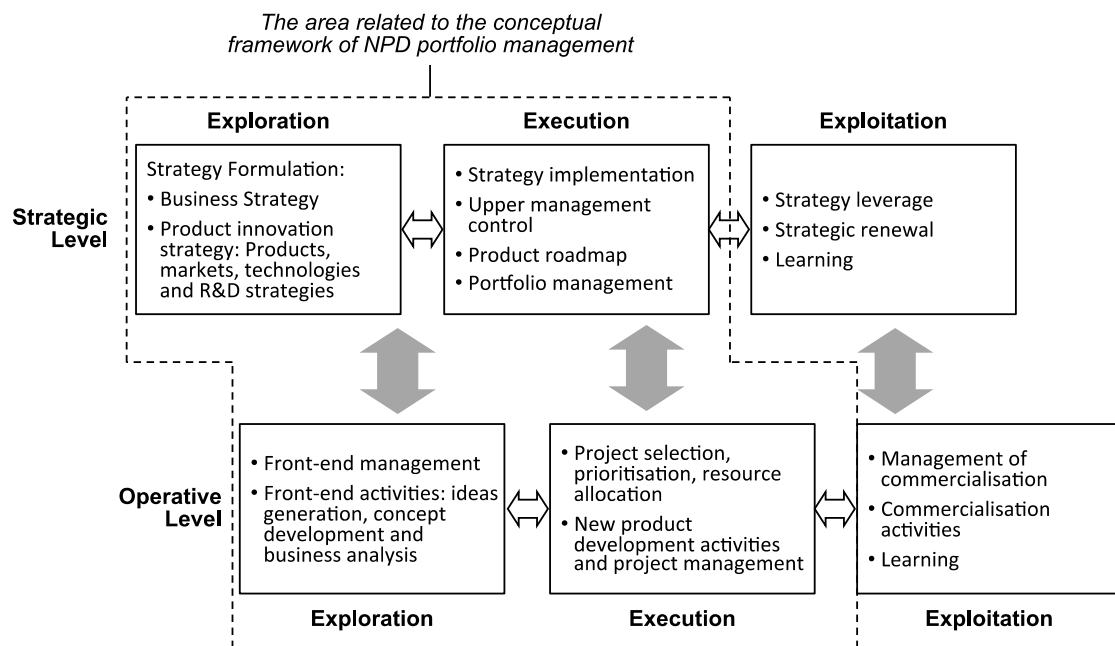


Figure 2.5: Linkages of Strategic and Operative Level in NPD Projects

Adapted from Poskela (2007)

From a strategy process perspective, Chakravarthy and Doz (1992) suggested that the utilisation of the right decision process and *administrative systems* (organisational structure, planning, control, incentives, human resource management and value systems) enables firms to achieve and maintain their strategic position. In line with this, in the context of NPD portfolio management, Poskela (2007) argued that successful portfolio management is indicated by *decision-making structures* that support realisation and management for both top-down and bottom-up project activities.

2.4.5 Conclusions

Synthesis of the findings fails to reveal how the NPD portfolio management links with the strategy process. This issue is not addressed in any of the literature reviewed, except for Poskela's (2007) article which can be considered as only subtly pertaining to the issue.

Poskela's (2007) article is regarded as the key article; nevertheless it has some limitations. Firstly, the study only investigated the integration of strategic and operative level activities in the front-end stage. Secondly, whereas it indicated the factors which influence the effectiveness of the integration, the study did not identify any formal mechanisms by which the linkages are formed and maintained. Finally, the study has not paid attention to the interaction between exploration, execution and exploitation activities.

2.5 INSIGHTS ACROSS THE LITERATURE

Analysis of the key findings of the literature review leads to some important notions. Firstly, studying portfolio management from the decision-making perspective is closely elucidated by the literature, i.e. in Kester et al.'s (2011) article, whereas studies investigating the link between portfolio management and the strategy process are sporadic and vague. Kester et al. (2011) identified two factors involved in the portfolio decision-making process – rational and political – but does not consider the organisational factor. Environmental factors which lead to portfolio changes have also not been included in the analysis.

Secondly, the issue of how NPD portfolio management links with the strategy process has not been clearly covered in the literature. Nevertheless, there is an important insight gained in the discussions, which is that the links between strategic and operative levels in the new product development activities are in place. However, the literature ((Poskela, 2007)) does not specifically suggest formal mechanisms for forming and maintaining these links. In addition, the links between exploration, execution and exploitation activities remain overlooked.

These notions lead to the insights that the organisational factor of the decision-making process which establishes the links between strategic and operative levels, and between exploration, execution and exploitation activities, is still overlooked.

2.6 SUMMARY

This chapter has presented the literature review of new product portfolio management and its relationship to strategic decision-making and the strategy process. It has shown that:

- NPD requires a formal process to enable the NPD project to achieve its performance goals.
- NPD portfolio management involves the decisions of selecting or terminating and delaying or continuing (accelerating) projects. These are constituted by two levels of decision-making: strategic portfolio decisions and tactical portfolio decisions.
- Strategic decision-making process in NPD portfolio management involves three interrelated factors: rational, organisational and political factors. Kester et al.'s (2011) article is considered the key article in this area; however, while their framework manifests rational and political factors, the organisational factor is not clearly identified.
- There are two decision-making levels in portfolio management, i.e. tactical and strategic. These decisions are made by involving two approaches: systematic and analytical approaches for the former and unconscious unstructured approaches for the latter.
- The synthesis of the findings fails to reveal how the NPD portfolio management links with the strategy process. Although Poskela's (2007) article is regarded as key, the study only investigated the integration of strategic and operative level activities in the front-end stage. It indeed indicated the factors that influence the effectiveness of the integration; however, the study did not propose formal mechanisms of how the linkages are formed and maintained. Furthermore, the study did not give any attention to the interaction between exploration, execution and exploitation activities.

CHAPTER 3 ORGANISATIONAL ROUTINES

3.1 INTRODUCTION

This chapter presents a systematic literature review (SLR)⁹ examining the role of organisational routines in portfolio management. The chapter firstly discusses an overview of organisational routines and then explores the relationships between portfolio management and organisational routines. The chapter closes with a summary.

3.2 ORGANISATIONAL ROUTINES

The evolutionary perspective considers the course of action taken by an organisation when implementing strategy as one that is more emergent, in which its decision-making processes are driven by the development of the surrounding environment. Nevertheless, decision-making within the strategy process can at the same time be institutionalised by establishing *organisational routines* (Chakravarthy and White, 2002). Organisational routines thus have an important role in conducting an organisational decision-making process.

Routines are regarded as central to the analysis of organisational and economic change (Nelson and Winter, 1982). They are referred to as “all regular and predictable behavioural patterns of firm” (Nelson and Winter, 1982, p. 14). In a similar way, Dosi et al. (2000, p. 4) defined routines as “units or ‘chunks’ of organised activity with a repetitive character”. To elaborate what routines are, it is important to describe their meaning, internal structure, roles in organisations, and capacity as the source of change.

3.2.1 Definition of Routines

Three definitions of organisational routines can be found in the literature: (1) *behaviour patterns (recurrent interaction pattern)*; (2) *rules (standard operating procedures, heuristics, etc.)*, and (3) *dispositions* (Becker and Zirpoli, 2008). Becker (2004) in particular pointed out that ‘recurrent interaction patterns’ refers to collective recurrent

⁹ The systematic literature review framework is exhibited in Appendix A.

activity patterns. This implies that routines link *structure* and *action*, or an organisation and the process (Pentland and Rueter, 1994).

More specifically, Feldman and Pentland (2003) articulated routines as being “an essential aspect of organised work” (p.48), which shows “repetition, a recognisable patterns of action, multiple participants and interdependent actions” (p.103). For example, routines can include activities which range from well-specified technical routines for producing things, to policies, such as investment, research and development (R&D), and business strategies for product diversification (Nelson and Winter, 2002).

Furthermore, theorists have argued that organisational routines are generative, dynamics systems, not static objects (Feldman and Pentland, 2003; Pentland and Feldman, 2005; Pentland and Rueter, 1994). Routines are continuously emerging systems with internal structures and dynamics (Pentland and Feldman, 2005). The internal structure of a routine can produce a wide range of different outcomes on the continuum between ‘very stable’ and ‘constantly changing’, depending on circumstances (Pentland and Feldman, 2005)

3.2.2 Internal Structure of Routines

Routines can be characterised as one of two aspects. The *ostensive* aspect refers to the “abstract patterns that participants use to guide, account for and refer to specific performances of routine” (Pentland and Feldman, 2005, p. 795). They are “embodied understandings that are communicated in a narrative form” (Pentland and Feldman, 2008b, p. 286). Routines can also be represented by the *performative* aspect, i.e. the “actual performances by specific people at specific times, in specific places” (Pentland and Feldman, 2005, p. 795). This aspect points out the concrete and specific performances of the routine (Pentland and Feldman, 2007).

These performances are connected one to another through their relationship to the narrative, that is the ostensive aspect of the routine (Feldman and Pentland, 2005). This view is consistent with that articulated by Czarniawska (1997) who argued, “conversation in particular, and human actions, in general, are enacted narratives” (p.13). Organisational routines are thus a particular form of enacted narrative.

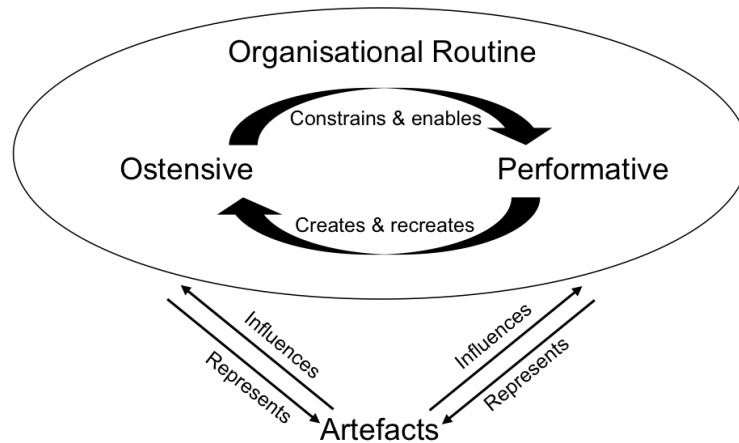


Figure 3.1: Key Elements of Organisational Routines

Source: Pentland and Feldman (2008a)

As shown in Figure 3.1, these two aspects are *mutually constitutive*, denoting that the ostensive aspect not only guides performances, it is also generated from those performances (Pentland and Feldman, 2005). *Structuration theory* proposes that structure is created and recreated through the actions taken by agents; meanwhile, the actions taken are constrained and enabled by structure (Giddens, 1984). This theory can be applied to explain the recursive relationship between ostensive and performative aspects, in that the performances create and recreate the ostensive aspect and the ostensive aspect constrains and enables the performances (Feldman and Pentland, 2003).

The ostensive and performative aspects of an organisational routine can be codified, enabled and constrained by so-called *artefacts* (see Figure 3.1) (Pentland and Feldman, 2005). Artefacts are the representation of the cognitive structures of individuals, such as scripts (written rules and procedures) as well as the physical and social structures of the organisation, such as factory and office (Pentland and Feldman, 2005; Pentland and Rueter, 1994). Artefacts such as rules and written procedures can represent the ostensive aspect of a routine, whereas artefacts such as a work logbook and database can be regarded as the archival trace of the performative aspects (Pentland and Feldman, 2005; Pentland and Rueter, 1994).

Artefacts may represent either the ostensive aspects or the performative aspects of a routine, or simply influence either the ostensive aspects or the performative aspects

(Pentland and Feldman, 2008a). These authors argued, however, that the influence role does not necessarily change the overall pattern. For instance, in a budgeting routine, filling out forms, which is considered a new action, does not necessarily lead to collaborative decisions which form new patterns of the routine (Feldman, 2003).

3.2.3 Role of Routines

Becker (2004) pointed out that routines contribute to an organisation by providing four features. Firstly, routines enable *coordination*, which is sourced from the capacity to support a high level of simultaneity; providing regularity and unity; making many simultaneous activities mutually consistent; providing each actor with knowledge of the behaviour of the others; providing instructions in the form of programmes; and establishing a *truce* for reducing conflict among participants, all of which lead to getting the work done (Feldman and Pentland, 2003).

Secondly, routines provide some degree of *stability* of behaviour. This feature refers to the notion that the behaviour of others can be constructed (Becker, 2004). Thirdly, routines enable *economising on limited cognitive resources*. As these resources are limited, they are usually dedicated to non-routine events, whereas repetitive events are handled semi-consciously (Becker, 2004; Simon, 1976). This semi-conscious processing of repetitive events involves less cognitive resources, as routines help in reducing options and guiding the search for a solution (Becker, 2004).

Fourthly, routines *bind knowledge*. Nelson and Winter (1982, p. 99) stated “that the routinisation of activity in an organization constitutes the most important form of storage of the organization’s specific operational knowledge”. The knowledge stored may represent some intelligent form in which organisations accumulate the history of their experience (Shapira, 1994). Teece and Pisano (1994) and Feldman and Pentland (2003), therefore, suggested that organisational knowledge resides as routines. As a knowledge repository, routines also store tacit knowledge. This differentiates routines from other forms of knowledge repositories, such as databases and documents (Becker, 2004).

3.2.4 Routines as a Source of Change

Many authors have asserted that routines are considered to be sources of stability and unchanging patterns of action (Feldman and Pentland, 2003). On the other hand, they are regarded as an important source of flexibility and change (Feldman and Pentland, 2003; Nelson and Winter, 1982). Feldman (2000, p. 626), therefore, suggested that “routines are not inert, but are as full of life as other aspects of organizations”.

Change in organisational routines can be viewed as an *exogenous change*, that is, change imposed from the outside of routines, by managers or by the environment (Feldman and Pentland, 2008). A manager who has control over a routine can make decisions to change it in order to achieve specific goals (Feldman and Pentland, 2008). From the environmental side, market changes or new technologies are the environmental forces which enable the driving of change (Tushman and Romanelli, 1985).

In contrast, interactions between ostensive and performative aspects provide a concept of change which comes from within organisational routines. This change is a result of engagement in the routine itself, referred to by several authors as *endogenous change* (Feldman, 2000; Feldman and Pentland, 2003; Feldman and Pentland, 2008). From the perspective of the model of *variation* and *selective retention* (Campbell, 1965 cited in Feldman and Pentland, 2003), performances are variations which are selectively retained in the ostensive aspect of the routine (Feldman and Pentland, 2003). This variation and selective retention framework leads to a view that a routine has an inherent endogenous capacity to create and retain novel patterns of action (Feldman and Pentland, 2003).

According to Feldman and Pentland (Feldman and Pentland, 2008), routines are built and reinforced by connecting parts, with these connections enabling routines to ‘gain or lose strength, stability and legitimacy’ (Feldman and Pentland, 2008, p.306).

From the actor network theory (ANT)¹⁰ perspective, change in organisational routines can occur if there is change in the connection between *actants*¹¹.

3.2.5 Conclusions

Organisational routines can be regarded as: (1) behaviour patterns (recurrent interaction pattern); (2) rules (standard operating procedures, heuristics, etc.); (3) dispositions. This implies that routines link *structure* and *action* or an organisation and the process. There are four main roles of routines: coordinating; stabilising behaviour; economising on limited cognitive resources; and binding knowledge.

The structure of a routine consists of two aspects: ostensive and performative, which are mutually constitutive. The ostensive and performative aspects of an organisational routine can be codified, enabled and constrained by the so-called artefacts.

Routines are regarded as an important source of flexibility and change in an organisation. Change in organisational routines can be viewed as exogenous or endogenous. Actor network theory views that change in organisational routines can be caused by the change in the connections.

3.2.5.1 Critique

There are a number of issues which emerge when considering organisational routines from a portfolio management perspective. Firstly, there is as yet no literature which addresses the relationships between organisational routines and NPD portfolio management. It is thus unclear whether NPD portfolio management involves organisational routines in its processes.

Secondly, the NPD portfolio decision-making process results in the portfolio performance, which ultimately impacts on the company's performance. However, the discussion in the literature makes no mention of the role of routines in affecting an

¹⁰ Actor network theory (ANT) is associated with the 'sociology of translation' (Law, 1992, p.380). 'Translation' in here is referred to as "a way of understanding how the use of ideas and objects change as they move from one context to another" (Pentland and Feldman, 2007) p.786). ANT focuses the attention on movement (Latour, 1999).

¹¹ Actants can include human and nonhuman-machine or symbolic references to abstractions-actors (Pentland and Feldman, 2005, 2007).

organisation's performance. Accordingly, it is still unclear what the roles of routines in NPD portfolio management are and what relationships exist between them.

3.3 ORGANISATIONAL ROUTINES AND NPD PORTFOLIO MANAGEMENT

The issues concerning how NPD portfolio management relates to organisational routines are addressed in five literature themes¹²: Organisational Capabilities (T₈), Agency (T₉), Behavioural Operations (T₁₀), Organisational Routines (T₁₁) and Portfolio Management and Capabilities (T₁₂). In this section, each theme is discussed in detail, and the relationship between them presented in the Subject Relevance Tree in Appendix A.4.3.

3.3.1 Organisational Capabilities (T₈)

Organisational capabilities are referred to as “the know-how that enables organisations to perform ... and extend [their] characteristics output actions—particularly, the creation of a tangible product or the provision of a service, and the development of new products and services” (Dosi et al., 2000, p. 1). In other words, they enable an organisation to realise its purpose into the significant outcomes (Dosi et al., 2000).

Capabilities are systematically shaped by *mindful ordinary acts* carried out by individuals both in development and deployment (Dosi et al., 2000; Salvato, 2009), and develop as a result of everyday, mundane activities (Salvato, 2009). These micro and ordinary activities carried out within and around organisations and at all levels in the organisational hierarchy determine the idiosyncratic content of capabilities and their dynamic adaptation over time (Salvato, 2009).

To sum up, organisational capabilities enable an organisation to realise its purpose into outcomes. These capabilities are shaped by mindful ordinary acts carried out by individuals as part of everyday, mundane activities.

¹² The literature themes refer to the systematic literature review framework presented in Appendix A.

3.3.2 Agency (T₉)

The agency theme is represented only by Emirbayer and Mische's (1998) theoretical article. While the term 'agency' remains elusive, Emirbayer and Mische (1998) defined it as "the temporally constructed engagement by actors of different structural environments – the temporal-relational contexts of action – which, through the interplay of habit, imagination, and judgment, both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations" (p. 970).

This definition implies that human agency encompasses three constitutive elements: iteration, projectivity, and practical evaluation, which relate to the different temporal orientations of agency (Emirbayer and Mische, 1998). This can be examined through the forms of action that are more oriented toward the past, the future and the present.

3.3.3 Behavioural Operations (T₁₀)

The behavioural operations theme was found only in Gino and Pisano's (2008) theoretical article. They defined behavioural operations as "the study of human behavior and cognition and their impacts on operating systems and processes" (Gino and Pisano, 2008, p. 679). In their study, (Gino and Pisano, 2008) explored the theoretical and implications of incorporating behavioural and cognitive factors into operations management models.

This approach identifies the underlying drivers of operating system performance, enabling a better understanding of "puzzling pathologies" (e.g. excess inventory, late product development projects, over-commitment to R&D projects, etc.) and a better identification of appropriate management interventions (Gino and Pisano, 2008, p. 688). Through the behavioural perspective, the source of problems in an operations management setting can be linked to systematic errors in managers' judgement and decisions. For example, in portfolio management, Gino and Pisano (2008) indicated that the inability of project managers to use a consistent judgment strategy causes suboptimal and inconsistent selection decisions regarding the projects in the portfolio.

3.3.4 Organisational Routines (T₁₁)

There are an adequate number of articles exploring the subjects related to organisational routines with different foci of analysis. In discussing them, this section is divided into two parts: Changes in Routines, and Routines and Organisational Capabilities.

3.3.4.1 *Changes in Routines*

Teece et al. (1997) viewed dynamic capabilities as being characterised by *path dependent processes*, in which a firm's previous "investment and 'repertoire' of routines" restrict its future behaviour (p. 522-523). Many scholars have nevertheless elaborated dynamic capabilities theory further in order to present a more complete picture of how dynamic capabilities and their underlying routines can be path creating rather than path dependent (Peters and O'Connor, 2012).

While routines which underpin dynamic capabilities are considered sources of stability and unchanging patterns of action (Feldman and Pentland, 2003), they can also be an important source of flexibility and change (Feldman and Pentland, 2003; Nelson and Winter, 1982). Peters and O'Connor (2012) specified that routines can be either static or transformational. Static routines emerge from the elaboration of structures, positions and strategies (Zollo and Winter, 2002). These types of routines are able to reduce variety in the organisation and ensure predictability and stability of process outcomes (Peters and O'Connor, 2012). Transformational routines, in contrast, emerge from changes to these attributes (Amburgey et al., 1993, cited in Peters & O'Connor, 2012).

This duality creates tensions between the need to establish consistency and to respond to change (Turner and Rindova, 2012). In such situations, organisations need to simultaneously set up and maintain two *ostensive patterns*: one of addressed consistency and another of flexibility in internal coordination.

From the perspective of routines as practice, stability and change are relational and *mutually constitutive*, meaning that change may foster stability, but that on the other hand, stability may create change (Feldman and Orlikowski, 2011). In relation to this, Turner and Rindova (2012) suggested that dual ostensive patterns can be maintained by exercising *artefacts* – the representation of the cognitive structures of individuals (Pentland and Feldman, 2005; Pentland and Rueter, 1994) – and connections both in

processes which standardise and stabilise behaviours, and in processes which facilitate flexible and mindful responses. Artefacts function in order to standardise routine actions and reorganise routines under conditions of change. Meanwhile, connections are used for coalescing routines into well-understood and accepted patterns of interdependent action and for reconstituting routines which then will be leveraged to form new agreements about the redesigned action sequences (Turner and Rindova, 2012).

Routines are established simultaneously with other structures, including technological, coordination and cultural structures which create overlapping artefacts and social expectation (Howard-Grenville, 2005). Changes in routines which are embedded in other structures are enabled by the role of *agency*, as temporally constructed engagement by *actors* of different structural environments (Emirbayer and Mische, 1998; Howard-Grenville, 2005). Actors with more power and command over resources possess greater chances of changing embedded routines over time (Howard-Grenville, 2005). This implies that managerial intervention plays a role in changing routines (Gino and Pisano, 2008; Salvato, 2009).

3.3.4.2 Routines and Organisational Capabilities

Routines and organisational capabilities represent “regularities in organisational behaviours, cognitions and performances” (Salvato and Rerup, 2011, p. 472). They are closely related, where capabilities involve organised activities which consist of routines with a repetitive character. Thus, it can be noted that “routines are the building blocks of capabilities” (Dosi et al., 2000, p. 4). This section discusses the conceptual structure of entities which build organisational capabilities.

A theoretical article by Salvato and Rerup (2011) breaks down organisational routines and capabilities into parts and maps their interrelationships, resulting in a synthesis of the knowledge of organisational routines and capabilities between multilevel entities, shown in Figure 3.2. This framework is formed by three constructs: organisational routines and capabilities as the central concept; higher-level constructs constituted by dynamic capabilities and firm strategies, and lower-level constructs, encapsulating individual skills, habits and managerial competencies.

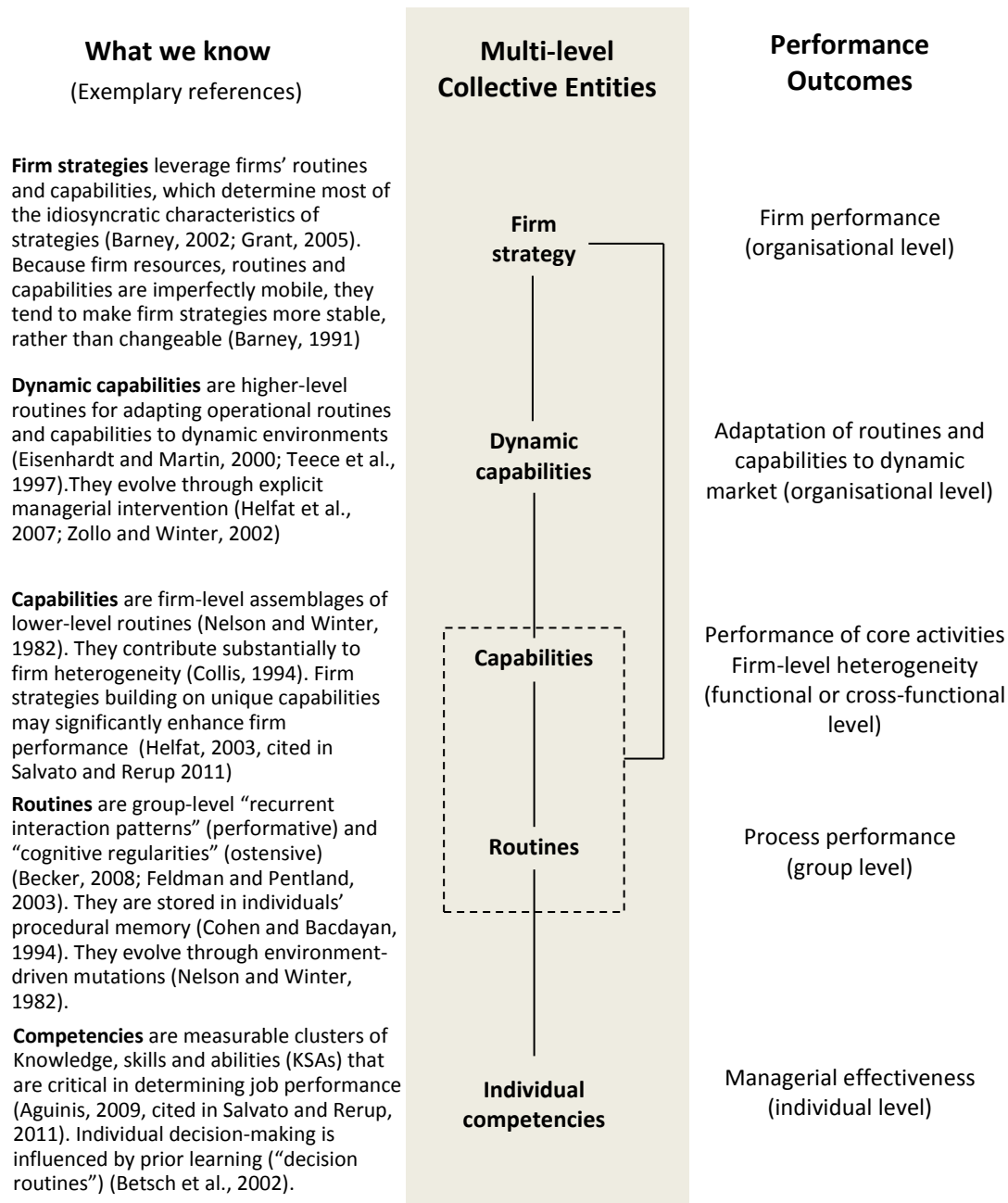


Figure 3.2: Multilevel Entities of Organisational Capabilities

Source: Salvato and Rerup (2011)

Salvato and Rerup’s (2011) framework shows that organisational routines are regarded as group-level entities, which generate process performance. They are considered to be stored in individuals’ *procedural memory* (Cohen and Bacdayan, 1994). Meanwhile, organisational capabilities are functional-level/cross-functional-level entities, resulting in the performance of core activities.

A collection of routines is considered as a *high-level routine* that represents organisational capability (Winter, 2000). Thus, Dosi et al. (2000) and Eisenhardt and Martin (2000) asserted that routines can be viewed as the building blocks of a firm's *dynamic capabilities*.

In the higher level, dynamic capabilities and firm strategies are considered as organisational level entities. Dynamic capabilities can be regarded as “the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (Teece et al., 1997, p. 516). The outcomes of dynamic capabilities are adaptations of routines and capabilities to dynamic markets. Among others, systematic processes for strategic decision-making and resource allocation are examples of dynamic capabilities (Eisenhardt and Martin, 2000).

In the lower-level, individual competencies represent individual level entities, which perform micro and ordinary activities within and around the organisation and at all levels in the organisational hierarchy (Salvato, 2009). These activities are the main determinants of the idiosyncratic content of capabilities and their dynamic adaptation over time (Salvato, 2009).

To sum up, routines are considered as sources of stability action as well as a source of flexibility and change. In other words, routines can be either static or transformational. Stability and change are relational and mutually constitutive, which can be enabled by exercising artefacts and connections. Furthermore, routines are building blocks of capabilities, and, in the organisational level, constituted dynamic capabilities.

3.3.5 Portfolio Management and Capabilities (T₁₂)

The portfolio management and capabilities theme was found to be addressed only by Killen et al.'s (2012) theoretical article. This indicated that the application of the dynamic capabilities concept in the context of portfolio management research had only recently started. Killen et al. (2012) suggested that dynamic capabilities theory aligns with the learning and change aspects of portfolio management process; in addition, it outlines mechanisms through which portfolio management can contribute to competitive advantage.

The application of the *processes, positions* and *path* framework (Teece et al., 1997) has made it clear that the ongoing evolution of portfolio management capabilities is part of the functioning of dynamic capabilities. These capabilities must change and evolve in response to the environmental dynamics (Eisenhardt and Martin, 2000; Teece et al., 1997). Finally, Killen et al. (2012) suggested that tracking *capability initiation* and *evolution, learning* and *change* are beneficial for the study of portfolio management as dynamic capabilities.

3.3.6 Discussion of the Findings

The literature reviewed contains little explicit information related to the issues concerning the relationship between portfolio management and organisation routines. This section discusses the connections between the key findings which are underpinned by Salvato and Rerup's (2011) framework of multilevel entities of organisational capabilities. Further, Killen et al.'s (2012) findings lead the discussion to the main ideas.

As stated in the previous section, NPD portfolio management entails resource allocation decision-making processes carried throughout the strategic and operative levels of an organisation (Figure 2.1). On the other hand, Salvato and Rerup's (2011) framework (Figure 3.2) deals with the levels in the organisation rather than the levels of activity. Nevertheless, the correlation between these levels seems to be apparent, i.e. that organisation level entities are concerned with strategic level activities, and functional or cross-functional and group levels entities are concerned with operative level activities. It thus appears that the NPD portfolio management process is exercised across different entities in organisational capabilities: routines in the group level, capabilities in the functional or cross-functional level, and dynamic capabilities in the organisational level.

In the literature reviewed, the theoretical article by Killen et al. (2012) is the only article that explicitly discusses portfolio management using a dynamic capabilities perspective. The most significant points that contribute to the attempt to answer the systematic review question are firstly, that the dynamic capabilities concept outlines the mechanisms of portfolio management processes in realising the business strategy. Secondly, dynamic capabilities embody the concept of learning and change process that

evolves as the mechanisms respond to environmental dynamism. Furthermore, as dynamic capabilities are constituted by routines, thus these mechanisms are built by a combination of static and transformational routines (Peters and O'Connor, 2012) that are mutually constitutive (Feldman and Orlikowski, 2011).

3.3.7 Conclusions

No literature so far has addressed the relationship between portfolio management and organisational routines. This implies that NPD portfolio management has not been investigated from an organisational routines perspective.

Salvato and Rerup's (2011) and Killen et al.'s (2012) studies, which are still based on theoretical views, are considered to be those which come closest to the issue. Salvato and Rerup's (2011) study contributed to the understanding of the routine's position within organisational capabilities, while Killen et al. (2012) proposed the dynamic capabilities view to portfolio management. Having acknowledged that dynamic capabilities are constituted by organisational routines, these findings could be seen to be connected, a position which leads to an enhanced understanding of the linkage between portfolio management and organisational routines.

3.4 SUMMARY

This chapter has presented the literature review of new product portfolio management and its relationship to organisational routines. It has shown that:

- The structure of a routine consists of an ostensive and a performative aspect; these are mutually constitutive.
- Change in organisational routines can be viewed as both exogenous and endogenous.
- Routines link the organisation and its processes, thus the collection of routines represents the organisational capability.
- NPD portfolio management has not been investigated from an organisational routines perspective.

CHAPTER 4 SYNTHESIS OF THE LITERATURE

4.1 INTRODUCTION

This chapter presents the synthesis of the conceptual findings resulting from the systematic review (SLR) of four streams of literature: portfolio management; strategic decision-making; the strategy process; and organisational routines (Chapters 2 and 3). The purpose of the chapter is to identify research gaps. The discussion comprises four sections: (1) key conceptual findings; (2) integrating the findings into the NPD portfolio management conceptual framework; (3) identification of research gaps, and (4) defining research questions. The results of the discussion are then summarised in the final section.

4.2 KEY CONCEPTS IN THE LITERATURE

The SLR discerned five key conceptual findings. Firstly, the strategic decision-making process can be viewed from three perspectives: (1) *rational*; (2) *political*, and (3) *organisational*. Within portfolio management, Kester et al. (2011) identified three types of decision-making process: *evidence-*, *power-* and *opinion-based*. While Kester et al.'s (2011) evidence- and opinion-based processes correspond to the rational perspective, the power-based processes are associated with the political perspective. However, Kester et al. (2011) appeared to under-represent – or even overlook – the organisational perspective in their study.

Secondly, the dynamic nature of the business environment has an impact on portfolio decisions, and can cause the acceleration, postponement or termination decisions of NPD projects (Steffens et al., 2007), ultimately affecting portfolio performance (Closs et al., 2008; Müller et al., 2008; Steffens et al., 2007). These factors, however, seem not to have been considered in the integrated frameworks proposed in the literature, such as the one proposed by Kester et al. (2011).

Thirdly, no single article directly addresses the link between portfolio management and the strategy process. Some recognise the link between the strategic and operative levels of the portfolio management process (e.g. Perks (2007) and Poskela

(2007)); however, none identify ways to form and maintain a link between portfolio management and strategy development and implementation.

Fourthly, the organisational perspective of decision-making views decisions to be based on organisational processes (Allison, 1971; Mazzolini, 1981). Decision-making processes follow specific patterns, which are influenced and formed by organisational routines (Mazzolini, 1981; Royer and Langley, 2008; Schwenk, 1989). Related to the first finding that the role of organisational factors in portfolio decision-making processes continues to be overlooked, this finding corroborates that previous studies have not specifically addressed the relationship between portfolio decision-making processes and organisational routines.

Fifthly, organisational processes take place at different levels (Salvato and Rerup, 2011). Those occurring at the NPD project team and cross-functional levels can be associated with the operative level activities which produce tactical portfolio decisions, whereas the processes carried out at the organisational level can be related to strategic portfolio decisions. Dynamic capabilities at the organisational level might influence portfolio management processes to involve learning and change processes in responding to the dynamics of the environment (Killen et al., 2012). As routines are the constitutive entities of capabilities and dynamic capabilities (Dosi et al., 2000), it can thus be speculated that organisational routines constitute the decision-making structure across the operative and strategic levels of the portfolio management process. However, because the extant literature does not discuss the relationship between portfolio management and organisational routines, this needs further study.

In conclusion, the literature suggests that portfolio management involves decision-making processes which entail interaction between rational and political factors. However, it overlooks the organisational factors which impact on inadequate understandings of the process and the structure of portfolio management. While a number of articles recognise the link between the strategic and operative levels of a portfolio management process, the link between the decision-making processes in portfolio management and the strategy process is not directly addressed. Finally, even though some research does suggest that organisational routines underlie decision-making processes, no literature studies the relationship between organisational routines and the decision-making process in portfolio management.

4.3 CREATING A CONCEPTUAL FRAMEWORK

Chapter 2 presented a conceptual framework of portfolio management (Figure 2.1), based on the NPD stream of literature. With the benefit of the insights derived from the other literature streams, this framework was enhanced to derive Figure 4.1. The framework is composed of three main parts: (1) the portfolio management process; (2) the additional linkages identified from the literature (shown by the blue lines), and (3) the entities and links which potentially need to be explored further (shown by the dashed line shapes and the red block arrows).

The first part is a reconfiguration of the conceptual portfolio management framework (Figure 2.1) by incorporating Poskela's (2007) concept of the division of NPD activities into strategic and operative levels. In addition, two new processes have been added: (1) *decision-making processes* within the portfolio management activities, and (2) *changes, learning and strategic renewal*, driven by the strategic level activities.

Figure 4.1 shows decision-making to underlie the process of portfolio management, and to lead to strategic and tactical portfolio decisions. These processes are formed by the interaction between rational, political and organisational factors (Kester et al., 2011; Royer and Langley, 2008; Schwenk, 1988, 1989). Royer and Langley (2008) indicated that the organisational factor, which is constituted by explicit or implicit rules (Zhou, 1997), or *organizational routines* (Royer and Langley, 2008), is one which probably shapes the dynamics of the rational and political elements of the process. However, Royer and Langley's (2008) notion is based on a conceptual study and lacks empirical basis. Moreover, in the context of portfolio management, the organisational factors were overlooked by Kester et al.'s (2011) study and are thus new to the framework depicted here.

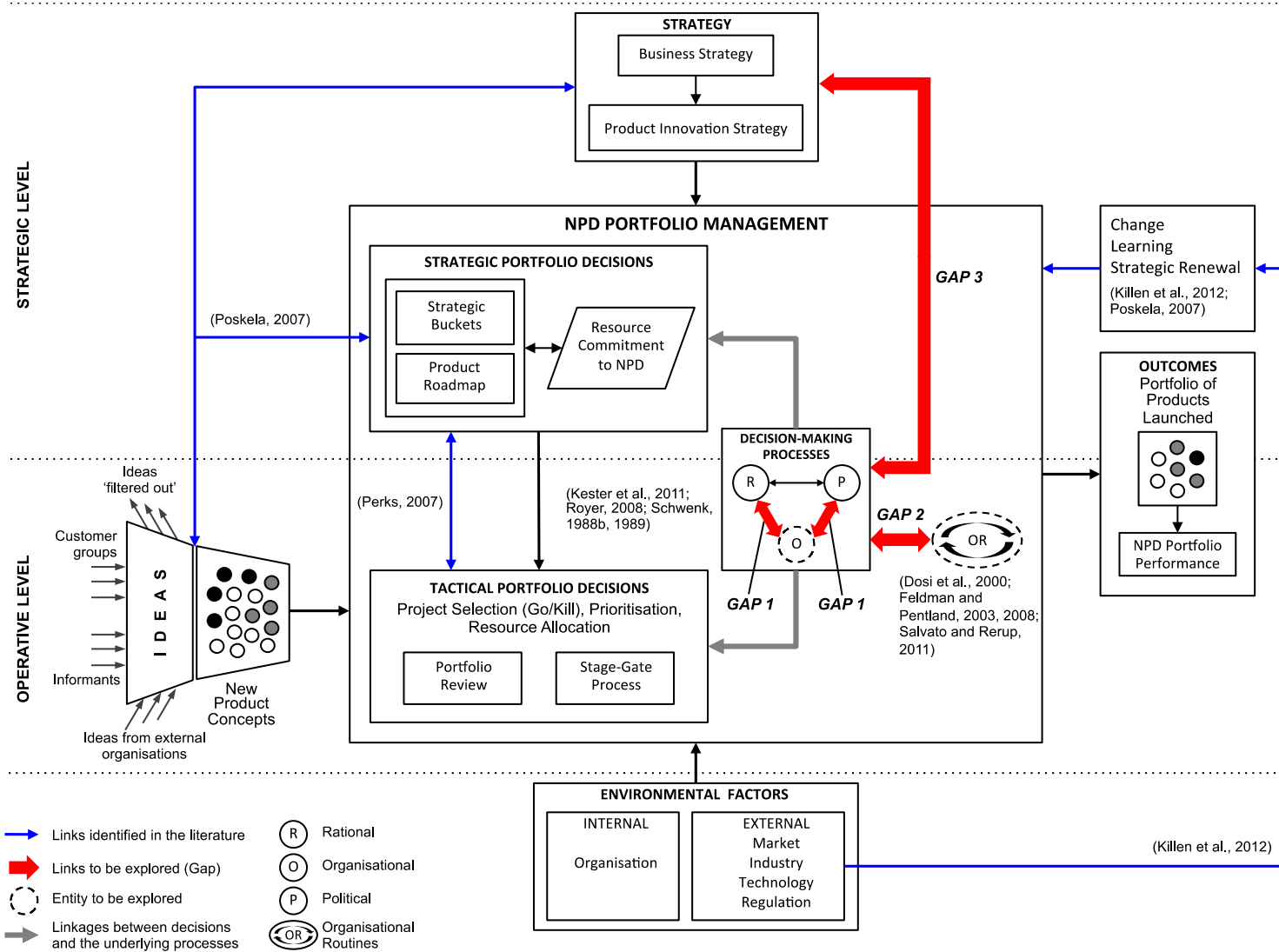


Figure 4.1: Integration of Portfolio Management Framework and Conceptual Findings

Adapted from: Cooper (1984, 2005), Goffin and Mitchell (2010), Poskela (2007) and Terwiesch and Ulrich (2008)

Furthermore, changes, learning and strategic renewal (Killen et al., 2012; Poskela, 2007) are regarded as *organisational adaptation* processes, which generate changes in structures and routines (Schwenk, 1988, 1989). In this context, portfolio management can be viewed through the lens of a dynamic capabilities concept, which outlines the mechanisms of portfolio management in realising strategy in dynamic environments (Killen et al., 2012). However, the studies in this area (e.g. Killen et al. (2012)) have continued to focus on conceptual development and lack an empirical approach.

The second part of the framework contains two additional links. The first shows the linkages between strategic and operative level decision-making processes, discerned by Perks (2007) and Poskela (2007). However, they did not suggest how the links between these two levels could be deliberately formed and maintained. The second link, as indicated by Killen et al. (2012), relates external environments to the processes of change, learning and strategic renewal which take place within the portfolio management process.

The third part represents unexplored entities and links. The unexplored *organisational factors* entity leads to its unexplored links with the rational and political factors of decision-making processes, shown as *Gap 1*. Furthermore, the unexplored *organisational factors* entity leads to the formation of an unexplored link between organisational routines and decision-making processes, depicted as *Gap 2*. Lastly, although Terwiesch and Ulrich (2008) indicated that portfolio management interacts with business strategy, the mechanism for linking one to the other is not addressed in the extant literature. This unidentified link is represented by *Gap 3*.

The reworked conceptual framework shown in Figure 4.1 presents a comprehensive view of the portfolio management process by incorporating the additional processes, unexplored entities and unexplored links (gaps). However, it should be noted that this diagram is based on a review of the literature and it is not necessarily similar to the way portfolio management takes place within actual organisations. This constitutes the core purpose of this thesis: to identify what the process looks like in practice. In the next section, the unexplored entities and links are discussed in detail to identify research gaps.

4.4 IDENTIFICATION OF RESEARCH GAPS

The three gaps — *Gap 1*, *Gap 2* and *Gap 3* — identified earlier can be considered to be research gaps in the portfolio management area. In this section, they are discussed further to specify the potential areas of study.

Gap 1 is associated with the links between organisational factors (organisational routines) and the rational and political factors of decision-making processes. These three factors interact with each other as the underlying processes in portfolio management which produce strategic and tactical portfolio decisions. *Gap 1* is: *The extant literature overlooks the organisational factors in the portfolio decision-making process.* This is referred to as a *partial* gap.

Gap 2 is concerned with the relationship between decision-making processes and organisational routines. This gap relates to *Gap 1* which is concerned with the role of organisational routines in portfolio decision-making processes. *Gap 2*, further, shows that previous studies have not used the concept of organisational routines as a lens through which to investigate portfolio management; this link therefore remains unidentified. *Gap 2* is: *The extant literature does not use the concept of organisational routines for investigating portfolio management.* This can be classified as a *very significant* gap.

Gap 3 is related to decision-making processes which can generate the portfolio decisions that are aligned with the business strategy. *Gap 3* is: *The extant literature does not suggest which are the formal processes that will enable this alignment to be achieved.* This can be categorised as a *significant* gap.

It can be seen that these three research gaps offer new research opportunities in the areas of portfolio decision-making and its relationship with strategy process and organisational routines. The next section translates these gaps into research questions.

4.5 DEFINING RESEARCH QUESTIONS

Research questions form one of the most important elements in research design. They provide direction when defining the nature and scope of the research (Blaikie, 2010). Three research questions are derived from the key research gaps discussed earlier:

RQ 1. *How is new product development portfolio management conducted?*

RQ 2. *What organisational routines can be identified in the new product development portfolio management in companies?*

RQ 3. *Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

RQ 1 is a descriptive question which enquires into the company's portfolio management practices. RQ 2¹³ is translated from Gap 1 and Gap 2 and constitutes a descriptive question which investigates the organisational routines involved in the portfolio management processes. Finally, RQ 3 deals with a descriptive question which examines whether a link between the portfolio management processes and the business strategy exist.

4.6 SUMMARY

This chapter has presented the synthesis of the SLR's conceptual findings which denotes the *research gaps*, "*size*" of gap, and *research questions*. It has illustrated the following:

- Gap 1 is: The extant literature overlooks the organisational factors in the portfolio decision-making process. This is referred to as a partial gap.

Gap 1 led to RQ 1: *How is new product development portfolio management conducted?*

- Gap 2 is: The extant literature does not use the concept of organisational routines for investigating portfolio management. This can be classified as a very significant gap.

Gap 1 and Gap 2 led to RQ 2: *What organisational routines can be identified in the new product development portfolio management in companies?*

- Gap 3 is: The extant literature does not suggest which are the formal processes that will enable this alignment to be achieved. This can be categorised as a significant gap.

Gap 3 led to RQ 3: *Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

¹³ The process of answering RQ 1 and RQ 2 is iterative. This is shown in the data analysis framework described in Chapter 5, Research Design.

CHAPTER 5 RESEARCH DESIGN

5.1 INTRODUCTION

Research design is “an integrated statement of and justification for the technical decisions involved in planning a research project” (Blaikie, 2010, p. 15), ranging from general assumptions to specific methods of data collection and analysis (Bryman and Bell, 2007; Creswell, 2009). It provides a structure of components and procedures of empirical research, purposed for guiding its implementation (Bryman and Bell, 2007; Grunow, 1995). Five fundamental elements constitute a research design: research questions and purposes, research strategy, philosophical perspectives, research methodology and research methods (data collection and analysis) (Blaikie, 2010; Creswell, 2009; Partington, 2002); each should be aligned with the others for a successful study (Partington, 2002). This chapter discusses these elements and how they were used to build the research design of this study. It covers Research Questions and Purposes, Philosophical Perspective, Research Methodology, Case Selection, Research Methods, Data Collection Framework and Data Analysis Framework.

5.2 RESEARCH QUESTIONS AND PURPOSES

Research questions provide direction when defining the nature and scope of the research (Blaikie, 2010), thus determining the most suitable research design (Creswell, 1998, 2009; Yin, 2009). In this study, the research questions were derived from the key research gaps identified in the SLR.

The SLR showed that decision-making is one of the *underlying processes* of portfolio management. These processes are the origin of the main research problems which are represented by the three research gaps discussed earlier. These problems were addressed by investigating what actually occurred in the portfolio management process in each organisation investigated.

The study required the employment of a *descriptive research* approach, aimed at discovering and describing “the characteristics of and patterns in some social phenomenon” (Blaikie, 2010, p. 60). The investigation focused on describing the

behavioural aspects of the portfolio management processes, as is appropriate to facilitate the observation of their dynamic nature.

The organisational element overlooked by previous portfolio management studies (Gap 1) can be represented by organisational routines (Royer and Langley, 2008; Schwenk, 1989). This element is considered to be one which potentially shapes the dynamics of the rational and political elements of the decision-making process (Royer and Langley, 2008). As this issue relates to Gap 2 (the relationship between portfolio management and organisational routines), it will be addressed concurrently with Gap 2. Accordingly, before responding to these intertwined issues, the study needed to uncover what actually occurred in the portfolio management process of each company.

Addressing the issue of the relationship between portfolio management processes and organisational routines (Gap 2), the study took the stance that an organisational decision-making process is a regular and predictable part of individual and organisational behaviour patterns which are either guided by implicit rules or based on explicit rules (Zhou, 1997). This view embodies the organisational routines concept, which refers to routines as “all the regular and predictable behavioural patterns of the firm” (Nelson and Winter, 1982, p. 14). The lens of organisational routines is thus an appropriate one to employ, as it can reveal the behavioural patterns in the portfolio management processes.

As the link between the portfolio management process and business strategy is tenuous (Gap 3), the study needed to investigate whether this link prevails in the case companies. For any organisation, this link is contextual; the study thus captured different forms of link in its context.

As a result, three research questions which were descriptive in nature and that required open-ended enquiry were developed. They are:

RQ 1 How is new product development portfolio management conducted?

RQ 2 What organisational routines can be identified in the new product development portfolio management in companies?

RQ 3 Is the company’s espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?

These research questions led to the exploration of real events in portfolio management in the context of several different organisations. The study thus was *exploratory*, implying the need for more inductive data collection and analysis techniques. Furthermore, as the research questions were also purposed to establish the mechanisms which produce these events, the study worked towards providing an *explanatory* analysis.

5.3 PHILOSOPHICAL PERSPECTIVES

Philosophical perspectives set out alternative *research paradigms*, designed to form connections between ideas, social experience and social reality (Blaikie, 2007). An understanding of these different philosophical helps researchers to develop a rigorous and workable research design (Easterby-Smith et al., 2008). The philosophical stance that this study adopted is outlined in the discussion of its *ontological* and *epistemological* perspectives presented in the following subsections.

5.3.1 Ontological Perspective

The research questions suggest that the mechanisms which generate the portfolio management process and the factors influencing these mechanisms are central to the phenomenon observed. In order to reveal how an organisation manages this process (RQ 1), an understanding is required of the structures which underlie the process (RQ 2 and RQ 3). The context in which the process occurs can vary over the lifetime of an organisation; nevertheless, most companies are most likely to have certain mechanisms for managing the process, and these are amenable to observation.

The perspective from which this phenomenon is viewed is aligned with the ontological position of a *depth realist*. This deems a phenomenon to contain *ontological depth* (Blaikie, 2010), stratified into three domains of reality: *empirical* (experience and perceptions), *actual* (events and actions) and *real* (structures, mechanisms, power and relations) (Ackroyd and Fleetwood, 2000; Bhaskar, 1975). This is the branch of realism proposed by Bhaskar (1975), which recognises the subjectivity and social nature of knowledge acquisition (Dobson, 2001).

5.3.2 Epistemological Perspective

Epistemology is “a general set of assumptions” concerning the most suitable approaches for exploring reality (Easterby-Smith et al., 2008, p. 60). It deals with the question of what knowledge should be considered and how it is to be used (Bryman, 2001; Chia, 2002). These assumptions guide researchers in selecting appropriate scientific procedures to produce reliable social scientific knowledge (Blaikie, 2007)

Blaikie (2007, 2010) suggested that each epistemological position relates to a specific ontological position. It is thus advised its associated positions that are logical and most likely to occur in practice¹⁴. They show that depth realist ontology is best associated with *neo-realism* epistemology, which aspires to discover the structures or mechanisms which produce the pattern of a phenomenon. The discovery process of the portfolio management structures and mechanisms was initiated by recognising the regularities generated by those mechanisms (Blaikie, 2007, 2010).

In practice, however, it is often immensely difficult to detect and explain the regularities of these mechanisms (Easterby-Smith et al., 2008). Blaikie (2010) therefore suggested that to unveil these structures and mechanisms, it may be necessary to identify the entities and processes that are beyond the surface.

Based on these views, the research methodology and methods for this study were thus developed based on the neo-realism epistemological position.

5.3.3 Conclusions

The research questions which led to the unveiling of the structures and mechanisms of the phenomenon investigated suggest a depth realist ontological position to be the most appropriate. This fits with the neo-realism epistemological position. From a portfolio management perspective, these philosophical positions render both advantages and disadvantages; these are summarised in Table 5.1.

¹⁴ See (Blaikie, 2007), p. 95, and (Pentland, 1999), p. 26.

Table 5.1: Advantages and Disadvantages of the Philosophical Position Adopted

Advantages	Disadvantages
<ul style="list-style-type: none"> • Reveals the underlying structures and mechanisms of events and processes • Enables the revelation of hidden yet important phenomena 	<ul style="list-style-type: none"> • Structures and mechanisms are not obviously observable • A long time span of study is required
Provides fundamental impacts if the results are applied for process improvements	Data acquisition and analysis require large amount of time
Offers room to implement new approaches in research	Accuracy and validity become the critical issues

5.4 RESEARCH METHODOLOGY

The research questions lead to the determination of the most appropriate research methodology. Six research methodologies provide a potential fit for the neo-realism epistemological position: (1) case method; (2) experimental methods; (3) grounded theory; (4) quasi-experimental research (5) survey feedback, and (6) survey research (Easterby-Smith et al., 2008). In order to select the most appropriate, two issues were considered: the characteristics of the phenomena addressed and what can be learned from research methodologies used in previous studies.

The enquiries prompted by the research questions refer to an emerging and complex phenomenon, an understanding of which requires a detailed exploration, as there is little theory available to explain it. These enquiries also needed to take into account the context of the problem. To deal with these research problems, Creswell (1998) suggested using a *qualitative approach*. This type of research can be applied to explore a social or human problem, during which the researcher “builds a complex, holistic picture, ... and conducts the study in a natural setting” (Creswell, 1998, p. 15).

More specifically, among the different types of qualitative approach the *case study* is considered to be the most suitable methodology, allowing as it does the researcher to explore in depth one, or a small number of, *organisations, events, processes* or *individuals* over time (Creswell, 2009; Easterby-Smith et al., 2008). In addition, it enables the investigations to “retain the holistic and meaningful characteristics” of these real-life events in specific contexts (Yin, 2009, p. 14).

Referring to the methodologies used in the extant literature¹⁵, out of 22 empirical research studies, 13 (59.1%) were based on qualitative research, six (27.3%) applied quantitative research and three (13.6%) employed mixed methods research. All the qualitative research studies used the case study method (three single-case and 10 multiple-case studies)

From 13 case study articles, four are considered to be key in terms of the SLR, and their research methodology was scrutinised for references to assist in defining the methodology to be adopted. This investigation is summarised in Table 5.2 presenting the corresponding research questions, methodology used in the extant literature, and the methodology to be adopted.

RQ 1 (the “how” question) is *explanatory* in nature (Bailey, 1987; Yin, 2009), and is likely to be investigated using case studies (Yin, 2009). Furthermore, as shown in Table 5.2, it corresponds to five case study articles, of which three are *explanatory* studies, whereas the other two are *exploratory* studies which look for descriptive answers (Blaikie, 2010). This confirms that explanatory research mainly uses case study methods.

RQ 2 and RQ 3 (related to the “what” question) are more exploratory (Bailey, 1987; Yin, 2009). In this enquiry, a case study would not be an advantageous method to use (Yin, 2009). Nevertheless, as shown in Table 5.2, RQ 2 is built in response to five case study articles. Four are *exploratory* studies, whereas the fifth is an *explanatory* study. In contrast, RQ 3 is built by using three explanatory case study articles. This comparison seems to imply that even though the research question is exploratory in nature, a case study can be used.

Table 5.2: Research Question and Methodology Used

Research Question	Methodology Used in the Extant Literature
RQ 1. How is new product development portfolio management conducted?	<ul style="list-style-type: none"> • From 5 qualitative articles, 1 single-case and 4 multiple-case studies <ul style="list-style-type: none"> - 3 cases are explanatory - 2 cases are exploratory Previous key research: <i>Kester et al. (2011)</i> <ul style="list-style-type: none"> • Grounded theory • Sample: 4 companies

¹⁵(Tjaturpriono, 2013).

Research Question	Methodology Used in the Extant Literature
RQ 2. What organisational routines can be identified in the new product development portfolio management in companies?	<ul style="list-style-type: none"> • Data collection sources: <ul style="list-style-type: none"> - interviews - meeting observations - documents - data analysis: <ul style="list-style-type: none"> - three-step coding procedure: initial line-by-line coding, focused coding, and axial coding (Glaser and Strauss, 1967, cited in Kester et al., 2011) <ul style="list-style-type: none"> • From 5 qualitative articles, 2 single-case and 3 multiple-case studies <ul style="list-style-type: none"> - 4 cases are exploratory - 1 case is explanatory <p>Previous key research: Turner and Rindova (2012)</p> <ul style="list-style-type: none"> • Sample: 6 organisations • Data collection sources: <ul style="list-style-type: none"> - interviews - documents • Data analysis: <ul style="list-style-type: none"> - content analysis (Miles and Huberman, 1994) <p>Peters and O'Connor (2012):</p> <ul style="list-style-type: none"> • Longitudinal study • Grounded theory • Grounded theory development in investigating micro processes (Langley, 1999) • Sample: 21 companies • Data collection: <ul style="list-style-type: none"> - Interviews - Documents - Meeting observations • Data analysis: <ul style="list-style-type: none"> - data coding and categorisation - prospective, longitudinal investigation and constant comparative analysis (Glaser and Strauss, 1967, cited in Peters and O'Connor, 2012)
RQ 3. Is company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?	<ul style="list-style-type: none"> • All 3 qualitative articles are multiple-case studies • 3 cases are explanatory <p>Previous key research: Poskela (2007)</p> <ul style="list-style-type: none"> • Sample: 20 companies • Data collection source: <ul style="list-style-type: none"> - interviews • Data analysis: <ul style="list-style-type: none"> - <i>Ladder of Analytical Abstraction</i> (Miles and Huberman, 1994; Carney, 1990 cited in Poskela, 2007): summarising and packaging the data, repackaging and aggregating the data, and developing propositions to contrast an explanatory framework. - content analysis, noting patterns, clustering, and making contrasts and comparisons (Miles and Huberman, 1994; Yin, 2009)

In conclusion, the problem raised in the RQ 1 is explanatory, whereas those addressed by RQ 2 and RQ 2 are exploratory in nature, According to the indications presented by a number of scholars (e.g. Creswell (1998, 2009), Easterby-Smith et al.

(2008) and Yin (2009)) and the descriptive findings from the literature, it was deemed appropriate to investigate RQ 1, RQ 2 and RQ 3 using the case study method.

5.5 CASE SELECTION

This research problem was investigated using a multiple-case study, as it provides a stronger base for theory building (Yin, 2009). Moreover, using multiple cases results in a more robust, generalisable and testable theory than that resulting from a single-case study (Eisenhardt and Graebner, 2007). The SLR demonstrates that out of 13 instances of case study research in the literature, 10 conducted multiple-case research (see Table 5.2). This indicates that multiple-case research has been used more extensively than single-case study and is probably more appropriate for portfolio management studies.

Multiple cases were chosen for theoretical reasons, i.e. a *literal replication* (which predicts a similar result) or a *theoretical replication* (which predicts contrasting results but for anticipatable reasons) (Yin, 2009). In reference to this, the research problem was examined using four cases which can be divided into two subgroups (two cases for each group). This allows the research to exercise the theoretical replication across the subgroups while conducting the literal replication within each; in this way, the research is able to investigate two different patterns of theoretical replication.

The cases were also chosen based on practical reasons. For this study, three main selection criteria were considered: (1) the company develops a range of products, (2) the new product development cycle is fairly short, and (3) the researcher had key contact persons in the company.

From a geographical perspective, the SLR shows no article was found reporting portfolio management study in Asian countries, except one reporting a study in Japan. This indicates that portfolio management practices in Asian countries have attracted little attention. On the other hand, this region is an emerging market, experiencing enormous economic development. Companies in this region therefore provide a fruitful area of study, offering as they do specific contexts of phenomena, such as economic growth, market dynamics and a variety of cultures.

Based on these considerations, from 16 Indonesia-based companies approached, four companies from cosmetics, food, consumers and automotive sectors agreed to

cooperate with the study. Three companies represent markets with a dynamic environment, while one represents a more stable market. Having cases from different sectors enables the research to contrast the portfolio management process within different contexts.

5.6 RESEARCH METHODS

In a case study approach, data collection activities investigate a bounded system such as a process, activity, event, programme or multiple individuals (Creswell, 1998). In order to increase the reliability of case study research and guide the researchers in carrying out the data collection, a deliberate plan or protocol is required (Yin, 2009).

The data collection process typically employs multiple methods (Eisenhardt, 1989). This leads the study to apply a triangulation by data source and method (Miles et al., 2014), which will strengthen *qualitative validity* (Creswell, 2009). This study thus used triangulating data sources, involving four sources: (1) interviews; (2) meeting observations; (3) documents (Creswell, 1998, 2009; Yin, 2009), and (4) simulation (Bailey, 1987; Yin, 2009). Each method is discussed in detail in the following subsections.

5.6.1 Interviews

Interviews, as social interaction between two or more people (Bailey, 1987), are used to gather “perceived causal inferences and explanations” about a specific event (Yin, 2009, p. 102). Pentland and Feldman (2005) suggested that interview questions can probe the *ostensive aspect* of processes, whereas observations can elicit the *performative aspect*.

In this study, a semi-structured interview method was applied. Two sets of interview questionnaires had been developed to address enquiries to managers on two different levels (strategic and operational). Appendix I presents these two sets of questions, designed to interview directors (1.5 hours) and managers (1 hour).

5.6.2 Meeting Observations

Meeting observations are employed to collect *non-verbal behaviour* data (Bailey, 1987) which can elucidate real-time events and the context of the case (Yin, 2009). As

mentioned earlier, an advantage of this method is its appropriateness for investigating the performative aspect of organisational routines (Pentland and Feldman, 2005).

5.6.3 Documents Analysis

How documents are used in management research varies; they can be used to support and enhance the findings from other data sources (Yin, 2009) and can be analysed using a *content analysis* method (Miles and Huberman, 1994).

From an organisational routines perspective, documents can be considered artefacts. They are typically represented by cultural features and technical operations (Yin, 2009) which can be in the form of written rules and procedures, or scripts (Pentland and Feldman, 2005; Pentland and Rueter, 1994). Rules and written procedures can represent the ostensive aspect of a routine, whereas work logbooks and databases can be regarded as the archival trace of the performative aspects (Pentland and Feldman, 2005; Pentland and Rueter, 1994). In this study, the documents were collected to identify routines embedded in a number of organisations and related to the portfolio management process in each.

5.6.4 Simulation

In this study, a simulation of portfolio selection was utilised to trigger managers to perform the ‘conversations’¹⁶ typically enacted when they deal with a real situation in determining the company’s product portfolio. The managers were assigned a short case study¹⁷ which required them to select an NPD portfolio from seven potential projects with a specific budget. This case was adapted from a teaching case study developed by Cranfield School of Management¹⁸. The case included a *risk-reward diagram* (in the form of a *bubble diagram*) of these potential projects, designed to support the participants in analysing the portfolio. Forty-five minutes were available for the simulation.

¹⁶ “...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events” (Cohen and Bacdayan, 1994, p.554)

¹⁷ The simulation case is exhibited in Appendix J.1.

¹⁸ This case is a modified version of an innovation portfolio case developed for Cranfield School of Management by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

The idea of using a simulation was based on the concept that *causal mechanisms* could play a useful role in the research. These are defined as “ultimately unobservable physical, social, or processes through which agents with causal capacities operate, but only in specific contexts or conditions, to transfer energy, information, or matter to other entities” (George and Bennet, 2005, p. 137) Such mechanisms can be uncovered by employing an experiment-based research method which exercises considerable control over behavioural events (Bailey, 1987; Yin, 2009).

This notion also applies to the organisational routines context. Routines are retained behavioural capacities or capabilities (Hodgson and Knudsen, 2004) stored as procedural memory¹⁹ (Cohen and Bacdayan, 1994). A particular social and physical environment is necessary to trigger individual memories which thus deploy a pattern of behaviours (Hodgson and Knudsen, 2004).

5.7 DATA COLLECTION FRAMEWORK

Figure 5.1 provides an overview of the chronological data collection activities which took place for the duration of four weeks at each case company. The data collection sources include *interviews*, *meeting observations*, *documents* and *simulation*. The details of each activity are also described in Appendix K, and include the *participants*, *activity descriptions* and *data recording means*. The preliminary results of these activities were presented in an *interim site summary*, which will be provided in the closing meeting.

5.8 DATA ANALYSIS FRAMEWORK

A multiple-case study requires employing two levels of analysis: within-case and cross-case analyses (Miles and Huberman, 1994). In this study, the former explored portfolio management processes at each case company whereas the latter compared and synthesised their findings across the four case companies. The procedures guided these analyses are described in the following subsections.

¹⁹ “It is memory for how things are done that is relatively automatic and inarticulate, and encompasses cognitive as well as motor activities” (Blaikie, 2010).

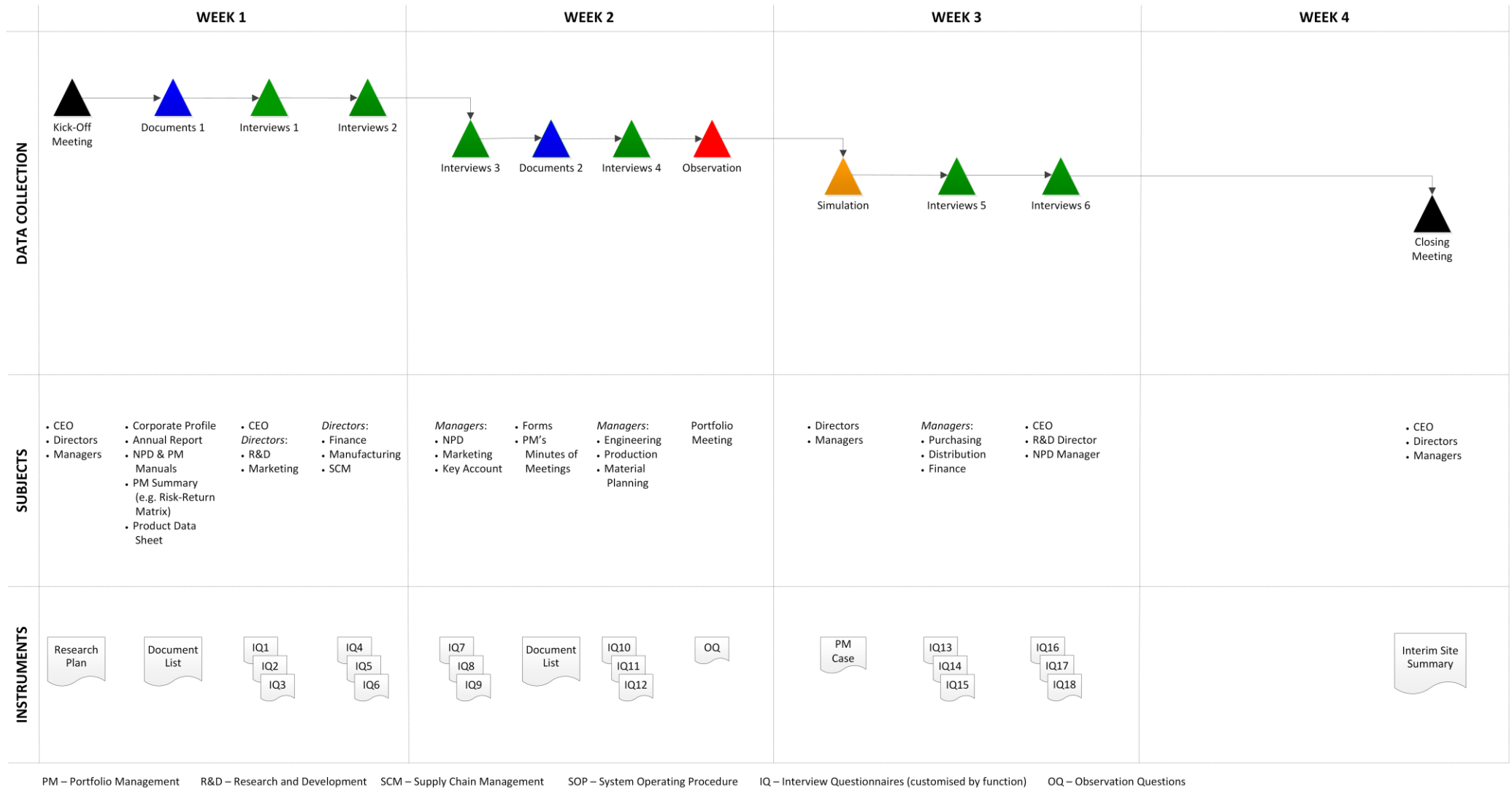


Figure 5.1: Data Collection Plan at Each Case Company

5.8.1 Within-Case Analysis

Figure 5.2 shows the framework used for data analysis. It presents data collected from multiple sources, the analysis processes, and the research questions as the reference. The analysis processes involve four main steps: first-order coding, comparing first-order codes with Feldman and Pentland's definition, forming categories, identifying relationship between categories, and incorporating supporting evidence from the simulation.

As shown in Figure 5.2, in the first-order coding the analysis centred on identifying first-order codes from the qualitative data (interviews, meeting observation and documents), which referenced Strauss and Corbin's (1998) notion of *open coding*. The coding was inductive, that is, emergent and not based on any earlier literature.

The next step was comparing the first-order codes to the routines traits defined by Feldman and Pentland (2003) which indicate the presence of routines by "repetition, a recognisable pattern of action, multiple participants and interdependent actions" (p.103). Each code showing adequate evidence associated with these traits was verified as a routine. The specific criteria applied in verifying the codes are shown in Table 5.3 This step resulted in a set of routines²⁰ which, when adopted, build the portfolio management capability of the case companies.

Table 5.3: Criteria for Verifying the Presence of Routines

Criterion (number of characteristics represented by evidence)	Verified as routines?
Equal or greater than three ²¹	Verified
Two	Partly verified
One	Not verified
None	Not verified

²⁰ These first-order codes were later called *subroutines* and the first-order code categories identified later were called *routines*.

²¹ The codes evidenced in a document represent formal procedures which show the characteristics of repetition, a recognisable pattern of action, multiple participants, and interdependent actions.

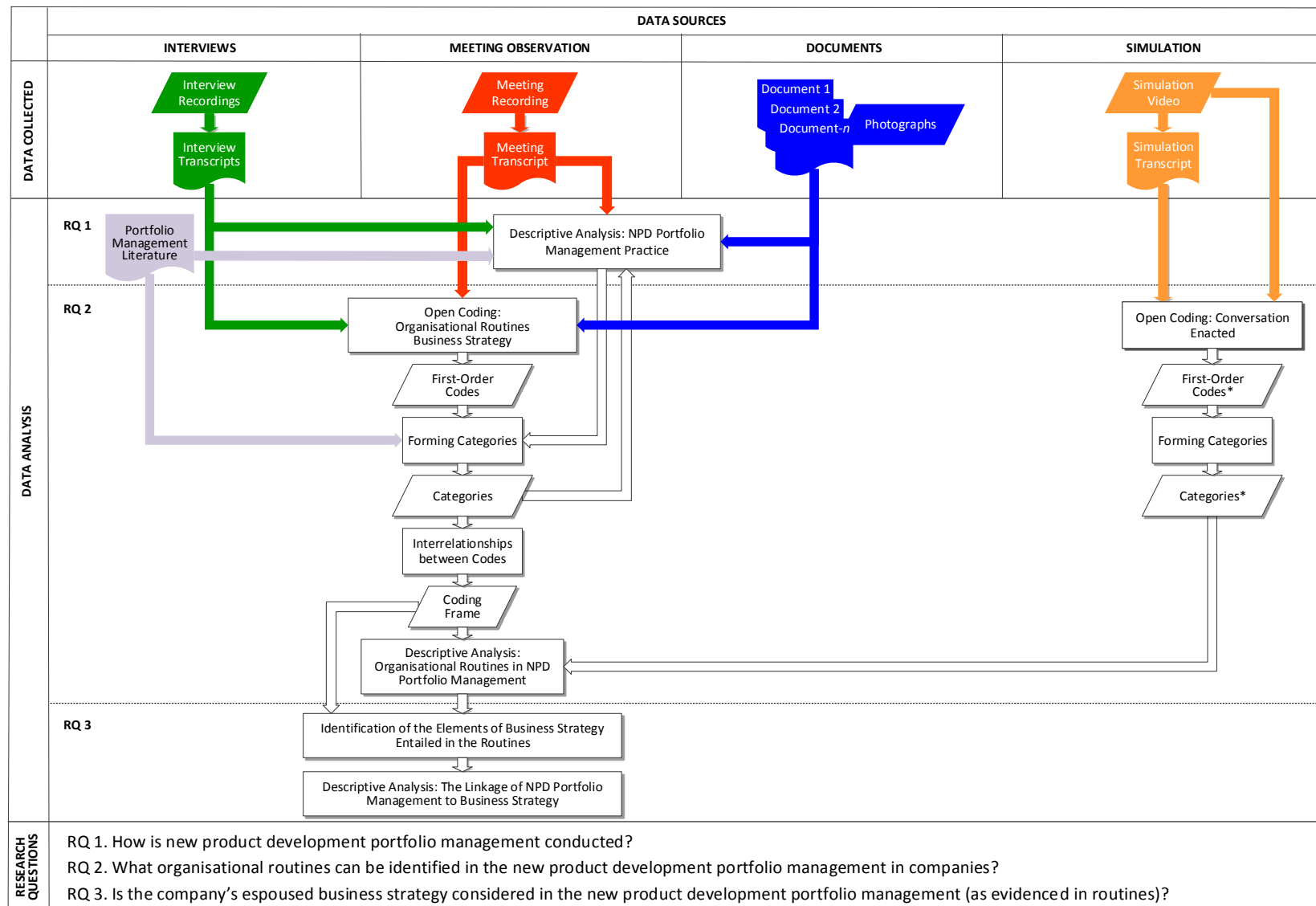


Figure 5.2: Within-Case Analysis Framework at Each Case Company

In the third step, these first-order codes were recoded by regrouping them into “a smaller number of categories, theme, or constructs” (Miles et al., 2014, p. 86) based on the similarity and adjacency of the activities represented by the codes. The categorisation, besides referring to the theme described in portfolio management literature as shown in Figure 5.2, also identified emergent themes (Miles et al., 2014). The process was conducted iteratively with the inspection of portfolio management categories during the descriptive analysis of portfolio management practice in RQ 1 (see Figure 5.2).

The fourth step was the analysis referred to by Strauss and Corbin’s (1998) notion of *axial coding* to address the relationships between categories. These relationships were identified through examining the connections between the first-order codes along with the categories. These steps resulted in a coding framework which represents the framework of routines underlying NPD portfolio management at the case companies.

Similarly, the coding steps were applied to simulation data. As shown in Figure 5.2, the conversations enacted were then incorporated to support the routines identified from the interviews, meeting observation and documents data. The results of this analysis led to the identification of subroutines which were discerned in the simulation.

5.8.2 Cross-Case Analysis

Figure 5.3 shows the framework used for cross-case analysis. It presents the results of the within-case analyses, the cross-case analysis processes, and the research questions as the reference. The analysis processes comprise three steps: portfolio management practice comparison across the cases; cross-case comparison of routines and the connections between the routines, and cross-case comparison of the business strategy considered in the routines.

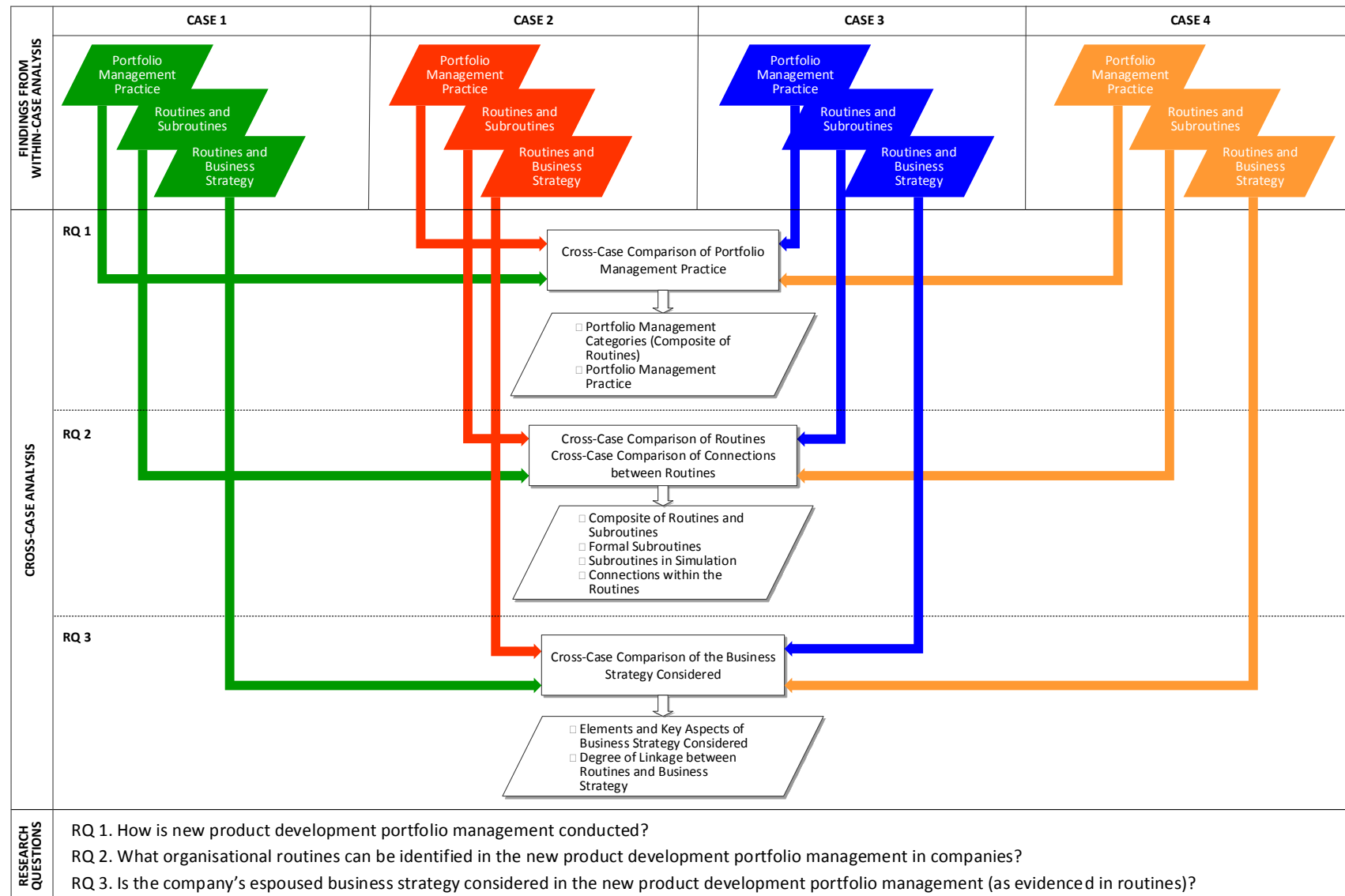


Figure 5.3: Cross-Case Analysis Framework

Figure 5.3 shows that the first analysis is related to answering RQ 1 (*How is new product development portfolio management conducted?*), comparing the portfolio management categories and the practice at the case companies. The result of the categories comparison was represented as a composite of routines, containing all routines involved across the case companies. Moreover, the analysis compared the portfolio management practice of each company, covering formality of the portfolio management process; portfolio management goals; strategic and tactical portfolio decisions; effective portfolio management; selection criteria, and the problems faced in managing the portfolio of products.

The next step dealt with the analysis associated with RQ 2 (*What organisational routines can be identified in the new product development portfolio management in companies?*), which compared the routines in NPD portfolio management. The analysis led to a composite of routines²², including the associated composite subroutines. In addition, from those subroutines the analysis compared ones considered to be formal subroutines, including the ones which emerged in simulation.

The analysis further was to compare the connections between routines. It involved the comparison of the number of total connections in each case and of connections attached to each routine. This step finally constructed a composite of routines showing attached connections at each of the routines.

As shown in Figure 5.3, analysis in the last step pertained to RQ 3 (*Is the espoused business strategy considered in the new product development portfolio management (as evidenced in routines)*). It compared the elements of business strategy involved and the subroutines within which they were considered. The analysis further compared the key aspects of business strategy (organisational goals, competitive strategy and capabilities) considered in the routines. It included an investigation into the degree to which the routines were linked to business strategy.

²² The analysis was conducted iteratively with the first step dealing with answering RQ 1.

5.9 PILOT CASE STUDY

A pilot case study is aimed at providing the researcher with an opportunity to evaluate and improve the data collection plans; lessons learnt about research design and field procedures is thus the essence of this research stage (Yin, 2009). In this study, the results examined included both the main issues being studied and the methodological issues (Yin, 2009).

The pilot case study was conducted in a London-based company which produces branded footwear. It took place from September to October 2014. The results of this pilot case study were used to evaluate and improve the research protocol. For example, the data analysis framework shown in Figure 5.2 is the result of improvements based on the pilot case study's results. The detail of the pilot case study is presented in Appendix B.

5.10 CONCLUSIONS

The research questions identified in the SLR suggested a depth realist ontological position and a neo-realism epistemological position. They were responded to using case study research, involving multiple cases from different sectors. The study employed four research methods: interviews, meeting observations, documents reviews and simulation. The analysis of the qualitative data collected was based on Strauss and Corbin's (1998) grounded approach, using open coding and axial coding.

5.11 SUMMARY

This chapter has presented a discussion of the research design applied in this study, and has illustrated the following:

- Three descriptive research questions which accommodate open-ended enquiries were derived: (1) How is new product development portfolio management conducted? (2) What organisational routines can be identified in the new product development portfolio management in companies? and (3) Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?
- The study took a depth realist ontological and neo-realism epistemological positions.

- Multiple case study was applied involving four Indonesia-based case companies from different sectors: cosmetics, food, consumer products and automotive.
- Four research methods were used, i.e., interviews, meeting observations, documents reviews and simulation.
- Research protocol was developed comprising data collection and data analysis frameworks.

CHAPTER 6 CASE STUDY 1: COSMETICSCO

6.1 INTRODUCTION

This chapter presents Case Study 1, a company located in Indonesia which manufactures beauty and personal care products. The study took place between December 2014 and April 2015, encompassing interviews, meeting observation, a review of documents and observation of a portfolio selection simulation. The results are presented in the following four main sections:

- The *case description* gives information on the company and the data collected;
- *NPD portfolio management* explains how the company conducts portfolio management and answers Research Question 1 (RQ1);
- *Underlying organisational routines* answers Research Question 2 (RQ2);
- *Link to business strategy* explains how portfolio management impacts strategy and answers Research Question 3 (RQ3).

The chapter closes with a summary.

6.2 CASE DESCRIPTION

6.2.1 Overview of the Company: CosmeticsCo

The company is referred to throughout as CosmeticsCo²³ and has six product categories: hair care, skin care, body care, make-up base, decorative²⁴ and herbal, which are marketed under ten product brands (Company Profile, 2013). Each brand is positioned to serve a specific market segment, either *mass*, *luxury* or *masstige*²⁵. From 2011 onwards, CosmeticsCo has developed an average of 150 new products (in terms of stock keeping units) per year (company presentation slide, p.10). The company's 2014 annual report²⁶ shows the turnover in 2014 as being around US\$60 million.

²³ The name has been changed to preserve anonymity.

²⁴ Decorative category is referred to as "...the results of the combination of world market trend with the results of an unique Indonesian excavation" (Annual Report, 2014)

²⁵ Mass products which are positioned as luxury ones.

²⁶ CosmeticsCo is a publicly listed company; it thus discloses the annual report in the company's website

6.2.2 Data Collection at CosmeticsCo

Data collection was conducted through 13 on-site visits. Meeting preparations and document collection required four visits, interviews required seven visits, and the meeting observation and simulation took one visit each. Further details of these visits are provided in Appendix L, and the data collected is explained below.

6.2.2.1 Interviews

Semi-structured interviews were conducted with 13 participants, covering five board of directors (BOD) members and eight managers from different functions. The directors were considered each to have a strategic role in the portfolio management team; they were thus interviewed using a set of questions which enquired not only into the portfolio management process but also into issues relating to company strategy²⁷. In addition, communication via email was undertaken with some participants after the visits, for clarification and confirmation of points raised.

Table 6.1 outlines the details of each interview, specifically the role and responsibility of each participant, the duration of each interview, the date it took place and the number of pages of the transcripts. The total duration of the interviews was nearly 17 hours. All were recorded and then transcribed, resulting in 367 pages of transcripts.

Table 6.1: Interview Details at CosmeticsCo

No	Role	Reference-Initial	Interview details		Transcript (no. of pages)
			Duration (hr:min:sec)	Date	
Board of Directors					
1	Director, Sales and Marketing #1	INT-DSM1	1:43:22	13-01-2015	46
2	Director, Sales and Marketing #2	INT-DSM2	1:56:09	14-01-2015	34
3	Director, Innovation Centre	INT-DIC	1:39:00	11-03-2015	34
4	Deputy Director, Sales and Marketing	INT-DDSM	1:50:36	15-01-2015	42
5	Deputy Director, Finance and Administration	INT-DDFA	1:25:19	13-01-2015	32
Managers and Supervisor					
6	Manager, Marketing	INT-MM	1:26:32	15-01-2015	34

²⁷ Interview questionnaires are presented in Appendix I.

No	Role	Reference-Initial	Interview details		Transcript (no. of pages)
			Duration (hr:min:sec)	Date	
7	Manager, Sales	INT-MS	1:17:24	09-01-2015	23
8	Manager, Product Development	INT-MPD	1:10:05	13-01-2015	26
		Email-MPD	–	21-10-2015	–
9	Manager, Research	INT-MR	1:00:36	12-01-2015	17
10	Manager, Plant	INT-MP	1:04:07	19-01-2015	26
11	Manager, Applied Research	INT-MAR	0:55:05	11-03-2015	22
12	Manager, Purchasing	INT-MPR	0:37:59	12-01-2015	14
13	Manager, Technical Engineer	INT-MTE	0:50:33	19-01-2015	17
14	Supervisor, R&D	Email-SRD	–	21-09-2015	–
			–	15-10-2015	–
Total			16:56:47		367

6.2.2.2 Meeting Observation

On the thirteenth site visit (6th April 2015), a product development progress coordination meeting was observed. Table 6.2 summarises the participants of the meeting: three managers from Marketing and four managers from the R&D department. Together they reviewed the progress of each new product, identified problems and made decisions about further progress. The meeting lasted nearly 1¼ hours and the recording resulted in 41 pages of transcript.

Table 6.2: Meeting Participants at CosmeticsCo

No	Role	Reference-Initial
1	Manager, Group Brand	OBS-MGB
2	Manager, Product Group	OBS-MPG
3	Product Executive	OBS-PEX
4	Supervisor, R&D	OBS-SRD
5	Supervisor, Formulation	OBS-SF
6	Specialist, Formulation	OBS-SpF
7	Coordinator, Registration	OBS-CR

6.2.2.3 Documents

Documents were collected during four visits and from the company website. A total of 29 documents (in seven categories) were collected. Table 6.3 lists their details, including the name and document initials, number of pages or minutes of video, a description and the collection date of each.

Table 6.3: Documents Collected at CostmeticsCo

No	Document Name	Reference-Initial	#	Description	Collection Date
1	Company profile	DOC1	'8:51	Video of company profile	23-03-2015
2	Annual report 2013	DOC2	157	Document reporting the company's strategy and its performances including the financial results in 2013	Downloaded on 08-03-2015
3	Annual report 2014	DOC3	157	Document reporting the company's strategy and its performance including the financial results in 2014	Downloaded on 20-01-2016
4	Company introduction presentation slides	DOC4	31	Overview of the innovation process conducted in the company	18-12-2014
5	Product catalogues	DOC5-DOC21	17	Communicating the product features of each brand	08-12-2014 and 15-01-2015
6	Company magazines	DOC22-DOC24	62, 62, 75	Three edition magazines presenting the company's events, achievements, new products and profiles of its executives	08-12-2014
7	Books	DOC25-DOC29	192, 207, 252, 324, 202	Five books describing respectively the founders of the company, the founder's way of managing the company, the inherited efficacy of herbal products, pioneering in green science, and a green science perspective on the products	08-12-2014

Note: #–Number of pages or (for the video) minutes

6.2.2.4 Simulation

The simulation took place on 23rd March 2015. Five participants had been selected, comprising two BOD members²⁸ and three managers, as presented in Table 6.4.

Table 6.4: Simulation Participants at CosmeticsCo

No	Role	Reference Initial
1	Director, Innovation Centre	SIM-DIC
2	Deputy Director, Sales and Marketing	SIM-DDSM joined at minute 19:40
3	Manager, Product Development	SIM-MPD
4	Manager, Research	SIM-MR
5	Manager, Applied Research	SIM-MAR

²⁸ Note that not all directors were willing to take part in the simulation.

As explained in the methodology chapter, participants were assigned a short case study²⁹ which required them to select an NPD portfolio from seven potential projects³⁰ with a specific budget. This case was adapted from a teaching case study developed by Cranfield School of Management³¹. The case included a *risk-reward diagram* (in the form of a *bubble diagram*) of these potential projects, designed to support the participants in analysing the portfolio.

Forty-five minutes were available for the simulation. The portfolio decisions and discussion lasted about 51 minutes. The simulation was filmed and the video recording was transcribed, generating a 30-page transcript.

6.3 NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 1

This section addresses RQ 1: *How is new product development portfolio management conducted [at CosmeticsCo]?* The question was answered mainly by referring to descriptions from individual managers and company documents, which were triangulated with the statements of other interviewees. However, it should be noted that more detailed information from RQ 2 (organisational routines in portfolio management) informed the analysis, as the analysis process of RQ 1 was iterative³². This section presents an overview of the company's portfolio management practice, followed by a comparison with theory, and then conclusions.

6.3.1 Overview of CosmeticsCo's Practice

CosmeticsCo has formal established procedures for developing new products, which have been awarded ISO 9001 certification. Detailed inspection showed however that these formal procedures include nothing on NPD portfolio management, as the plant manager asserted: "...*actually* [the procedures] *are more for product development [rather than for portfolio management]...*" (INT-MP, p.15). Clear evidence that the company's NPD process framework does not cover portfolio issues is presented by

²⁹ The simulation case is exhibited in Appendix J.1.

³⁰ The projects entail the development of three product groups: A, B and C; the projects thus are titled by indicating each product's respective product group: (A)ntares, (A)sterion, (A)tlas, (B)ellatrix, (B)etria, (C)apella and (C)astor.

³¹ This case is a modified version of an innovation portfolio case developed for Cranfield School of Management by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

³² This iterative process is depicted in the data analysis framework (Figure 5.2) in the research design (Chapter 5).

Figure 6.1 – nothing in this mentions portfolio management. The implication is that portfolio management is dealt with informally outside the NPD process, as the marketing manager remarked: “...there is no special [portfolio] meeting...” (INT-MM, p.29). The portfolio emerges from discussions on individual, potential projects, as the marketing manager indicated: “...products are selected at the beginning of a feasibility [study], ...[they] are determined already [before BOD meetings]...” (INT-MM, p.9).

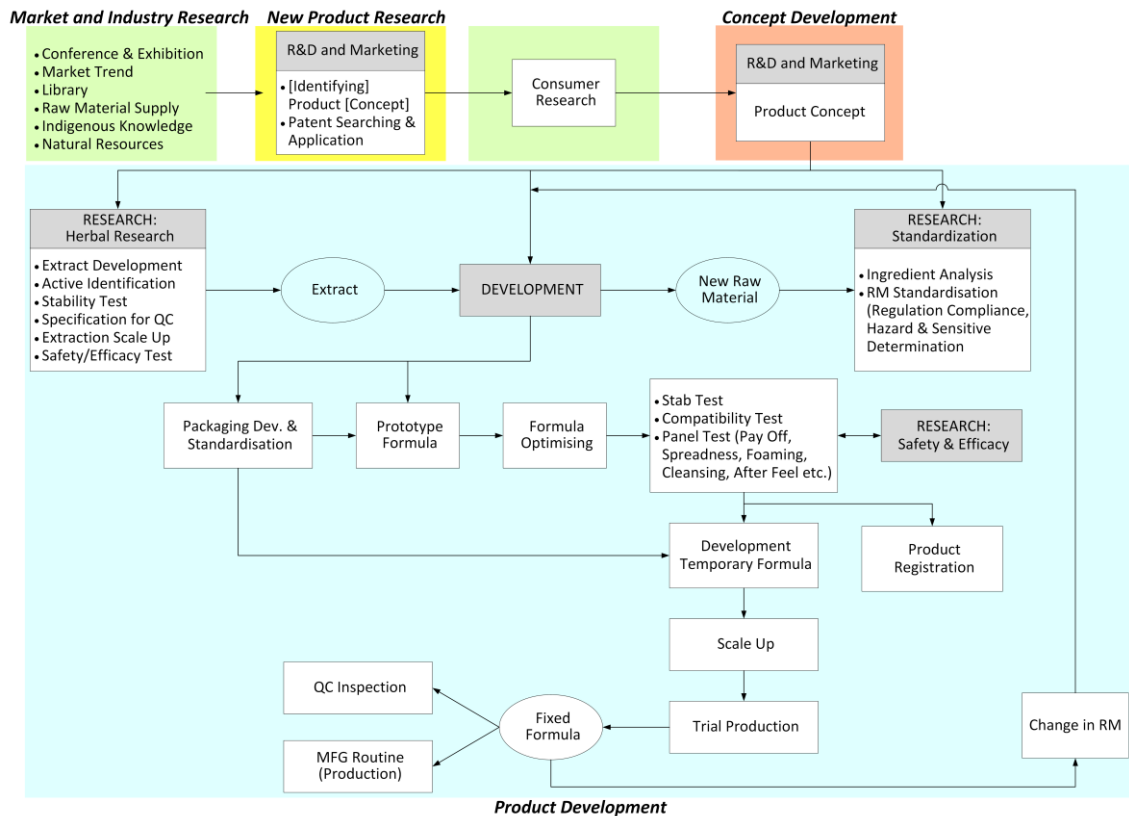


Figure 6.1: NPD Framework at CosmeticsCo

Source: *Creation and Development of a New Product (DOC4, p.16)*

Although CosmeticsCo does not have a formal process of portfolio management, detailed analysis of the interviews, the meeting observation and documents (including the one shown in Figure 6.1) revealed how CosmeticsCo manages their portfolio. Based on ideas from the literature³³, CosmeticsCo’s informal practice can be grouped into seven categories, as shown in a three-by-four matrix³⁴ in Figure 6.2 (in Figure 6.1,

³³ The ideas are also influenced by the results of RQ 2 on organisational routines.

³⁴ The matrix form arrangement is purposed for later use on cross-case analysis.

different colours suggest certain categories): (2)³⁵ Market and Industry Analysis (depicted by green shading); (3) New Product Research (yellow shading); (5) Concept Development (partly depicted by red shading); (7) Build Business Case; (9) Management Review; (10) Product Development (blue shading), and (12) Launch Planning. Each category is discussed further in the following sections³⁶.

(1)	(4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	(8)	(11)
New Product Research (3)	(6)	Management Review (9)	Launch Planning (12)

Figure 6.2: Categories of Portfolio Management Practice at CosmeticsCo

Source: Analysis of Interviews, Documents and Observation³⁷

Market and Industry Analysis

CosmeticsCo generates ideas for new products based on the sources shown in Figure 6.1: conferences and exhibitions, market trends, libraries, raw material supply, the company's internal knowledge and local natural resources. For example, the sales and marketing director #1 pointed out, “...if possible we attend all the exhibitions, in order to... keep our eyes open. The product innovation [ideas] occasionally emerge from chitchat with suppliers ...” In addition, “...We [refer to] global [market] trends, [and use] local potential [ingredients] [into consideration]...” (INT-DSM1, p.14). An additional priority is understanding the market, as the director asserted: “...the first thing is the market – is there a need in the market? If the need isn't there, just forget [about developing the product concept] this time” (INT-DSM1, p.41).

³⁵ This number refers to the category number shown in Figure 6.2

³⁶ Note that in the following sections, example quotes are given with, in most cases, supporting evidence from different sources (either other managers, observation or a document) to provide triangulation.

³⁷ Supplemented by insights from the process of answering RQ 2.

Concept Development

In the early stages, the ideas generated form a potential product portfolio, as the marketing manager indicated: “...we came back from the exhibitions – there were so many [ideas], weren’t there? We selected [some of] them ...it’s been [decided since the beginning], really, which ones we should launch” (INT-MM, p.11).

R&D and marketing work together to translate these ideas into product concepts, as shown in Figure 6.1 (DOC4, p.16). The product development manager supported this, saying, “So it could be that R&D’s ideas are taken – it could be from [marketing]. Later [the ideas] will be looked into [by marketing] from the marketing point of view, and then a product concept is created” (INT-MPD, p.1).

New Product Research

CosmeticsCo explores new ingredients and formulas which define new potential products in such a way as to fulfil the opportunities identified by market and industry research. This research is conducted collaboratively by the R&D and marketing departments.

Accordingly, R&D continuously seeks new formulas, as the sales and marketing director #1 stated: “Normally, my R&D collects every formula, so [we] have a [formula] catalogue” (INT-DSMA, p.19). These formulas are then offered to the marketing department to be aligned with identified market opportunities, as specified by the marketing manager: “... from our [R&D] side, we present [the formulas]. From marketing... they see whether there are [formulas] suitable for their respective brands” (INT-MPD, p. 1)

Build Business Case

Next, managers evaluate the business feasibility aspects of each idea, as the marketing manager stated: “After we get [the information] from market research, then [marketing] actually do a sort of feasibility [study], ... so before we generate a product concept... we need to have studied beforehand who the competitors are; if we’re really going to go into that [product], [we need to know] roughly how much the investment is...” (INT-MM, p.3-4). Discussion of each of the potential projects leads to a set of business proposals for the board of directors: “Well, usually, after all [the product concept

creation processes] are finished, then a complete business proposal is made – the one presented to the board of directors” (INT-DSM2, p.16), the sales and marketing director #2 remarked.

Management Review

According to the marketing manager, business proposals are presented in regular BOD meetings: “Every month a board meeting is in place” (INT-MM, p.30). In the meeting, the proposals are evaluated from different aspects, as the product development manager explained, “The management team will re-evaluate. ...the market share, how much the target is, what the marketing strategy looks like – [they] will be re-evaluated” (INT-MPD, p. 2). Furthermore, the sales and marketing director #2 added, “The board [of directors] normally looks at it from the perspective of [whether] the price is within [range], the investment is OK, the target market: all of them” (INT-DSM2, p.16).

Based on this evaluation, the BOD grants approval to those products which are to be taken further, and in so doing appears to maintain the number of products in the portfolio, as the sales and marketing director #1 specified: “...if you have to [develop] new products, then you have to kill some of the bottom – the bottom-most of the product portfolio; ...the expectation is that you have to substitute their sales; [the sales] must be as much as those...” (INT-DSM1, p.27). The marketing manager explained how the BOD decision takes a proposed new product to the development stage: “When the BOD has approved [the business proposal], we can then provide R&D with the [product] concept, ...it’s kind of the kick-off: ‘OK, the project can start’” (INT-MM, p.19-20).

The company then reviews the results of the products launched, as the sales manager explained: “...the review related to the product portfolio is more about the products launched...” (INT-MS, p.11). The review is conducted in BOD meetings; according to the marketing manager, “Every month a board meeting is in place; we have to provide information about the progress [of the products launched] – whether that deviates from the KPI³⁸ which we determined. And if the [degree of] non-achievement is too great, I have to be able to give reasons and provide an action plan...” (INT-MM, p.30). The KPI are evaluated at different points, as the sales manager

³⁸ Key performance indicators.

specified: “...the period is the first two months – how [their performances] look, from the distribution side, their sales – then the first six months... and we have another look at the one-year period. This is for the new products” (INT-MS, p.11).

Product Development

The main processes of the development stage, as shown in Figure 6.1, comprise formula development, packaging development and product test (appraisal). This was explained by the marketing manager: “If the feasibility study is OK – meaning that the board [of directors] is OK – to start the project, we create a [product] concept and brief R&D. After that, R&D develops the formula” (INT-MM, p.6). Meanwhile, “As [the formula] is being developed by R&D, [everything happens in] parallel, ...the packaging [development] also starts right away. What we want the packaging to look like...” (INT-MM, p.7-8). After finishing these processes the formula needs to undergo different tests. As the research manager explained, “Product appraisal means ...we evaluate – ...evaluate the safety and efficacy of the product. ... Every single product, before going into production, before it can be stamped by QA, needs to pass safety tests [applied] to human” (INT-MR, p.1). Furthermore, “...efficacy can only be done if the safety [test] is OK. The second step is whether the stability is OK, compatibility is OK...” (INT-MR, p.10).

Throughout the development period³⁹ CosmeticsCo regularly conducts a progress review on each NPD project, as the marketing manager specified: “That’s a coordination meeting... [It’s held] monthly; [although] if [we] are about to launch [new products], it could be two to three times per month. [We discuss] the timetable; everything must stick to the timetable” (INT-MM, p.29). In the meeting, the managers share any problems they have encountered; according to the product development manager, “...we have a coordination meeting... in there, everyone shares [any issues]. “Oh! There are obstacles, this [process] has got to this [point]”” (INT-MPD, p. 19). For example, a coordination meeting in the *luxury brand group* decided not to accept a sample *container* because it did not fulfil certain requirements; as the group brand

³⁹ At CosmeticsCo, product development typically takes one year.

manager directed, *“Write it down – that the container received is ‘not OK yet, waiting for revision’”* (OBS-MGB, p.3).

At this stage, the product portfolio is most likely frozen, as the marketing manager asserted: *“...products are selected at the beginning of a feasibility [study], ...[they] are determined already [before BOD meetings]; so they can’t be just revoked halfway through the process, unless it’s really because of the R&D results... it’s rare though. I’d presume it’s never happened”* (INT-MM, p.9). Moreover, according to the innovation centre director, *“... if we’ve decided that the business proposal is acceptable, it’s actually too late to step back... – it’s impossible; [we’ve ordered the materials and so] we’re constrained by the quantity of scale. What’s it called? – a minimum [order] quantity”* (INT-DIC, p.26).

The final stage is production preparation, comprising scale-up and trial production, as shown in Figure 6.1. The applied research manager also indicated that *“...the development starts from researching the active ingredients, then developing the formula, [followed by] many tests that they need to carry out; after that comes the [setting up of] the production...”* (INT-MAR, p.2). This process is still under R&D supervision, according to the applied research manager: *“... finally, production is still controlled..., not controlled but supervised..., because R&D is [the department] which creates [the formula], so for the scale-up, R&D is still involved. However, after it starts running steadily, then it’s released”* (INT-MAR, p.2).

Launch Planning

Before launching a new product, the company sets up the marketing strategy; according to the applied research manager, *“Well, after [the production scale-up], then marketing will carry out the development of the marketing strategy and that kind of thing”* (INT-MAR, p.2). Alongside this, the company allocates the appropriate distribution channels for the product, as the sales manager described: *“Before [it’s] launched, we speak with sales people; we need [to look into] the four Ps⁴⁰ from the pricing aspect – what the price is, what the competitors offer, and what we offer. Then, the placement – in which distribution [channels] we want to place the products”* (INT-MS, p.3).

⁴⁰ Product, price, place and promotion.

In summary, CosmeticsCo does not have formal procedures regarding NPD portfolio management and most discussions are based on the feasibility of each individual project, rather than consideration of the whole portfolio. Nevertheless, the company's informal practice in managing the entire portfolio management process can be grouped according to seven different categories (as shown in Figure 6.2).

6.3.2 Comparison of CosmeticsCo's Practice with Theory

This section compares CosmeticsCo's current practice with key theory, notably *portfolio management goals* – value maximisation, balanced portfolio and strategic alignment – (Cooper et al., 1997a, 2001) and *effective portfolio management* (e.g. senior management's role in selection decisions) (Cooper et al., 2001).

The results of the comparison are presented in Table 6.5, comprising the portfolio management aspects from which the practice is viewed, comments, representative quotes and triangulation notes.

Table 6.5⁴¹: Analysis of CosmeticsCo's Portfolio Management Practice

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
Formal procedures	No formal procedures	<i>...actually the [procedures] are more for product development [rather than for portfolio management]...</i> (INT-MP, p.15).	<i>... specific procedures for managing the product portfolio, I think, are not there.</i> (INT-MAR, p.6)
Portfolio management goals:			
<i>Value maximisation</i>	Evaluation is of individual products, not based on project valuation. Selection is based on the highest sales and profit.	<i>The board of directors always reviews each element of the costs, sales, production, marketing, R&D, G&A-[all about] financial: all of them are reviewed.</i> (INT-DDFA, p.24)	<i>So, surely, if our concern is about business, then [the portfolio we aspire to] is one that must have high profit</i> (INT-MM, p.2)
	Prioritisation is not based on budget allocation. Budget is allocated according to departments	<i>Well, actually we haven't yet had [a special allocation for product development] ... normally R&D have their own general budget .</i> (INT-MM, p.1-2).	
<i>Balanced portfolio</i>	Allocating highest proportion to the biggest brand (in term of sales) or having the largest consumer base	<i>Well, we as management [decide], "Let's focus on S and M⁴²". Because [S is the biggest brand and] M is the second one</i> (INT-DSM1, p.10).	<i>...normally, if the [proposed] new products are items of personal care – like shampoo, the kind of things used by everyone – the BOD is more lenient.</i> (INT-MM,

⁴¹ Table is based on portfolio management literature.

⁴² 'S' and 'M' represent the name of product brands.

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
<i>Strategic alignment</i>	A particular proportion is dedicated to 'colour trend' products, which represent company strategy of providing innovation	<i>"Every year 'S' [brand] launches a new colour trend adopted from various cultures of Indonesia" (DOC3, p.32)</i> <i>...the image maker is actually on [these products] (INT-MM, p.9)</i>	p.6). <i>Colour trend is a must. And normally other products should give way to the colour trend... So there is a [certain] priority (INT-MAR, p.11)</i>
Strategic portfolio ⁴³ decisions	Top management determines the prioritised brands No specific product road map	<i>Normally, at least for the next five years, board management decides ... which brands would be strengthened; what aspects would be strengthened. (INT-DDSM, p.29)</i>	
Tactical portfolio decisions			
<i>Stage-gate process</i>	No formal stage-gate process. 'Go' or 'No go' decisions revolve around BOD	<i>[The 'Go or kill' decision] is based on product pareto⁴⁴... actually, the decision is [made] by marketing, the owner and the board of directors. (INT-MR, p.9)</i>	<i>...I just mentioned [regarding the 'Go or kill' decision] that after a proposal is finalised... [then] we present it to board [of directors]. (INT-DSM1, p.39)</i>
<i>Portfolio review</i>	No portfolio review process. Evaluation looks at individual products	<i>We measure [portfolio success] based on individual [performance]... (INT-DIC, p.27)</i>	
Effective portfolio management:			
<i>Senior management role in selection decisions</i>	Board of directors makes approval decisions on the proposed portfolio	<i>Marketing is the leader for new product development [projects]. After preparing a feasibility study, we have to present it to the board [of directors]; above all, the board will make the decision. (INT-MM, p.4)</i>	<i>Innovation or ideas come from marketing; however, at the end, decisions are on the board [of directors]. (INT-MS, p.5)</i>
<i>Senior management and R&D management relationship</i>	Structurally, R&D management is under the sales and marketing director. The director is intensely involved in leading the NPD portfolio management processes, working together with R&D and marketing.	<i>Organisation structure chart (DOC4, p.14)</i>	<i>It's done, the dry-product [sample] has undergone a panel [test] with Mr. 'K' [sales and marketing director #1] (MPG). Has Mr. 'K' conducted a panel [test] on the sample which we developed ourselves? (SpF) (OBS-MPG, SpF, p.13-14.)</i>
<i>Portfolio management methods</i>	Only financial measurements applied	<i>And indeed, at the end [we turn] towards financial [aspects]." (INT-DIC, p.21)</i>	<i>Oh, in the organisation? The first thing to be decided is definitely the margin – whether the new product will provide additional margin for the company. If not... it won't be released (INT-MS, p.5).</i>
<i>Organisational structure and support systems</i>	R&D and marketing are structurally under the sales and marketing director,	<i>The Innovation Centre coordinates the specialists involved in the innovation</i>	<i>The Innovation Centre is... a project leader on this 'innovation engine', in which</i>

⁴³ See Figure 2.1.

⁴⁴ Company's term, which relates to pareto rule, to point out to the products which have significant impact on the company's achievement

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
	which enables the alignment of their activities to occur naturally. In addition, the Innovation Centre division supports in facilitating this alignment and also in establishing cooperation with external research institutions	<i>process; otherwise, they'll work in their own areas. For example, [in the past], R&D was just concerned with conducting research and producing patents – 10 to 20; however, they didn't get sold. [On the other hand], marketing only thought about selling; they weren't aware that R&D had excellent products (INT-DIC, p.7).</i>	<i>the core team members come from R&D, marketing and production... (INT-DIC, p.32)</i>
Selection criteria	Profitability	<i>...So actually the final consideration is... having new products should provide additional margin for the company, instead of eroding the margin. (INT-MS, p.6)</i>	
	Market share	<i>...next, [the selection decision refers to]... how great the potential market share in Indonesia is; what percentage we're gonna take... (INT-MS, p.6)</i>	
	Product mix	<i>... when preparing a feasibility study, [we] consider the composition of the products. Because 'S'⁴⁵ [contributes] over 50%, it's a cash cow; so [its composition] should be secured. (INT-MM, p.4)</i>	
	Production capabilities	<i>...whether we're able to produce [the product] on our own? If we're not, it should be [done] outside, shouldn't it? That should be considered as well... (INT-MM, p.4)</i>	<i>...however, the capability [concern] is not simply about whether the company is able to create innovation, but also about the capability in terms of production, the machinery [availability]. (INT-DDSM, p.14)</i>
Problems in portfolio management	Overwhelmed coping with the speed of design changes	<i>...in [this environment which] rapidly evolves, how should we design products which don't require changes every year...? So we don't need to rejuvenate those products every year, because we have to deal with new products that have to be launched... (INT-MPD, p.24)</i>	
	Company's pioneering innovation is unfit for market needs	<i>...sometimes we have new [product] concepts, the latest ones; however, in Indonesia those products aren't accepted yet. Or we think something's best for consumers, but they don't care about them... (INT-MPD, p.24)</i>	

⁴⁵The initial of one of CosmeticsCo's product brands

Formal Procedures

As described in the previous section, CosmeticsCo has no formal documented procedure for managing the product portfolio. The only established formal procedures are those dedicated to managing new product development.

Portfolio Management Goals

The literature stresses the need to consider value maximisation, a balanced portfolio and strategic alignment. It was found that CosmeticsCo evaluates individual products according to the feasibility of individual business proposals, mainly from a financial point of view. However, the evaluation is not based on the approach of *maximising the value* of the whole portfolio. The company does not apply a standard method of evaluating a project (there was no evidence of using, for example, NPV or a ‘bang-for-the-buck’⁴⁶). Rather, the company mainly considers sales, cost and profit criteria.

Moreover, portfolio prioritisation appears not to be based on budget allocation; the projects are not ranked on the list until the budget is exhausted. This is because the budget seems to be allocated according to department, rather than being based on product development projects. This is indicated by the marketing manager: “*Well, actually we haven’t yet had [a special allocation for product development] ... normally R&D have their own general budget*” (INT-MM, p.1-2).

The *right balance* perspective is considered implicitly, as evidenced by the company’s maintenance of a particular proportion for its mass, luxury and masstige products, including the colour trend products. The highest proportion seems to be allocated to the biggest brands which serve the mass market. The BOD appears to prefer potential products from the product groups which have a large consumer base.

In terms of the *strategic alignment* goal, CosmeticsCo develops so-called ‘colour trend’ products. These are designed to strengthen the corporate brand as the leading company in innovation. Every year the company devises ingredients to make a new colour (referred to as a ‘colour trend’) for specific products. This colour is decided according to a theme associated with a specific locality in Indonesia from which the natural resources are sourced, as stated in the annual report 2014: “*Every year ‘S’*

⁴⁶ A few examples of valuation methods presented in (Cooper et al., 2001).

[brand] *launches a new colour trend adopted from various cultures of Indonesia*” (DOC3, p.32). This colour trend can also be considered a reflection of the company’s strategy to build uniqueness.

Strategic Portfolio Decisions

As shown in Figure 2.1, strategic portfolio decisions can include defining a product road map and committing to allocate resources allocation into *strategic buckets*. At CosmeticsCo, top management prioritise according to brand; nonetheless, a specific product road map does not formally prevail.

Tactical Portfolio Decisions

As Figure 2.1 shows, tactical portfolio decisions are made by implementing portfolio stage-gate processes and portfolio reviews. CosmeticsCo does not have formal stage-gate and portfolio review processes. ‘Go’ or ‘No go’ decisions revolve around BOD meetings

Senior Management Role in Selection Decisions

The literature stresses the need of involvement of senior management in new product selection decisions. At CosmeticsCo, it was found that while the portfolio of products is formed initially by the R&D and marketing teams, the approval decision is made by the BOD. The marketing manager pointed out that, “*Marketing is the leader for new product development [projects]. After preparing a feasibility study, we have to present it to the board [of directors]; above all, the board will make the decision*” (INT-MM, p.4).

Senior Management and R&D Management Relationship

The literature suggests that a good relationship exists between senior management and the R&D management. At CosmeticsCo it was found that structurally the sales and marketing director supervises the R&D department – that is, the research and product development managers, as shown in the company’s organisation chart (DOC4, p.14). This position enables the director to lead the entire portfolio management processes, working together with R&D and marketing. They are not only involved in strategic level activities but also in those at operational level organised by R&D and marketing. For example, the director is involved in the ‘panel test’ as indicated in the conversations arising between the product group manager (marketing) and the formulation specialist

(R&D) during a coordination meeting: *“It’s done: the dry-product [sample] has undergone a panel [test] with Mr ‘K’ [sales and marketing director #1] (MPG). Has Mr ‘K’ conducted a panel [test] on the sample which we developed ourselves? (SpF)”* (OBS-MPG, SpF, p.13-14).

Portfolio Management Methods

The literature points out the need to use appropriate methods when making a decision. However, it was found that CosmeticsCo appears to employ only a financial model and financial indices instruments from *portfolio management methods*⁴⁷ suggested by Cooper et al. (1999). In particular, the company considers the margin to be the key criterion.

Organisational Structure and Support Systems

This requirement relates to Cooper et al. (2001)’s suggestion that “A solid organisational support structure is needed to enhance internal communications” (p.25). It was found that CosmeticsCo has established an *innovation centre* division, led by a director who had a role as a coordinator in aligning the marketing and R&D activities.

Selection Criteria

In its aim to select right projects, CosmeticsCo evaluates NPD proposals by assessing various criteria: profitability, market share, product mix and production capability. Profitability seems to be the most important criteria, referring to the sales manager’s statement: *“Oh, in the organisation? The first thing to be decided is definitely the margin...”* (INT-MS, p.5). CosmeticsCo also considers the potential sales of a new product over the total potential market size. A product mix criterion is aimed at maintaining the composition of product brands in the market in order to secure their sales contribution. Finally, CosmeticsCo, evaluates the availability of its production facilities.

⁴⁷ “Financial models and financial indices, probabilistic financial models, open pricing theory, strategic approaches, scoring model and checklists, analytical hierarchy approaches, behavioural approaches, mapping approaches or bubble diagram” (Cooper et al., 1999, p.335).

Problems in Portfolio Management

CosmeticsCo should deal with its inability to tackle the need to make design changes swiftly, as the company competes in a trend-driven industry. The sales and marketing director #1 confirmed that situation: “... *As they are trendy products, speed in innovation must be really in place, otherwise you’ll be forgotten*” (INT-DSM1, p.10). In addition, CosmeticsCo faces the misalignment of the company’s advanced innovation with market needs.

6.3.3 Conclusions

This section has responded to RQ 1: *How is new product development portfolio management conducted [at CosmeticsCo]?* The discussion shows that:

- 1) CosmeticsCo applies formal procedures for developing new products; however, formal procedures for conducting portfolio management do not yet exist. This seems to indicate that the company pays less heed to the notion of a ‘portfolio’ or *portfolio mindset*⁴⁸ when developing an array of new products.
- 2) The R&D and marketing teams initiate the formation of a product portfolio by defining a number of potential product concepts, as a result of the identification of market needs and trends. The BOD evaluates these and makes decisions as to whether it is feasible to develop each of these concepts further.
- 3) The evaluation criteria are centred mainly on financial measures, such as profitability and sales. Consideration of the balance of the portfolio is implicit, with the purpose being to maintain the market position of each brand and its market share; the criteria appear therefore not to be definitely determined. In terms of strategic alignment, it seems that besides pursuing financial goals, the company persistently produces new products based on research into new local ingredients. For these innovative products, the company allocates a longer period of evaluation, in recognition of the fact that they might not generate profits during their early period in the market⁴⁹.

⁴⁸ “A complete understanding of all of the projects in the NPD portfolio and how each is aligned to the firm’s strategy” (Kester et al., 2011, p. 647).

⁴⁹ Refers to the sales and marketing director #1 description: “...*the colour trend, in the first year we may lose...*” (INT-DSM1, p.19).

4) From the perspective of portfolio management, BOD meetings⁵⁰ seem to be the place where the pivotal review of new product concepts, new products under development, and newly launched and existing products takes place. Decisions concerning prioritisation of new product concepts and whether to ‘continue or discontinue’ are also made at these meetings. Yet at no point are specific portfolio management methods employed in any of these processes.

6.4 ORGANISATIONAL ROUTINES IN NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 2

This section addresses RQ 2: *What organisational routines can be identified in the new product development portfolio management [at CosmeticsCo]?* Answering this question was based on five analysis stages: (1) first-order coding; (2) comparing first-order codes to Feldman and Pentland’s definition; (3) forming categories; (4) discerning the relationships between categories, and (5) comparison with supporting evidence from the simulation.⁵¹

6.4.1 First-Order Coding

In this part, the analysis centred on identifying first-order codes from the qualitative data, which references Strauss and Corbin’s (1998) notion of *open coding*. The coding was inductive – emergent and not based on any earlier literature (as no previous investigations of portfolio management using the perspective of routines were found).

The first-order coding began by applying line-by-line coding to the data transcripts to draw out initial information related to all activities conducted by managers involved in NPD portfolio management. This is mainly a group rather than an individual activity. It is also regular and ongoing⁵².

⁵⁰ This conclusion is based solely on analysis of interviews with managers and directors, as the company did not grant the author access to BOD meetings. The innovation director explained this policy (through email, 28-06-2016), saying that BOD meetings not only discuss product development but also other strategic company issues which are highly confidential and cannot be disclosed to outside parties.

⁵¹ Simulation data was used to triangulate the data from the field study – interviews, observation and document reviews (see Chapter 5, Research design).

⁵² “The company consistently carries out program for improving its competitive advantages as follows: 1) Development and innovation [programmes for delivering] new product lines...” (DOC3, p.55).

For example, Figure 6.3 shows a section of the transcript of the interview with the sales and marketing director #1, showing the first-order codes. The italicised text is the transcript and the codes appear in the second column. For example, the *Formulas collection and research* code denotes the R&D activities in developing new formulas. In addition, the transcript section also shows the relationship code *New product research* → *Creating product concept*, which indicates that the results from *New product research* affects *Creating product concept* routines. This information is used for revealing the relationships between categories, which is discussed in the next section. The first-order codes and their relationships were stored in NVIVO.

Transcript	First-Order Codes
Director of Sales and Marketing #1, p. 19	
<p>Normally, <u>my R&D collects every formula</u>, so [we] have a [formula] catalogue. The marketing [team] then come – we come to <u>make a business feasibility [proposal]</u>.</p>	<p>Formula collection and research Business feasibility proposal</p>
<p>OK, we look at the market: what about the whitening? do we need another whitening or not? We do, as I'm being attacked by [our competitor], for example. <u>Whitening – OK. What does the formula looks like – what sort of white aspects should it have? Oh, they're like this, OK, we translate them into a [product] concept</u>, the formulation is ready, and then we [design] the graphics, the packaging. From that we do another market test.</p>	<p>New product research Creating product concept New product research → Creating product concept</p>
<p>So the first one is the market size. Is it enough? For instance, we talk about 10 billion a month – could this product reach 10 billion? If it can't, don't ask for a marketing fee – meaning don't ask for marketing expenditure, right? That means that product is developed just as a complementary item. So we have 5-10 billion [market size] – can [the product] achieve 5 billion [sales] a month or 10 billion [sales] a month? [Let's say] this is achieved, as the market is big. What things do you need? “Oh, I need this advertisement, this, this”; <u>we also test the product. The consumers are happy – oh, according to the consumers it's good, the design is cool [for example...], and done – it's ready. Only then, based on the business proposal, we discuss- I bring it, along with the marketing [team], to the board [of directors]. “Our opportunity is here, ...the market is yay big, and the consumer behaviour is also still like this, their preferences are like that, these are the additional [preferences] as they expect more”, for instance.</u></p>	<p>Market test-FGD #1 Business proposal evaluation</p>

Figure 6.3: First-Order Coding an Interview at CosmeticsCo

6.4.2 Comparing First-Order Codes to Feldman and Pentland's Definition

The codes which emerged were then refined by sorting out those which were confirmed as routines. This identification⁵³ was based on Feldman and Pentland's (2003) definition, which characterises routines by "repetition, a recognisable pattern of action, multiple participants and interdependent actions" (p.103). Each code that shows adequate evidence associated with these traits was verified as a routine. The specific criteria applied in verifying the codes are shown in Table 6.6.

Table 6.6: Criteria for Verifying the Presence of Routines

Criterion (Number of characteristics represented by evidence)	Verified as routines?
Greater than or equal to three ⁵⁴	Verified
Two	Partly verified
One	Not verified
None	Not verified

In total, out of 65 first-order codes, 29 were verified⁵⁵ as routines using Feldman and Pentland's definition. The results of the verification are presented in Table 6.7, including the supporting evidence of the routines characteristics from different data sources: first-order codes and the data sources (interviews, observation and documents) from which the evidence was drawn. For example, supporting evidence shows that 'Attending exhibitions, seminars' indicates all routines traits; whereas for 'consumer research' only three routines traits were identified.

⁵³ The identification process used an *etic* approach. This approach allows a researcher to "...make assessments that are independent of the assessments of the participants in the routines... Thus, the researcher identifies the routine (or process) based on their own, theory-driven criteria" (Pentland and Feldman, 2008b, p.292).

⁵⁴ The codes evidenced in a document represent formal procedures which show the characteristics of repetition, a recognisable pattern of action, multiple participants, interdependent actions.

⁵⁵ See Appendix C.1 for examples of first-order codes which were not verified as routines.

Table 6.7: Total of 29 Routines in Portfolio Management*

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Attending exhibitions, seminars	●	●	<i>I’m from R&D, in product development. We communicate a lot with lots of suppliers, principals in the seminars...</i> (INT-MPD, p.1)	<i>... we usually attend seminars, exhibitions; we get kinds of ideas. Maybe for Indonesia [these ideas] haven’t been [needed] up to now, but when we get home, the formula is developed anyway... whether what we’ve been told by the suppliers, the manufacturers of the materials is right or not.</i> (INT-MPD, p.3)	<i>...but ideas of [product] concepts don’t have to come from marketing. R&D can provide [them] too – for instance, from us, from exhibitions or from trends. We search for trends: we go to exhibitions, we [attend] exhibitions, conferences, seminars etc.</i> (INT-MAR, p.1)		<i>Creation and Development of a New Product</i> (DOC4, p. 16)
Market research	●	●	<i>...the first thing is the market – is there a need in the market? If the need isn’t there, just forget [about developing the product concept] this time.</i> (INT-DSM1, p.41)	<i>So if the product is certainly going to be launched, we have to [carry out] market research first. The point is, around, if we sell... to what extent is the acceptance [from our consumers]? Is [the product] really needed or not?</i> (INT-MM, p.3)			<i>Creation and Development of a New Product</i> (DOC4, p.16)
Consumer research	●	●	<i>Creation and Development of a New Product</i> (DOC4, p.16)	<i>... in the marketing [department], consumer behaviour research is in place. Well, at that point we [combine] the consumer behaviour research and our world tour observation research.</i> (INT-DSM1, p.1)			<i>Alright, we had a look, researched further. Veil, veil, veil... from the veil the qualitative [research] came out with that veil is associated with itchy, smelly, dandruff</i> (INT-DSM1, p. 21)
Colour forecasting	●		<i>... we usually use [a colour consultant] from Paris, ‘BS’[†]; they do the colour forecasting for two years ahead.</i> (INT-DSM1, p.13)	<i>The routine thing every year is colour trend... we carry out research; actually, out there, globally, there are many [institutions] doing that kind of research. We can buy their research [to speculate] “What’s the colour [going to be] like next year?”</i> (INT-MPD, p.23)			

* Note: This seven-page table is provided in full to demonstrate the level of analysis needed to identify routines in a valid and reliable way.

† A consulting company.

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
New product research	●			<i>We have to be [based on] research, what the shape looks like. So one year before the product is to be developed, we need to research to figure out that the shape should be like this; its green [colour] should be like this, not like that, because the consumer had said, “I like those which are like this or that”. (INT-DSM1, p.2)</i>		<i>...From... [the product development] side, we present [the formulas]. From marketing... they see whether there are suitable [formulas] for their respective brands. (INT-MPD, p.1)</i>	<i>We don’t only develop totally new products, we also rejuvenate existing products... by, for example, adding new ingredients, new claim; [it’s like putting] new ‘clothes’ [on the same product]. (INT-MR, p.8)</i>
Formula collection and research	●		●	<i>Normally, my R&D collects every formula, so [we] have a [formula] catalogue. (INT-DSM1, p. 19) Creation and Development of a New Product (DOC4, p.16)</i>	<i>Continually MTIC[‡] [does] development process and creation of formulas to meet market demand which is very diverse and competitive (DOC1, p.50)</i>	<i>...we research... why Kalimantan[§] people, [despite their climate being] so hot, have white skin? Dayaks^{**} have white skin. Oh, apparently, they apply a cold powder made from the “X” fruit. (INT-DSM1, p.2)</i>	<i>To speed up the process we in R&D, despite the [product] concept not being in place yet, usually create what are called formula prototypes; it’s a sort of data bank. So when... the [product] concept is ready: “Oh, it’s been developed; so [product development] can be faster” (INT-MPD, p.3)</i>
Cooperation with external institutions	●			<i>Even though our people are competent, not everything can be mastered. So we cooperate with competent people from outside organisations... that’s why we cooperate a lot with academics... (INT-DIC, p.7)</i>	<i>There are also [new ideas discovered] through joint research with other universities or other [institutions]; it normally involves many sources. (INT-DSM2, p.16)</i>	<i>[As for research] institutions, ...we work together with universities to explore [the inventions discussed as part of] their PhDs. (INT-DSM1, p.2)</i>	
Product selection	●			<i>...when [we’re] about to propose [new products], they’ve been considered from many alternatives. For example, we came back from the exhibitions – there were so many [ideas], weren’t there? We selected [some of] them... it’s been [decided since the</i>	<i>...products are selected at the beginning of a feasibility [study], ...[they] are determined already [before BOD meetings]... (INT-MM, p.9)</i>		

[‡] The name of the innovation centre division of CosmeticsCo.

[§] The Indonesian part of Borneo Island.

^{**} The indigenous people of Borneo Island.

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Creating product concept	●	●	●	beginning], <i>really, which ones we should launch.</i> (INT-MM, p.11) So it could be that R&D’s ideas are taken – it could be from [marketing]. Later [the ideas] will be looked into [by marketing] from the marketing point of view, and then the product concept is created. (INT-MPD, p.1)	Creation and Development of a New Product. (DOC4, p.16)	The lipstick is done, but I might develop a liquid one (MPG). That means the stick one is cancelled, doesn’t it? (SpF). [Yes, it is]. It’s liquid, like lime (MPG). Has the concept been submitted? Why haven’t I [in R&D] received it yet? (SpF). The concept is already complete, but it’s still in regards to the stick one (SRD). So, the concept needs to be revised, right? Then we’re waiting for the new concept [from marketing] (SpF). (OBS-MPG,SRD, SpF, p.29-30)	...we form into one result the [consumer] research and the local potential [ingredients]; we combine [them] to get a product concept. (INT-DSM1, p.14)
Product concept evaluation	●			...[the one] who has to at least evaluate [the product concept] is from marketing. After marketing, this then goes... to R&D; there might be around six people who evaluate [it] besides the brand manager. (INT-MPD, p.12)	...the first thing is the market – is there a need in the market? If the need isn’t there, just forget [about developing the product concept] this time. But if, for example, “Oh, perhaps [there will be a need] two years from now,” then just wait for two years (INT-DSM1, p.41)	From the marketing point of view, if this concept is continued, [we need to ask] will it be worth it or not? So every department will evaluate [the product concept] from the R&D, manufacturing and marketing aspects. (INT-MPD, p.2)	Later, the R&D director will evaluate the formulation and packaging aspects... So every division carries out an evaluation – from R&D, manufacturing and marketing. Only then [do we] come up with what is called a final product concept. (INT-MPD, p.2)
R&D sharing panel	●			In R&D we are the formulators, who develop the formulas. Internally, we form a panel [to share ideas among] ourselves... So it’s like a solid team, ensuring that the formulas we deliver to marketing are the best out of all the others... (INT-MPD, p.5)		..., when we’re going to launch new product, R&D and marketing will conduct a coordination meeting to review whether the formula and packaging design are ready... these are also related to manufacturing... (INT-MP, p.16)	
Panel test	●		●	Creation and Development of a New Product. (DOC4, p.16)		The results of a panel test can vary – because [marketing] conducts a panel test among a minimum 30 persons. (INT-MPD, p.10)	The panel test and FGD are conducted before developing the business proposal and the presentation to BOD. (Email INT-MPD, 21-10-15)
Market test-FGD #1	●			FGD is very influential, because it gives confident to us by showing whether the product will be accepted			[Marketing] creates a product concept... Normally after that, we conduct an FGD. We carry out sort of

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>or not by consumers. (INT-MS, p.23)</i>			<i>research and an FGD with a number of people. (INT-DSM2, p.16)</i>
Production capabilities evaluation	●				<i>...they will have started enquiring about the price, calculating it, and then [considering]: Are we capable of this or not? For example, this machine is occasionally just a tooling [system], [which should] fit into our big machine. (INT-MM, p.29)</i>		<i>...the R&D manager has to consider this [product concept] – whether it can be developed or not – as it [might, for example] contain high tech concepts or whatever, for which we don’t have the internal resources. (INT-MPD, p.2)</i>
Business feasibility proposal	●			<i>Then the marketing [team] comes – we come to prepare a business feasibility [proposal]. (INT-DSM1, p. 19)</i>		<i>The coordination [during the feasibility study] is like an informal meeting. Marketing coordinates with purchasing, with R&D. Occasionally, there’s no need to have a meeting – sometimes we come down to them or make a phone call... (INT-MM, p.19)</i>	<i>After we get [the information] from market research, then [we] do a sort of feasibility [study]... so before we generate a product concept... we need to have studied beforehand who the competitors are; if we’re really going to go into that [product], [we need to know] roughly how much the investment is... (INT-MM, p.3-4)</i>
Budget allocation	●			<i>Once a year actually. Say next year we want to do such-and-such, we’re budgeting for it now. “Oh, we want to do this, this...”, whether the machine is available; “we need this, we want to launch this product, do we need additional machines or not? Is the capacity enough or not? Or do we need anything new?” (INT-MP, p.24)</i>	<i>... the budget for this year was reviewed last year, wasn’t it? At that time we actually had a picture of how many categories we wanted... – whether lipstick or face powder – yet at the beginning of [this] year this [proposition] was then reviewed in more detail (INT-DDSM, p.18)</i>	<i>...marketing actually allocates [the budget to] each brand. But sometimes the board or finance says, “This amount is for marketing anyway” – but I have to deduct it first for overhead [costs], royalties. (INT-MM, p.21)</i>	
Business proposal evaluation	●			<i>The board usually examines [the business proposal] and [decides] whether the price is within [the range], the investment is OK, and it’s OK from a marketing aspect, from a target market aspect: all these. Occasionally, everything is OK and [every proposed product] can be developed; however, in the end, out of 10 we [usually] just select two, because we prioritise [products] that are the most appropriate. (INT-DSM2, p.16-17)</i>		<i>Then, ...based on the business proposal, we discuss- I bring this [business proposal], along with the marketing [team], to the board [of directors]... (INT-DSM1, p.19)</i>	<i>Then [marketing] prepare the business proposal. The management team re-evaluates... the market share, the target, what the marketing strategy looks like – [they] will be re-evaluated. The brand manager needs to present [them] to the board of directors] (INT-MPD, p.2)</i>

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Post-launch review	●			<i>Well, particularly for new products, that [review] is usually more specific. What kind of new products are launched, what occurs this month or this semester – they will be monitored in terms of sales-per-unit (INT-DDFA, p.24)</i>	<i>Every month a board meeting is in place; we need to provide information about the progress [of the products launched], if that deviates from the KPI which we determined. And if the [degree of] non-achievement is too great, I have to be able to give reasons and provide the action plan... (INT-MM, p.30)</i>		<i>...the review related to the product portfolio is more [about] the products launched... the [performance] period is the first two months – how [performance] looks, from the distribution side, sales – and then the first six month’s [performance]. (INT-MS, p.11)</i>
Existing product review	●			<i>...if, for example, in the third year the growth unexpectedly fails to achieve [the target] and sales fails to achieve [the target], [whereas] the costs reach [the target], this means losses – the bottom line is we’re lost. So we can ‘OK’, ‘Go’ or ‘Kill’. (INT-DSM1, p.40)</i>	<i>Sometimes [the number of products] sold was three out of ten. This means we need to regularly [review] the seven left; how should they be treated? Stop the production or get them promoted? So that’s why every month in the business review, this [issue] is raised: [evaluating] how much stock there is, how it should be tackled... (INT-DDSM, p.19)</i>	<i>Every month a board meeting is in place... so every month I have to report... [I] not only report about new products, but actually also report about everything. (INT-MM, p.30)</i>	<i>Well, in customer care [the complaints] are then sorted: “These are for promotion, these are complaints about a product, these are complaints about quality.” (INT-MM, p.10)</i>
Product development kick-off	●			<i>When BOD has approved [the business proposal], we can then provide R&D with a [product] concept... it’s kind of the kick-off: “OK, the project can start. (INT-MM, p.19-20)</i>			<i>When BOD has approved [the business proposal], we can then provide R&D with a [product] concept... (INT-MM, p.19-20)</i>
Formula development	●	●		<i>When the feasibility study is OK – meaning that the board [of directors] is OK – to start the project, then we create a [product] concept, and brief R&D. After that, R&D develops the formula. (INT-MM, p.6)</i>	<i>Creation and Development of a New Product (DOC4, p.16)</i>		<i>...then we create a [product] concept, and brief R&D. After that, R&D develops the formula. (INT-MM, p.6)</i>
Extract development	●	●		<i>‘S’ [brand] needs [to incorporate] specific ingredients from Indonesia; that becomes its strength and uniqueness... so R&D sometimes first has to source the plants, and then [they are] extracted. (INT-MM, p.7)</i>	<i>Creation and Development of a New Product (DOC4, p.16)</i>		<i>Creation and Development of a New Product (DOC4, p.16)</i>

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Packaging development	●	●	As [the formula] is developed by R&D, [everything happens in] parallel; ...the packaging [development] also starts right away. What we want, [that’s what] the packaging has to look like... (INT-MM, p.7-8)	...out of each brand there may be nine, ten products [which are developed]. Each marketing [group] has projects every year, either to replace the existing products or [to develop] completely new products... For instance, “How much packaging stock is available? How many raw materials are available? When are we going to launch? Are the available stocks enough? Do we need to order more packaging?”... (INT-MP, p.6)	Creation and Development of a New Product (DOC4, p.16)	Packaging [development] will be split further, starting from mock-up and design – mock-up to production process – and... the tasks are divided; some parts are made by R&D, some are made by us, [marketing], some are made by sales. Well, those [processes] are monitored every week. (INT-DDSM, p.30)	Creation and Development of a New Product (DOC4, p.16)
Product appraisal	●	●	Product appraisal means ...we evaluate – ...evaluate the safety and efficacy of the product. ... Every single product, before going into production, before it can be stamped by QA, needs to pass safety tests [applied] to human (INT-MR, p.1).	Creation and Development of a New Product (DOC4, p.16)	Creation and Development of a New Product (DOC4, p.16)	...when developing a product, we should consider its production. R&D will develop the process guidance, although the production [team] who will carry out it. We have to prepare the equipment required for production, because laboratory scale equipment is different with those for the production scale (INT-MPD, p.6)	...So efficacy can only be ensured if safety has been OK. The next ones are: the stability has been OK, compatibility has been OK... (INT-MR, p.10)
Production scale up	●	●	Creation and Development of a New Product (DOC4, p.16)	... finally production is still controlled... not controlled but supervised... because R&D is [the department] which creates [the formula], so for the scale-up, R&D is still involved. However, after it starts running steadily, then it’s released [to manufacturing]. (INT-MAR, p.2)	Creation and Development of a New Product (DOC4, p.16)	...when developing a product, we should consider its production. R&D will develop the process guidance, although the production [team] who will carry out it. We have to prepare the equipment required for production, because laboratory scale equipment is different with those for the production scale (INT-MPD, p.6)	
Market test-FGD #2	●		For particular new products, sometimes FGD or market research is carried out again. For example, for products [which require a] large budget. (Email-MPD, 21-10-15)	Normally, before the product launch, there is always an FGD. The FGD actually includes... [the product’s] colour, packaging, fragrance, benefit, the benefit value of the product: those all are [examined in] FGD... (INT-MS, p.9)	Creation and Development of a New Product (DOC4, p.16)	...when developing a product, we should consider its production. R&D will develop the process guidance, although the production [team] who will carry out it. We have to prepare the equipment required for production, because laboratory scale equipment is different with those for the production scale (INT-MPD, p.6)	...OK, we translate them into a concept; the formulation is ready, and then we [design] the graphics, the packaging. After that we do a market test again. (INT-DSM1, p.19)
Product development progress coordination	●	●	There’s a coordination meeting... so there’s no special [portfolio] meeting... [It’s held] monthly. [It’s] still monthly, but if [we] are about to launch [the new products], it could be 2-3 times per month. [We discuss] the timetable: everything must stick to	Those who routinely [have coordination meetings] every month are R&D and marketing, because in the beginning the one more in charge is R&D. Later on, if it’s already about in the middle [of the process], [where] the product being developed	Creation and Development of a New Product (DOC4, p.16)	...the product development progress [meeting]..., it’s very technical. So it’s normally marketing, R&D and purchasing who have a meeting; the directors are welcome to attend, but it’s very technical really. [For example], “Oh... there’s problem with	In terms of a meeting, we call a product development progress coordination [meeting], conducted before a BOD meeting held every month. (Email-SRD, 15-10-2015)

First-Order Codes	Data Sources			Supporting Evidence for Feldman and Pentland’s Definition			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Developing marketing strategy	●			<p><i>the timetable. (INT-MM, p.29)</i></p> <p><i>But is the printing design ready or not? It’s actually common to have printing on the container, isn’t it? Well, the FA^{††} is done; it has to undergo FA processes in order to be provided to the suppliers, so they’ll deliver ones already printed. (OBS, group brand manager, p.4)</i></p>	<p><i>becomes clear, then those involved are PPIC, purchasing, production, and at the end [of the process] QC and QA are then involved” (INT-MPD, p.19).</i></p>	<p><i>A, problem with B”. (INT-MAR, p.12)</i></p> <p><i>Yes, so we have a coordination meeting... there, everyone shares [any issues], “Oh! There are obstacles, this [process] has got to this [point]” (INT-MPD, p.19)</i></p>	
				<p><i>Well, after [the production scale-up], marketing will carry out the development of the marketing strategy and that kind of thing. (INT-MAR, p.2)</i></p>	<p><i>Before [it’s] launched, ...we need [to look into the] four Ps [product, price, place, promotion]. From the pricing aspect, what the price is, what competitors offer, what we offer... Then, the placement – in which distribution [channels] we want to place the products. These should involve sales people really. Then how the promotion is going to be [done]. (INT-MS, p.3)</i></p>		<p><i>Well, after [the production scale-up], marketing will carry out the development of the marketing strategy... (INT-MAR, p.2)</i></p>
Placement of products at right channels	●			<p><i>For our premium products like ‘D’^{‡‡} which have a high price, of course we place them only in premium department stores... [while] hypermarkets, supermarkets, and notably minimarkets are [the distribution channels] for the mass products (INT-MS, p. 13)</i></p>	<p><i>...normally, a company like ours, which has been running [a business] focusing on cosmetics, knows the [appropriate] distribution channels by heart. (INT-DDSM, p.10-11)</i></p>		<p><i>...the factory has been set up, as well as the raw materials... finally we determine where we’re gonna distribute [the products]... (INT-DDSM, p.10-11)</i></p>

INT–Interview, OBS–Meeting observation, DOC–Document

†† Final artwork.

‡‡ The initial of one of CosmeticCo’s product brands.

6.4.3 Forming Categories

The first-order codes were then grouped into categories based on the similarity and adjacency of the activities represented by the codes. The process was conducted iteratively⁶³ with the inspection of portfolio management categories in RQ 1. For example, the first line of the transcript of an interview with the sales and marketing director #1 (Figure 6.3), states, “*Normally, my R&D collects every formula, so [we] have a [formula] catalogue*”. This was coded as first-order code ‘Formula collection and research’ which was then classified in the ‘New product research’ category.

The result of category formation is displayed under the data structure in Figure 6.4. This shows that seven categories emerged from the data: (2) Market and Industry Analysis; (3) New Product Research; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning. These indicate where routines play a role in portfolio management at CosmeticsCo.

⁶³ The analysis was also supported by information which emerged from the relationships between the first-order codes, shown in Appendix C.2.

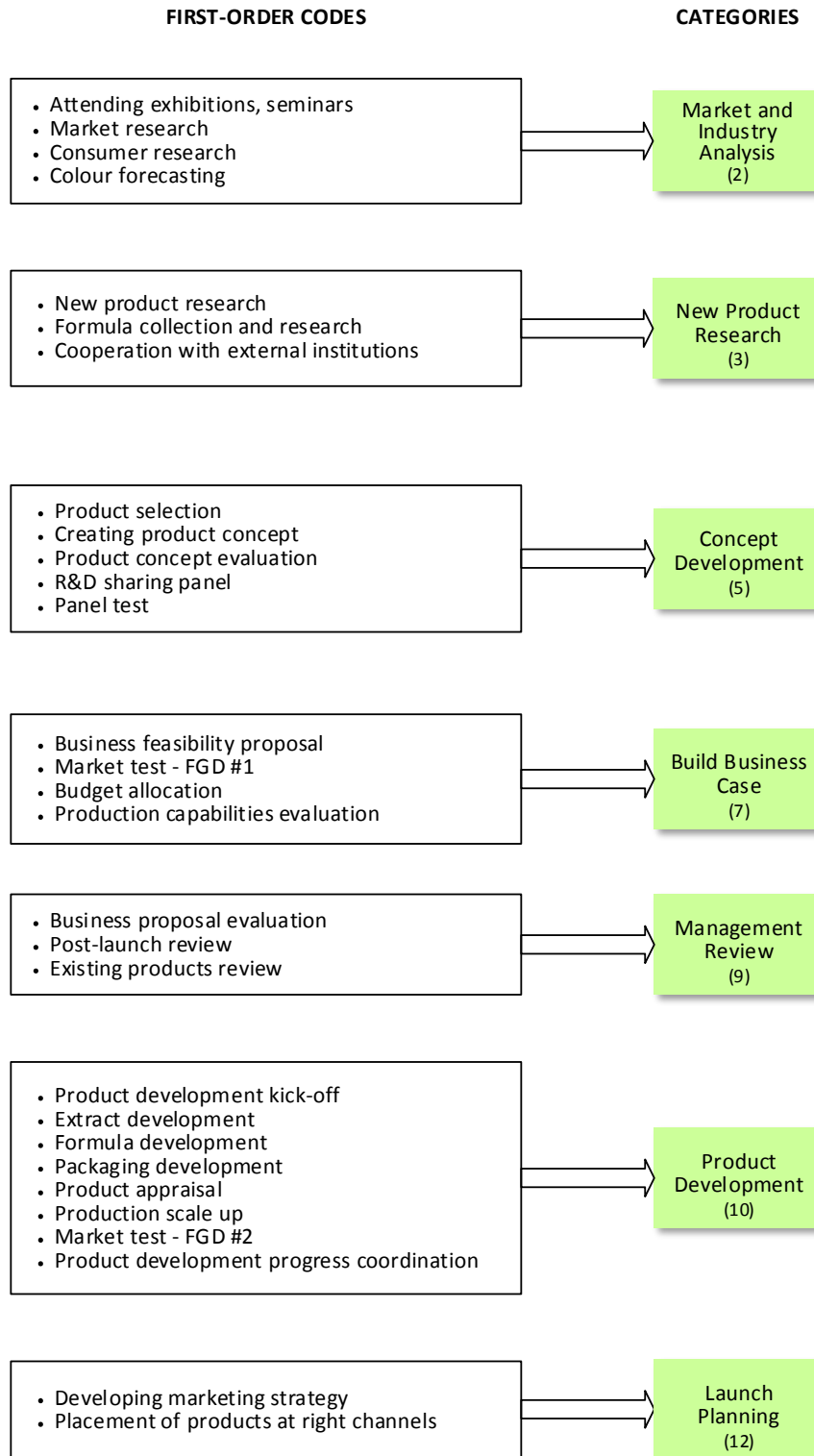


Figure 6.4: Data Structure of Organisational Routines in the NPD Portfolio Management at CosmeticsCo⁶⁴

⁶⁴ Note that these categories match those shown in Figure 6.2, indicating the iterative nature of the way RQ 1 and RQ 2 were answered.

6.4.4 Relationships between Categories

In this part, the analysis referred to Strauss and Corbin's (1998) notion of *axial coding* to address the relationships between categories. These relationships were identified through examining the connections between the first-order codes, as demonstrated in the example in Figure 6.3, which sets out the connection between the codes of 'New Product Research' (under 'New Product Research') and 'Creating Product Concept' (under 'Concepts Development')⁶⁵.

Figure 6.5 shows the relationships between and among the categories. Here, a single-headed arrow represents one routine which affects another routine; a double-headed arrow denotes interplay between routines. For example, the 'Market and Industry Research' routine affects (represented by the symbol '→') the 'New Product Research' routine. An interplay also exists between the 'Market and Industry Research' and 'New Product Research' routines. These relationships provide information concerning the process occurring, which enabled the process framework to be delineated. This framework shows that⁶⁶ routines are built by connecting parts; their connections thus establish the existence of the routines (Feldman and Pentland, 2008).

To conclude, evidence from various sources supports the construct of relationships between routines. This led to the development of the framework of routines in CosmeticsCo's NPD portfolio management, as shown in Figure 6.6

⁶⁵ The complete connections between first-order codes are shown in Appendix C.2.

⁶⁶ As described in Chapter 3, Organisational Routines.

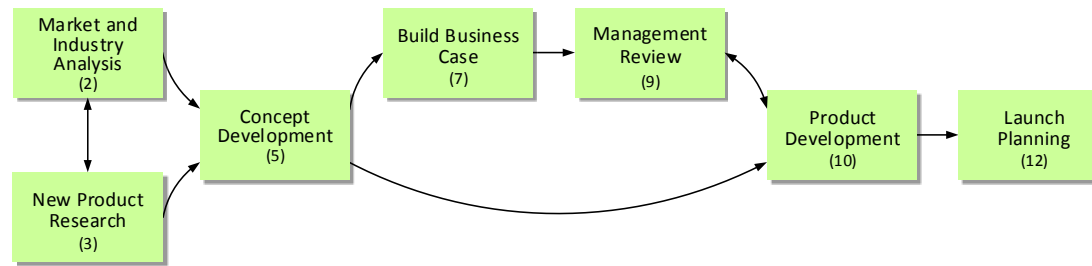
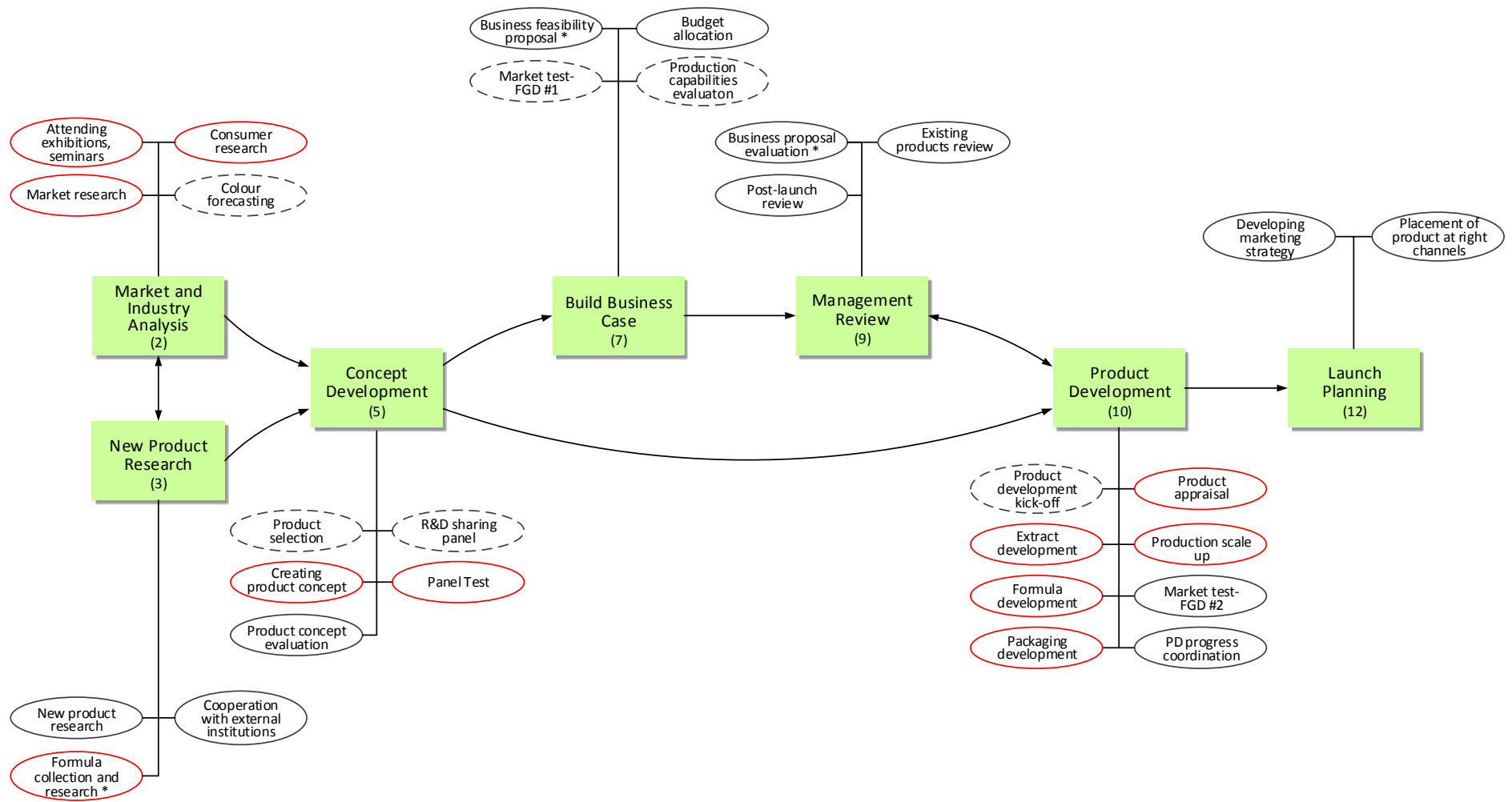


Figure 6.5: Relationships between Routine Categories at CosmeticsCo

ROUTINES	2 Market and Industry Research	3 New Product Research	5 Concept Development	7 Build Business Case	9 Management Review	10 Product Development	12 Launch Planning	REPRESENTATIVE QUOTE
2 Market and Industry research	↔		→					...so the first stage certainly comes from the [market] research, meaning whether the product [ideas] are actually needed or not by consumers. (INT-MM, p.3) Creation and Development of a New Product (DOC4, p.16)
3 New Product Research		→						Whitening – OK. What does the formula look like – what sort of white aspects should it have? Oh, they're like this? OK, we translate them into a [product] concept. (INT-DSM1, p.19)
5 Concept Development			→			→		Well, usually, after all [the product concept creation processes] are finished, then a complete business proposal is written, the one presented to the board of directors. (INT-DSM2, p.16) If this [presentation to BOD] gets through, then [marketing] give [the product concept] to us to launch. However, even if [the process] hasn't reached that stage, the development is still carried out, otherwise we waste time... (INT-MPD, p.3)
7 Build Business Case				→				Then... based on the business proposal, we discuss- I bring this [business proposal], along with marketing [team], to the board [of directors]... (INT-DSM1, p.19)
9 Management Review					→			When the BOD has approved [the business proposal], we can then provide R&D with a [product] concept... it's kind of the kick-off. "OK, the project can start". (INT-MM, p.19-20)
10 Product Development					→	→		Yeah, because sometimes, [the evaluation is based on] the concept ...[and] the evaluation is actually performed by the directors, who don't have any idea what the formula looks like, what the design looks like. [So they need a kind of] mock-up... (INT-MPD, p.3) Well, after [production scale-up], then marketing will carry out the development of the marketing strategy... (INT-MAR, p.2)
12 Launch Planning								

Note: → – One routine affects another routine
 ↔ – Interplay between routines



Note:

- - Partly verified
- - Formal (documented) subroutine
- * - Evidence for this routine was also found in the simulation (explained in Section 6.4.5)

Figure 6.6: Framework of Routines Underlying the NPD Portfolio Management at CosmeticsCo.

6.4.5 Supporting Evidence from the Simulation

The simulation was designed to stimulate discussion to demonstrate how CosmeticsCo performs portfolio management. As described in Chapter 3, Cohen and Bacdayan (1994) considered that organisational routines are stored as *procedural memory*⁶⁷. The simulation was applied to identify *conversations*⁶⁸ which stem from the participants' procedural memories, in which routines in portfolio management are likely to be embodied. By recognising these actions, the corresponding routines thus can be revealed.

Two BOD members (the innovation centre director, and the sales and marketing deputy director) and three managers (of product development, research, and applied research) participated in the simulation. The BOD representatives are permanent board members involved in CosmeticsCo's BOD meeting; the managers participated also usually attend the BOD meetings.

The video recording and its transcript were analysed to identify where the conversations appeared to show routines. An investigation then sought to determine which actions are seemingly exercised in the routines in the company's portfolio management processes. The results, shown in Table 6.8, show that the simulation confirmed three routines. For example, the 'Collecting new creation' conversation, enacted by the sales and marketing deputy director (DDSM) at time 00:39:56 to 00:40:24, is considered to be performed in the 'Formula collection and research' routine, which prepares new formulas for future purposes. This conversation shows how, when dealing with how a set of projects should be selected, the director evoked the procedural memory which stores the 'Formula collection and research' routine when he recognised there was a potential product for future.

⁶⁷ "It is memory for how things are done that is relatively automatic and inarticulate, and encompasses cognitive as well as motor activities" (Cohen and Bacdayan, 1994, p.554).

⁶⁸ "...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events" (Czarniawska, 1997, p.42).

Table 6.8: Routines and Corresponding Conversations in the Simulation

Routines	Representative Quote	Corresponding conversations in Simulation	#	Representative Quotes
New Product Research				
Formula collection and research	<i>Normally, my R&D collects every formula, so [we] have a [formula] catalogue. (INT-DSM1, p. 19)</i>	Collecting new creation	1	<i>Maybe we in R&D can evaluate ['Atlas'] this year. As the development needs eight years; therefore, ... if we [develop it from now], we will have its intellectual property and we can register it in advance. So other people can't use it even if we launch it ['Atlas'] eight years later. (SIM-DDSM, 00:39:56-00:40:24)</i>
Build Business Case				
Business feasibility proposal	<i>The marketing [team] come next; we come to prepare a business feasibility [proposal]... So, [the] first [consideration] is the market size. Is it [big] enough or not? (INT-DSM1, p.19)</i>	Considering selection criteria	3	<i>...so, the ones we select are the products which have high market potential, and those that have actually been part of the development process will be accomplished, as they will provide returns. After that, we'll move to the next products, those that have potential even though the market priority might be smaller. (SIM-DDSM, 00:48:30-00:48:50) (Debriefing)</i>
	<i>...business proposal, what the trend is, the segments, how strong the market is, to what extent we're gonna capture the market share and whether the company's resources are available. (INT-DSM1, p.41)</i>	Considering manpower resources	5	<i>If [we take] 'Antares' as an example, extra money may be needed, because of the shortage of manpower. (SIM-MR) [According to] the 'Antares' resource requirement, manpower for the project comes from other projects. (SIM-MAR) Oh, if it's chosen, other projects will be struggling. (SIM-DIC) (SIM-DIC, MAR, MR, 00:31:13-00:31:43)</i>
	<i>So in launching a new product, there are two [elements] we measure: timing and the sales... But for a specific new product launch, for example, as part of the launch proposal, we present the first-year sales target. (INT-MM, p.30)</i>	Relating time-to-launch to return	2	<i>It needs to be considered here..., the Asterion's development time; the time to launch is six months, meaning that it's very fast. If we can [proceed]..., we can gain revenue again right away. (SIM-DDSM, 00:27:43-00:27:56)</i>
Management Review				
Business proposal evaluation	<i>The board will ask, "What percentage are you gonna take from the market share?..." (INT-DSM1, p.39)</i>	Considering market share	2	<i>Well, what's the percentage of the contribution of the Japanese market to our [total] market? (SIM-DDSM, 00:23:58-00:24:02)</i>
	<i>Before entering that commercialisation [stage], they'll prepare a business proposal. How much your forecast is, how the communication is [managed], what the positioning [of the product] is, what claims does it make, and then how great are your sales projections... If it's feasible then the BOD will decide: "OK, this [project] will be funded" (INT-DIC, p.14)</i>	Considering sales projection	7	<i>If we have to choose, we'd rather take 'Bellatrix', really, instead of 'Capella'. (SIM-MPD) Why 'Bellatrix'? (SIM-DIC) Because the sales projection is much higher than that of 'Capella'. (SIM-MPD) (SIM-DIC, MPD, 00:16:19-00:16:32)</i>

Routines	Representative Quote	Corresponding conversations in Simulation	#	Representative Quotes
	<i>...in the end, out of 10 we [usually] just select two, because we prioritise [products] that are the most appropriate. (INT-DSM2, p.16-17)</i>	Portfolio prioritisation	10	<i>But if we take 'Atlas', surely, our 'Asterion' and 'Bellatrix' will die... stuck; [meanwhile] they have funded, really. (SIM-DIC). Yes, it's a pity, as they're already ongoing (SIM-MAR) So, that means that we schedule 'Atlas' for next year. (SIM-DIC) (SIM-DIC, MAR, 00:41:29-00:41:49)</i>
	<i>The board usually examines [the business proposal] and [decides] whether the price is within [the range], the investment is OK, and it's OK from a marketing aspect, from a target market aspect: all of these. (INT-DSM2, p.16)</i>	Referring to selection criteria	8	<i>So there are three [criteria]: the first one is time, the second one is NPV, the third one is development cost; [this is] correct, isn't it? (SIM-DIC, 00:15:00-00:36:00) [This is] correct, isn't it? So, the time criterion is fulfilled, the turnover criterion is fulfilled, the cost criterion is fulfilled. Correct? (SIM-DIC, 00:06:28-00:06:45)</i>
	<i>So far, internally, we might have had exhaustive 'go' or 'no-go' decisions; however, the [top] management can still say: "OK, we'll cancel it". (INT-MS, p.8)</i>	Pertaining BOD approval	1	<i>Less than 1 [billion]; with a saving... If we can propose to the board [of directors], and if the board agrees, we'll make a saving, but the development of 'Atlas' continues. (SIM-DDSM, 00:42:01-00:42:16)</i>

Note: #—Number of occurrences of the related episode

The simulation provided supporting evidence for the existence of specific subroutines in CosmeticsCo's portfolio management process, including the 'Formula collection and research', 'Business feasibility proposal' and 'Business proposal evaluation'. Most conversations were associated with the 'Business proposal evaluation' subroutine categorised under 'Management Review'. This demonstrates that the simulation typically represents the realm of portfolio selection, under which each potential project business case is evaluated by top managers.

Moreover, some procedural memories (revealed during conversation) which store 'Business feasibility proposal' (under 'Build Business Case') and 'Formula collection and research' (under 'New Product Research') subroutines also emerged. In particular, those which store the 'Business feasibility proposal' subroutine was relatively more dominant, with total of ten occurrences: 'Considering selection criteria' (3), 'Considering manpower resources' (5) and 'Relating time-to-launch to return' (2). Meanwhile, even though a 'Collecting new creation' conversation emerged only once (with the director), it provides distinct evidence that the top management pays close attention to the preparation of future products.

6.4.6 Conclusions

Based on evidence from the interviews, meeting observation, documents and simulation, it is shown that portfolio management at CosmeticsCo is built utilising seven routines: (2) Market and Industry Research; (3) New Product Research; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning. Each routine is based on several interacting subroutines.

6.5 LINKAGE TO ESPOUSED BUSINESS STRATEGY: RESEARCH

QUESTION 3

This section addresses RQ 3: *Is the [CosmeticsCo's] espoused business strategy considered in product development portfolio management (as evidenced in routines)?* The discussion is divided into two parts: (1) identifying CosmeticsCo's espoused business strategy and (2) identifying the routines in NPD portfolio management which consider the strategy.

6.5.1 Identifying CosmeticsCo's Espoused Business Strategy

A business strategy should consider the questions⁶⁹: “What main goals are we trying to achieve?”; “What markets do we focus on primarily?”; “How do we describe our competitive strategy?” and “Which capabilities do we need to develop?” (Bowman, 1998; Finlay, 2000). However, Cooper (1984, 2005) did not consider the target market to be an aspect of business strategy. Adopting this view⁷⁰, the three key aspects of business strategy considered in this study were organisational goals, competitive strategy and capabilities.

Questions enquiring into organisational goals, competitive strategy and capabilities were posed only in the interviews with the CosmeticsCo directors; nevertheless, a number of other managers raised these issues during the interviews. In the analysis, ‘organisational goals’, ‘competitive strategy’ and ‘capabilities’ were adopted as codes representing key aspects of strategy. The left-hand side of Table 6.9

⁶⁹ The list of questions was partly based on email discussions (18-02-2014) with Cliff Bowman, Professor of Strategic Management at Cranfield School of Management.

⁷⁰ As also reflected in Figure 2.1.

shows the results, including the data sources and supporting evidence. For example, ‘pioneering’ is an organisational goal which emerged from the interview with the sales manager, which was triangulated with a document (DOC4). To answer RQ 3, it is necessary to examine whether these key aspects of business strategy are considered by CosmeticsCo as part of the portfolio management process and if so, within which routine(s) they are considered.

6.5.2 Espoused Business Strategy Considered in the Routines

This subsection analyses whether the routines in CosmeticsCo’s portfolio management process (Figure 6.6) consider the company’s business strategy, in terms of organisational goals, competitive strategy and capabilities. An examination was conducted of each routine, inspecting whether these three aspects were referred. The results of this investigation are also presented in Table 6.9. As described earlier, the left-hand side of the table presents CosmeticsCo’s espoused business strategy, whereas the right-hand side of the table (shaded grey) depicts the routines in which the respective espoused business strategy is considered.

It is shown, for example, that the organisational goal ‘pioneering’ is considered to be part of the ‘Attending exhibitions, seminars’ subroutine (grouped under the Market and Industry Analysis routine), as discussed by sales and marketing director #2: *“Marketing can also see technology from abroad, for example at exhibitions. We attend exhibitions and see, ‘Oh this looks... brand new, even abroad’; then we bring ideas like these [to the company]”* (INT-DSM2, p.16). In contrast, the goal ‘global brands’ was not found in any routine.

The investigation results are then arranged within the framework of routines shown in Figure 6.7 This shows that different key aspects of business strategy are considered across portfolio management at CosmeticsCo. These are discussed in detail in the following passages.

The Market and Industry Analysis routine appears to pursue the organisational goals, specifically ‘pioneering’, ‘building future products’ and ‘featuring local resources and culture’. The New Product Research routine, besides considering organisational goals, also establishes a competitive strategy within the context of ‘responsive to the market’.

Furthermore, the Concept Development routine strives for the organisational goals of 'margin'. In this routine, a competitive strategy is employed, particularly in defining an appropriate 'portfolio' and in its 'focus on core brands'. CosmeticsCo's Build Business Case routine considers the organisational goals of 'market share' and starts to prepare the competitive strategy of 'promotion'.

Table 6.9: Data Supporting Identification of Espoused Business Strategy and Corresponding Routines

Key Aspects	Espoused Business Strategy		Routines in which the Espoused Business Strategy is Considered	
	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
Organisational Goals				
Pioneering	●	● <i>The things we expect are, firstly, to be a pioneer in the innovation sense. That's what we expect. For example, while others haven't got [particular items], we've got them already.</i> (INT-MS, p.2) <i>Innovation Leadership: Trend setter, Pioneer in Natural & Green Cosmetic, Invention/Patent.</i> (DOC4, p.7)	Market and Industry Analysis: Attending exhibitions, seminars	<i>Marketing can also see the technology from abroad, for example at exhibitions. We attend exhibitions and we see, 'Oh this looks... brand new, even abroad'; then we bring ideas like these [to the company].</i> (INT-DSM2, p.16)
Global brands	●	● <i>We want to be a leading company globally in toiletries, cosmetics and spa. But we have short-term goals for five years; we have to be a regional player.</i> (INT-DSM1, p.6) <i>Superior Uniqueness: Local Wisdom Go Global.</i> [DOC4, p.7]	—	—
Building future products*	●	<i>Why should we initiate [these brands]? ...because these are brands, which are still supported by [other brands], aimed at building the future.</i> (INT-DSM1, p.2)	Market and Industry Analysis: Attending exhibitions, seminars New Product Research: Formula collection and research	<i>...We usually attend seminars, exhibitions; we've got [all] kinds of ideas. Maybe for Indonesia [these ideas] haven't been [needed] up to now, but [when] we get home, the formula is developed anyway... (INT-MPD, p.3)</i> <i>...Maybe for Indonesia [these ideas] haven't been [needed] up to now, but when we get home, the formula is developed anyway... whether what we've been told by the suppliers, the manufacturers of the materials is right or not. We prove that in the laboratory – we ask for a little sample and try it; it's just to help us understand. So if, for example, a request comes, we've understood what substances are used.</i> (INT-MPD, p.3)
Featuring local resources and culture	●	<i>We have a policy that all colour trend [products] we create should feature a local area in Indonesia: the area, nature and culture.</i> (INT-MPD, p.23)	Market and Industry Analysis: Colour forecasting New Product Research: New product research	<i>We carry out research; actually, out there, globally, there are many [institutions] doing the same kind of research. We can buy their research, [to speculate] "What's the colour [going to be] like next year?" Our task is to make [sure] the colours, which will appear in Indonesia, are really fit for Indonesians.</i> (INT-MPD, p.23) <i>...then normally we blend the ideas from abroad with the Indonesia [identity], so that we have a distinct product... We need to master the technology and overseas products, which we combine with ingredients from Indonesia.</i> (INT-DSM2, p.16)
Market share*	●	● <i>In terms of the market share, out of all the players in Indonesia, we are number 5; we want to be number 4. Then, in the [area of] decorative [products], we, from number 3, want to become number 2.</i> (INT-MS, p.14)	Build Business Case: Business feasibility proposal	<i>...business proposal, how the trend is, the segments, how strong the market is, how much we are gonna take the market share and whether the company's resources are available?</i> (INT-DSM1, p.41)

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Aspects	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
		<p><i>Create a marketing strategy for all existing brands to prevent overlapping between brands; this can increase the market share of all owned brands... (DOC3, p.19)</i></p>	<p>Management Review: Business proposal evaluation</p>	<p><i>Our board [of directors] also knows whether what we propose is fit for what's happening in the market... then they should be concerned with [the factors] that determine the success of the product, [like]... what the percentage of market share in Indonesia we're going to take, what the impact's gonna be like on our sales within five years. (INT-MS, p. 6)</i></p>
Market existence	●	<p><i>There are products which aren't highly profitable; however, they're part of our proposition. And if we look at the vision of the owner to beautify Indonesian women, there are really some SKUs where the sales are not that high. They are in niche markets – but we have to exist there to dominate the beauty markets. (INT-MM, p.2)</i></p>	<p>New Product Research: New product research</p>	<p><i>We don't only develop totally new products, but also rejuvenate existing products. So those products must have had lots of loyal users, right? So we don't want them then turning around because we kill those products. (INT-MR, p.8)</i></p>
Market expansion	●	<p><i>The population – the ASEAN markets as a whole – is big enough. Indonesia has [a population of] just 250 million. However the cost of entry [into countries] like Laos, Kamboja, is low. So for the next five years we're going to invest in those countries. (INT-DSM1, p.7)</i></p>	–	–
Margin*	●	<p><i>Oh, in the organisation? The first thing to be decided is definitely the margin. Whether that new product will provide additional margin to the company. If not... it wouldn't be released (INT-MS, p.5)</i></p>	<p>Concept Development: Product concept evaluation</p> <p>Management Review: Business proposal evaluation</p>	<p><i>Consumer needs is number one. Then we look into the trends... But these two are calculated [to evaluate] how sustainable [the product concept] will be. Because sustainability in business is closely related to the profitability [of the business]. (INT-DDSM, p.22-23)</i></p> <p><i>Based on the business proposal, we discuss- I bring this [business proposal], along with the marketing [team], to the board [of directors]. This is our opportunity; the size is so much; the consumer behaviour is still like this; the preference is like this; this is the additional, as they expect more, for example. Only then do we estimate the P and L, how many years will this lose? (INT-DSM1, p.19)</i></p>
Growth	●	<p><i>For example, [if] we want to grow by so much, we discuss how much growth comes from existing products. Are the existing product [sales] enough to achieve the company's goal for next year? Normally, they aren't. So new products need to be [launched]. (INT-MS, p.3)</i></p>	<p>Management Review: Existing product review</p>	<p><i>Growth in the men's grooming industry, for example, is only 15%; How much do you get? 20%, that's not bad. Because you're supposed to get 30% if you want to seize the market share. (INT-DSM1, p.40)</i></p>
Competitive strategy				
Portfolio	●	<p><i>We have to really employ [the concept of] a portfolio. If we look at the segments, we have many [products in those segments]. We actually spread the risk. (INT-DSM1, p.10)</i></p>	<p>Concept Development: Product selection</p>	<p><i>What's the market condition like, which brands do we want to take on the challenge? And at the right time, only then we select the driver of the product portfolio. (INT-DSM1, p.22)</i></p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered			
Key Aspects	Data Sources			Representative Evidence	Routines	Representative Quotes
	Int	Obs	Doc			
Focus on core brands	●	●		Well, we as management... let's focus on 'S' and 'M'. Because 'M' is the second biggest brand [after 'S'] (INT-DSM1, p.10) ...the company established the strategy focusing on competitive advantage. The focus is directed at brands which will issue or promote the products, the type of product and category, the type of consumers, the distribution channels used and the marketing area. (DOC3, p.15)	<p>Concept Development: Product selection</p> <p>Management Review: Business proposal evaluation</p>	<p>We focus on those two. 'S' is a driver, 'M' is for retaining the low market, and another one actually is 'R' for retaining the hair [related products market]. (INT-DSM1, p.11)</p> <p>We would rather focus on the large 'cake'. (INT-MM, p.32)</p> <p>...normally if the [proposed] new products are like personal care, like shampoo – that kind of thing, used by everyone – the BOD is more lenient. (INT-MM, p.6).</p>
Promotion	●			First, promotion. Second, distribution. Third, availability. Well, from the promotion aspect, [we ask ourselves] has it gone to plan? Have we advertised in the right magazine, TV channel or website which fits our target markets? (INT-MM, p.33)	<p>Build a Business Case: Budget allocation</p> <p>Management Review: Business proposal evaluation</p> <p>Launch Planning: Developing marketing strategy</p>	<p>For new products, we're gonna invest in promotion. Ranging from the design to promotion needs more than 50% from the total [marketing] budget, actually. Because we're sure that products like [colour] trend is a kind of locomotive. So, basically, if we launch it, the other products will be carried with it. (INT-MM, p.23)</p> <p>After the launch proposal is ready, we need to present once more to the board [of directors] and to finance. Well, at that stage they should know the cash flow and investments for promotion. (INT-MM-p.20)</p> <p>Before [it's] launched, ...we need [to look into the] four Ps. From the pricing aspect – how much is the price, what the competitors' price is, how much ours is. Then, the placement – in which distribution [channels] we want to place the products. These should involve sales people really. Then how the promotion is going to be [done]. (INT-MS, p.3)</p>
Distribution	●			From a distribution point of view, we determine what types of channel we want to enter – hypermarket, supermarkets or cosmetics stores. (INT-MM, p.33)	<p>Launch Planning: Placement products at right channels</p>	<p>If we're gonna develop [new products]... the placement 'P' [is to determine] in which channels are we gonna place [the products]? [Let's say] modern [channels]. Which modern channels [are they]? (INT-MS, p.13)</p>
Responsive to market	●			So we really expect we can react faster to market [changes], because the moment [for the products] is not lasting, [like for] cosmetics, toiletries. So with some products we're market leader; or [if we have products] where we're the follower, we shouldn't be too late [entering the market]. (INT-MS, p.2)	<p>New Product Research: Formula collection and research</p>	<p>To speed up the process we, in R&D, although the [product] concept isn't in place yet, usually create what are called formula prototypes; it's a sort of data bank. So once... the [product] concept is ready: "Oh, it's been developed", so [the product development] can be faster (INT-MPD, p.3)</p>
Availability	●			Availability is related to displayed products. (INT-MM, p.33)	<p>Product Development: Product development progress coordination</p>	<p>There's a coordination meeting... [We discuss] the timetable: everything must stick to the timetable. (INT-MM, p.29)</p>
Capabilities						

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Aspects	Data Sources			Routines	Representative Quotes
	Int	Obs	Doc		
R&D human capital	●		<p><i>R&D human capital is the one which drives us, but then it's down to marketing... our organisation capability is strengthened in the necessary areas: R&D, marketing, mainly their human resources. (INT-DSM1, p.12-13)</i></p> <p><i>So the [key capabilities] are based around competences. And as I've mentioned, one of these is R&D, which is very strong. I'd even say the number of personnel is too high. (INT-DIC, p.7)</i></p>	–	–
Lean marketing organisation	●		<p><i>In marketing we create an organisation which is really lean and mean. (INT-DSM1, p.12)</i></p>	–	–
Sophisticated and efficient production facilities	●		<p><i>And then certainly, there's the machinery. We just bought new machines, which are more sophisticated and faster. (INT-DSM1, p.13)</i></p>	–	–

Note: INT–Interview, OBS–Meeting Observation, DOC–Document

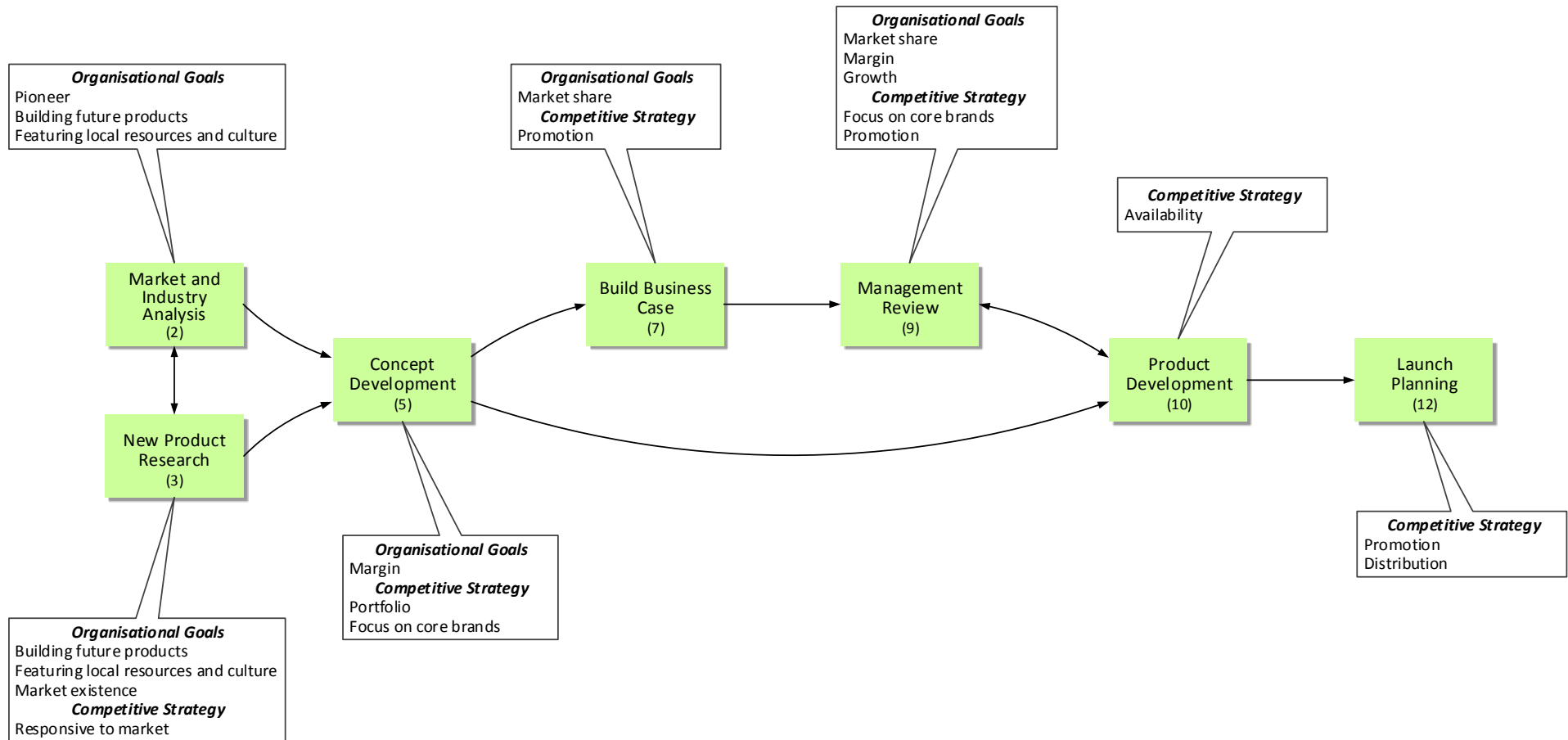


Figure 6.7: Routines and the Key Aspects of Business Strategy at CosmeticsCo

CosmeticsCo's Management Review routine seems to be the one which incorporates most issues of the business strategy. It pursues the organisational goals in regard to 'market share' and financial performance, namely 'margin' and 'growth'. In the terms of competitive strategy, it emphasises 'focus on core brands' and 'promotion'. Next, the Product Development routine no longer considers any organisational goals, as by this stage the portfolio has been selected. Rather, it focuses on the competitive strategy, i.e. 'availability'. This aims at ensuring the product development routine is able to launch any new product right on time. Finally, the Launch Planning routine, which has a relationship with the product development routine, concentrates on consideration of the competitive strategy of 'promotion' and 'distribution'

The investigation results show that while the organisational goals and competitive strategy are considered in the underlying routines, capability issues are not clearly observable. This might be because issues around capability development are talked over in various management forums and not in the portfolio management forum.

6.5.3 Conclusions

Three key issues of CosmeticsCo's espoused business strategy have been identified:

- 1) The organisational goals are constituted by: 'pioneering', 'global brand', 'building future products', 'featuring local resources and culture', 'market share', 'market existence', 'margin' and 'growth'.
- 2) The company's competitive strategy comprises the initiatives of 'portfolio', 'focus on core brands', 'promotion', 'distribution', 'responsive to market' and 'availability'.
- 3) The capabilities are concerned with the development of R&D's human capital, marketing efficiency and effectiveness, and manufacturing facilities.

CosmeticCo's business strategy seems to be considered across the underlying routines of the portfolio management process, particularly the organisational goals and competitive strategy issues. This supports the statement of the marketing manager: "*When we present [the business proposal] to the board [of directors], we have to be able to convince them that it's already aligned with company's objectives; it will never run away from them*" (INT-MM, p.9). Each routine considers different key issues of

business strategy, depending on the nature of the routine. In contrast, the capabilities issues seem to be under-represented in all routines.

6.6 SUMMARY

This chapter has presented an analysis of the CosmeticsCo case in response to RQ 1, RQ 2 and RQ 3. It has illustrated the following:

- RQ 1: *How is new product development portfolio management conducted [at CosmeticsCo]?*

CosmeticsCo has established and applied formal procedures for developing new products; however, procedures for conducting portfolio management do not yet exist. In selecting NPD projects, CosmeticsCo applies selection criteria which are mainly based on financial measures, such as sales and profitability. Finally, BOD meetings are the pivotal points at which the review of new product concepts, and newly launched and existing products occur.

- RQ 2: *What organisational routines can be identified in the new product development portfolio management [at CosmeticsCo]?*

The portfolio management process at CosmeticsCo is built upon seven main routines: (1) Market and Industry Analysis; (3) New Product Research; (5) Concepts Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning.

- RQ 3: *Is [CosmeticsCo's] espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

CosmeticsCo's espoused business strategy entails three key aspects: organisational goals, competitive strategy and capabilities. Organisational goals are considered during the market and industry research, new product research, concepts selection and development, build business case and management review routines. Competitive strategy is considered during new product research, concepts selection and development, build business case and management review; capabilities are under-represented in all routines.

CHAPTER 7 CASE STUDY 2: FOODCO

7.1 INTRODUCTION

This chapter presents Case Study 2, which examines a company located in Indonesia and which manufactures food and beverages. The study was conducted between December 2014 and April 2015, encompassing interviews, a meeting observation, a review of documents and observation of a portfolio selection simulation. The results are presented in the following four main sections:

- The *case description* provides information on the company and the data collected;
- *NPD portfolio management* explains how the company conducts portfolio management and answers Research Question 1 (RQ1);
- *Underlying organisational routines* answers Research Question 2 (RQ2);
- *Link to business strategy* explains how portfolio management impacts strategy and answers Research Question 3 (RQ3).

The chapter closes with a summary.

7.2 CASE DESCRIPTION

7.2.1 Overview of the Company: FoodCo

The company is referred to throughout as FoodCo⁷¹. It has eight product brands, each with different product categories (Company profile, 2015, p.13). FoodCo currently manages 165 existing stock keeping units (SKUs) (see interview with marketing insight general manager, 2015, p.9) and in 2015 was developing 21 new SKUs (see interview with product group #1 marketing general manager, 2015, p.7). Besides serving the Indonesian market, at the time of the study FoodCo was exporting its products to 22 countries in Asia, the Middle East, Europe, Australia and the Pacific region, Africa and North America (Company profile, 2015, p.22).

⁷¹ The name has been changed to preserve anonymity.

7.2.2 Data Collection at FoodCo

Data collection was conducted during 13 on-site visits. Interviews required nine visits, and the introductory meeting, meeting observation, simulation and progress report meeting took one visit each. Meanwhile, the company's documents were received via email. Further details of these visits are provided in Appendix L and the data collected is explained below.

7.2.2.1 Interviews

Semi-structured interviews were conducted with 15 participants, covering four directors and 11 managers from different functions. The directors were each considered to have a strategic role in the portfolio management team; they were thus interviewed using a set of questions which enquired into not only the portfolio management process but also into issues relating to company strategy⁷². In addition, communication via email and Whatsapp messaging was conducted with some participants after the visits, for clarification and confirmation of points raised.

Table 7.1 outlines the details of each interview, specifically the role and responsibility of each participant, the duration of each interview, the date it took place and the number of pages of transcription. The total duration of the interviews was nearly 18 hours. All were recorded and then transcribed, resulting in 380 pages of transcription.

Table 7.1: Interview Details at FoodCo

No	Role	Reference-Initial	Interview details		Transcription (no. of pages)
			Duration (hr:min:sec)	Date	
Board of Directors					
1	CEO, Group ⁷³	INT-CEO	01:15:28	20-03-2015	23
2	Director, Finance	INT-DF	00:57:38	12-02-2015	20
3	Director, Manufacturing	INT-DM	01:28:45	29-12-2014	23
4	Director, Strategic Procurement	INT-DSP	01:13:24	12-02-2015	20
Managers					
5	General Manager, Marketing, Product Group #1	INT-GMM1	01:07:14	16-03-2015	21

⁷² Interview questionnaires are presented in Appendix I.

⁷³ CEO of the holding company which owns FoodCo. He is actively involved in FoodCo's management.

No	Role	Reference-Initial	Interview details		Transcription (no. of pages)
			Duration (hr:min:sec)	Date	
6	General Manager, Marketing, Product Group #2	INT-GMM2	01:09:23	27-02-2015	19
		Email-GMM2	–	03-05-2016	–
					05-05-2016
7	General Manager, Marketing Insight	INT-GMMI	00:57:10	09-02-2015	27
		WAM ⁷⁴ -GMMI		26-04-2016	
				28-08-2016	
				07-10-2016	
				11-10-2016	
				26-10-2016	
8	Manager, R&D	INT-MRD	01:11:26	09-02-2015	33
		Email-MRD	–	14-04-2016	–
9	Manager, Consumer Insight	INT-MCNI	01:10:23	13-03-2015	27
10	Manager, Customer Insight	INT-MCTI	01:15:07	16-03-2015	28
11	Manager, Finance	INT-MF	00:33:20	12-02-2015	11
12	Manager, Supply Chain	INT-MSC	01:11:33	12-02-2015	30
13	Manager, Trade Marketing	INT-MTM	01:20:17	04-03-2015	30
14	Head, Manufacturing, Product Group #2	INT-HM2	01:28:48	04-02-2015	37
15	Manager, Distribution	INT-MD	01:06:38	27-02-2015	31
Total			17:26:34		380

7.2.2.2 Meeting Observation

During the twelfth site visit (20th April 2015), product group #2's marketing monthly review meeting was observed. Table 7.2 summarises the participants of the meeting: one director, three managers from marketing, four managers from R&D, one production manager, one manager from purchasing, two members of finance staff and one member of engineering staff. Together they reviewed the progress of the development of a new product, identified problems and made decisions regarding further progress. The meeting lasted nearly two hours and the recording resulted in 60 pages of transcript.

Table 7.2: Meeting Participants at FoodCo

No	Role	Reference-Initial
1	General Manager, Marketing, Product Group #2	OBS-GMM2
2	Director, FoodCo's subsidiary company	OBS-DSub
3	Manager, Brand, Product Group #2	OBS-MB2
4	Manager, R&D, Product Group #2	OBS-MRD2

⁷⁴ WhatsApp messaging

No	Role	Reference-Initial
5	Manager, Plant	OBS-MP
6	Head, Packaging Development	OBS-HPD
7	Senior Brand Development	OBS-BD
12	Specialist, Purchasing, Packaging Material	OBS-SpPUR
8	Staff member, Packaging Development	OBS-StPD
9	Staff member, Regulation	OBS-StR
10	Staff member, Finance #1	OBS-StF1
11	Staff member, Finance #2	OBS-StF2
13	Staff member, Engineering	OBS-StE

7.2.2.3 Documents

A total of five documents were collected via email. Table 7.3 lists their details, including the name and document initial, number of pages, a brief description of the contents and the collection date of each.

Table 7.3: Documents Collected at FoodCo

No	Document Name	Reference-Initial	#	Description	Collection Date
1	Company profile	DOC1	26	Overview of about the company's structure, milestones, strategic intent, businesses and facilities	Sent by email on 28-12-2015
2	Flow of seven stages	DOC2	7	NPD framework and descriptions of the development stages	Sent by email on 22-07-2015
3	Research and Quality Development	DOC3	9	NPD main process and NPD framework	Sent by email on 28-12-2015
4	Project schedule template-Rank A	DOC4	1	A scheduling template for Rank A-type products in Excel worksheet format	Sent by email on 28-12-2015
5	Project schedule template-Rank B	DOC5	1	A scheduling template for Rank B-type products in excel worksheet format	Sent by email on 28-12-2015

Note: #-Number of pages

7.2.2.4 Simulation

The simulation took place on 20th March 2015. Nine participants had been selected, comprising three board of directors (BOD) members⁷⁵ and six managers, as presented in Table 7.4.

⁷⁵ Note that not all directors were willing to take part in the simulation.

Table 7.4: Simulation Participants at FoodCo

No	Role	Reference-Initial
1	Director, Finance	SIM-DF
2	Director, Manufacturing	SIM-DM
3	Director, Strategic Procurement	SIM-DSP
4	General Manager, Marketing, Product Group #1	SIM-GMM1
5	General Manager, Marketing, Product Group #2	SIM-GMM2
6	General Manager, Marketing Insight	SIM-GMMI
7	Manager, Finance	SIM-MF
8	Manager, Supply Chain	SIM-MSC
9	Manager, Trade Marketing	SIM-MTM

As explained in the methodology chapter, the simulation assigned each participant a short case study⁷⁶ which provided them with a certain budget⁷⁷ and required them to select an NPD portfolio from seven potential projects⁷⁸. Each participant was provided with a *risk-reward diagram* (in the form of a *bubble diagram*) of these potential projects, to support them in analysing the portfolio.

Forty-five minutes were available for the simulation. The portfolio decisions and discussions lasted about 43 minutes. The simulation was filmed and the video recording was transcribed, generating a 22-page transcript.

7.3 NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 1

This section addresses RQ 1: *How is new product development portfolio management conducted [at FoodCo]?* The question was answered mainly by referring to descriptions from individual managers and company documents which were triangulated with the statements of other interviewees. However, it should be noted that more detailed information from RQ 2 (which addresses organisational routines in portfolio

⁷⁶ The simulation case is presented in Appendix J.1.

⁷⁷ This case is a modified version of an innovation portfolio case developed for Cranfield School of Management by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

⁷⁸ The projects entail the development of three product groups: A, B and C; the projects thus are titled by indicating the respective product group of each: (A)ntares, (A)sterion, (A)tlas, (B)ellatrix, (B)etria, (C)apella and (C)astor.

management) informed the analysis of RQ 1, which was iterative⁷⁹. This section presents an overview of FoodCo’s portfolio management practice, followed by a comparison of this practice with portfolio management theory, and then conclusions.

7.3.1 Overview of FoodCo’s Practice

FoodCo has formal established procedures for developing new products, represented in a seven-stage NPD framework as partly depicted in Figure 7.1. The research manager remarked that “...*actually the seven-stage [framework] is a business development process... an end-to-end [process], [showing how] a product is defined from the beginning until it is launched*” (INT-MRD, p.1).

Portfolio views are shown in ‘Initial Screening’ (Stage 1) along with the activities of “*Scanning and mapping [of] portfolio of business in F&B [food and beverage] in the existing category*”. Next, “*Screening process to identify attractive [product] categories by some criteria [is carried out]*” (DOC2, p.1). However, detailed inspection of the interviews, the meeting observation and the documents showed that FoodCo’s formal procedures do not incorporate anything which addresses the prioritisation and management of various products, as the R&D manager stated: “[product development] SOP⁸⁰ exists;...[however], *an SOP for selecting products is not in place* (INT-MRD, p.25).

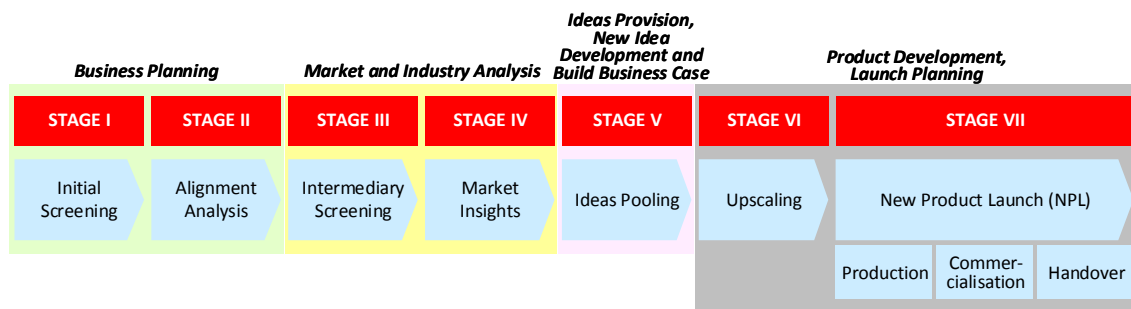


Figure 7.1: Seven-Stage NPD Framework at FoodCo

Source: Adapted⁸¹ from *Flow of Seven Stages* (DOC2, p.1-3)

⁷⁹ This iterative process is depicted in the data analysis framework (Figure 5.2) presented as part of the research design (Chapter 5).

⁸⁰ Standard operating procedure

⁸¹ The version shown here was adapted slightly to help preserve the company’s anonymity.

Further analysis of all data sources uncovered how FoodCo deals with their portfolio (including the example of the framework presented in Figure 7.1). Based on ideas from the literature⁸² FoodCo's portfolio management practice can be grouped into eight categories, as shown in the three-by-four matrix⁸³ shown in Figure 7.2 (in Figure 7.1, different colours suggest certain categories): (1)⁸⁴ Business Planning (depicted by green shading in Figure 7.1); (2) Market and industry analysis (yellow shading); (4) Ideas provision (pink shading); (6) New idea development (pink shading); (7) Build business case (depicted by the area within the line); (9) Management Review; (10) Product Development (pink shading), and (12) Launch Planning (grey shading). Each category is discussed further in the following sections⁸⁵.

Business Planning

This category includes stages I and II, during which interrelated activities are performed: (1) the evaluation of existing product categories in the market; (2) the identification of appropriate categories to be developed; (3) the prioritisation of categories, and (4) the development of a product road map. Under Alignment Analysis (Stage II) in particular, FoodCo carries out prioritisation of product categories, as indicated by the documents, which stated: "*Develop a matrix of product categories*" and "*Develop a [product] road map for 5 years*" (DOC2, p.1; DOC3, p.3). During this stage, top management assigns a target to each category, as the CEO explained: "[As part of the prioritisation of] *those four categories... we actually look at their potential, [such as] market size, and then we make a road map. We're gonna develop [them] so much...; [however] those are [still] 'bulky' [allocations] – the products [involved] aren't known yet*" (INT-CEO, p,7).

⁸² The ideas are also influenced by the results of RQ 2 ('organisational routines').

⁸³ The matrix-form arrangement is purposed for later use on cross-case analysis. It is later termed a '*palette of routines*'.

⁸⁴ This number refers to the category number shown in Figure 7.2.

⁸⁵ Note that in the following sections, in most cases quotations are given with supporting evidence from different sources (other managers, observation or a document), that is, triangulation.

Business Planning (1)	Ideas Provision (4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	(8)	(11)
(3)	(6)	Management Review (9)	Launch Planning (12)

Figure 7.2: Categories of Portfolio Management Practice at FoodCo

Market and Industry Analysis

This category includes stages III and IV, when the following activities are conducted: (1) the analysis of the industry and the product categories’ competitiveness; (2) the determining of the industry and company success indicators, and (3) consumer and market insight studies (DOC2, p.1; DOC3, p.3). Market insight (Stage IV) in particular identifies the most attractive potential market; as the general manager of market insight said, “...*business development... [implement] the seven-stage [framework] by always looking at the market situation [first]; what the market looks like. Then we [identify] which [areas] have the most potential growth. We normally pick out those that have high potential growth... then those that have high economic scale*” (INT-GMMI, p.1). Further, as part of the process the consumer insight team conducts a study on consumer behaviour, described by its manager thus:“...[The consumer insight] *study aims for understanding the emotional aspects of a [product] category, [viewed] from consumer perception...*” (INT-MCNI, p.11).

Ideas Provision

This category comes under Stage V (Idea Pooling). In addition to consumer insight studies, product ideas can also emerge from ‘creativity days’ and open innovation activities. Creativity days organised by R&D are purposed to generate technology-based product ideas, as the R&D manager pointed out: “*If the technology aspect is the one which drives the emergence of a new product, then ...R&D [should be the initiator]*” (INT-MRD, p.2). Therefore, “...*in R&D, for R&D-driven [purposes], we have a medium we call ‘creativity [days]’*” (INT-MRD, p.2). Creativity days can also gather new

product ideas from manufacturing, as the manufacturing director added: “*We have ‘creativity days’; R&D, manufacturing people propose [ideas] for [new] products*” (INT-DM, p.11).

FoodCo also sources ideas from external parties, as the group CEO mentioned: “*We conduct intensively ...what we call open innovation. Open innovation establishes cooperation with universities or consultants...*” (INT-CEO, p.10). The strategic procurement director also added that “*...in open innovation we don’t need... to develop [product ideas] on our own; instead, we can buy them from outside, [for example] from universities, or we can take over companies...*” (INT-DSP, p.1).

The ideas generated are then screened by a team, based on specific criteria, as the R&D manager explained: “*...After [the ideas] come in to R&D, we form a team [and] screen them, first based on whether the machinery is capable of [producing the products], whether they have potential...*” (INT-MRD, p.16). The ideas selected are presented to marketing, as the manager went on to explain: “*...Well, next we present the prototypes to marketing*” (INT-MRD, p.3).

Concept Development

This category encompasses some of the activities in Stage V (Ideas Pooling). As the company document suggest, this stage mainly “*determines product concepts from PIs [product ideas], which have the potential to become NID [new idea development]; [the evaluation is] based on consumer insight studies. [The concepts] describe the specification of the products, packaging, market potential and benchmarking [results]*” (DOC2, p.6).

Laboratory scale prototypes are also built at this stage. As the R&D manager remarked, “*New idea development is the development of a product at laboratory scale, developing selected product ideas into laboratory scale prototypes. If they’re accepted by marketing, then the NID phase ends*” (Email-MRD, 14-04-2016). As the company documentation indicates, this stage also involves other activities: formula research, technology and process preparation, feasibility analysis and internal panel testing (DOC2, p.6).

Build Business Case

This category involves Stage V (Ideas Pooling). It involves a financial feasibility study, carried out when the company develops new product categories which require new facilities, as indicated in the seven-stage framework: “*STAGE V-Ideas Pooling: New Facilities – Financial feasibility study*” (DOC 2, p.2). This is confirmed by the finance manager: “*Finance prepares the feasibility [study]. Normally, ...for existing products... we only calculate the GP [gross profit] target... [whereas] if we [propose] a new product which has never been developed before, and we need to purchase new machinery, then we prepare a proper FS [feasibility study] ...all [aspects] are calculated; the final one is ROI [return on investment]...*” (INT-DF, p.2)

Management Review

This category covers the management activities carried out to evaluate new products being developed, newly launched products and products currently in the market. It also includes existing brand tracking and existing product roadmap review procedures.

FoodCo reviews new projects in its ‘food forum’, which, according to the marketing insight general manager, “*...is actually a regular meeting where we discuss projects, mainly new product launch [projects], not existing products*” (INT-MRD, p.27). The projects are reviewed “*...[from] end to end, from consumer insight [research], technology [analysis], R&D until marketing [planning]* (WAM-GMMI, 26-04-16).

Newly launched products are reviewed regularly, as the marketing insight general manager remarked: “*...every week we review [the launched products]. In WI [week 1] [we review] how big the sales are, then what the advertising is like. [The review continues] until [the evaluation of] how much sales out are, how much the GP [gross profit] is. Every Monday we review these with the CEO*” (INT-GMMI, p.12), Existing products are reviewed by analysing their growth, and “*...whether, after some years, their growth is good, or going down, or whether we’re going to phase [them] out.*” (INT-MCTI, p.12).

Product Development

This category covers Stage VI and part of Stage VII. As Figure 7.1 shows, Stage VI performs up-scaling activities, ranging from preparing the high scale production of new products to planning their distribution. These activities include, among others, *“Machine installation and commissioning, Scale up prototype development, External consumer test, Stability test, Distribution plan, Food regulation process”* (DOC 2, p.2). Parts of Stage VII which constitute this category denote the extension of Stage VI, covering legal documents and further production preparation activities (see Figure 7.1). These activities include packaging development; MD⁸⁶ assignment and halal⁸⁷ registration, the ordering of materials, and production scale prototype development (DOC 2).

Launch Planning

This category includes parts of stages VI and VII. The activity element of Stage V is a marketing plan, as stated in the company document: *“Stage VI – upscaling: Marketing Plan”* (DOC2, p.2). In addition, as Figure 7.1 shows, these stages also include commercialisation activities involving price determination and mass production preparation, as the R&D manager described *“...the next [step] starts with commercialisation. Related departments [are involved]. For example, marketing will prepare the price structure... production will prepare the man power... Well after commercialisation we get into post-launch monitor processes.* (INT-MRD, p.20).

In summary, FoodCo applies a ‘seven-stage’ framework, representing formal procedures, for developing new products. However, these procedures do not formally incorporate activities related to portfolio management. Nevertheless, from a portfolio management point of view, FoodCo’s practices can be grouped into eight categories, as shown in Figure 6.1.

⁸⁶ MD is a registration number issued by Indonesia’s food and drug administration.

⁸⁷ A ‘halal’ certificate is issued by the Indonesian Ulema Council, stating the food is permitted to be consumed according to the Islamic rule

7.3.2 Comparison of FoodCo's Practice with Theory

This section compares FoodCo's current practice with key theory, notably *portfolio management goals* – value maximisation, balanced portfolio and strategic alignment – (Cooper et al., 1997a, 2001) and *effective portfolio management* (e.g., senior management's role in selection decisions) (Cooper et al., 2001).

The results of the comparison are presented in Table 7.5, comprising the portfolio management aspects from which the practice is viewed, comments, representative quotes and triangulation notes. For example, in terms of procedure formality, FoodCo does not have any formal, documented procedure for managing the portfolio. This is supported by an excerpt from the interview with the R&D manager, noted in the interview transcript (initialled with INT-MRD, p.25). In addition, the evidence is triangulated with the quote from the marketing insight general manager statement (INT-GMMI, p.7).

Table 7.5: Analysis of FoodCo's Portfolio Management Practice

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
Formal procedures	No formal procedures	The company has a [product development] SOP... [however], there's no an SOP for selecting products. (INT-MRD, p.25)	<i>It's a very entrepreneurial-driven [process], [based on] business judgement; there's no standard [procedures].</i> (INT-GMMI, p.7)
Portfolio management goals			
<i>Value maximisation</i>	Evaluation is on individual products. Selection is based on the highest contribution in terms of sales and profit	<i>... we select ones that truly contribute the most... we have 'gold' and 'platinum' criteria... we want all products in the portfolio to be categorised as platinum – these have a high margin and high volume [of sales].</i> (INT-GMMI, p.9)	<i>Finance prepares the feasibility [study]. Normally, ...for existing products... we only calculate the GP [gross profit] target.</i> (INT-DF, p.2)
	Project valuation is only applied for new product development which needs new facilities	<i>If we [propose] a new product which has never been developed before, and we need to purchase new machinery, then we prepare a proper FS ... Every [aspect] is calculated; the final one is the ROI.</i> (INT-DF, p.2)	<i>New facilities: Financial feasibility study Analysing feasibility using financial measurements: NPV, IRR, payback period, ROI</i> (DOC2, p.2-6)
<i>Balanced portfolio</i>	Balancing between mass and premium products	<i>...we refine our product portfolio from affordable products which currently contribute a 90% portion towards APP⁸⁸... The composition of [their</i>	

⁸⁸ Affordable premium product

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
		contribution] is 50-50. (INT-DM, p.2)	
	On the other hand, the company is still aiming at completing a range of products under the existing categories, rather than finding a balanced composition of categories	<i>In terms of portfolio, certainly we want a complete one, but in terms of the existing categories.</i> (INT-GMM1, p.3)	
Strategic alignment	Implementing company's strategy by moving towards affordable premium products	<i>... The main strategy is to achieve that goal, which is translated into NPL⁸⁹ and which pursues premium products.</i> (INT-DF, p.5)	<i>Well, in snacks, for example, the policy is that there should always be both mass and premium products.</i> (INT-DF, p.6)
Strategic portfolio decision ⁹⁰	Establishes a product road map containing 22 priority items	<i>Twenty-two [priority items] will be developed by 2017 as a [product] road map...</i> (INT-GMM1, p.10)	
Tactical portfolio decisions ⁹¹			
Stage-gate process	Stage-gate process is not clearly implemented in the formal new product development process	<i>...We [use] a process called 'GN'⁹² funneling, [which has] seven stages... if [we develop a product] within the same category, as all the analyses have been done we skip [some stages]; we just go [directly] to the product development part. So, the beginning parts are skipped.</i> (INT-GMM2, p.5)	
Portfolio review	No portfolio review process, as the review is on category rather than on the whole portfolio	<i>...in the food forum, for example, we [review the products] per category...</i> (INT-GMM1, p.18)	<i>...[about] the portfolio – we actually look at [the product] category... firstly, [we review] the [product] categories...</i> (INT-DSP, p.11)
Effective portfolio management:			
Senior management role in selection decisions	CEO makes final decisions on product portfolio	<i>...portfolio determination is actually in management [hands]...in this case, the CEO. [It's all to do with the] CEO and marketing, [about determining] the product portfolio, right.</i> (INT-MRD, p.18-21)	<i>Decisions about launching or developing [products] are normally taken by... marketing and top management. It could be a top-down [approach] – top management sees opportunities then sends them to marketing to be developed – or the other way around: [it's] marketing who devises [new products] and obtains approval from top management.</i> (INT-MCNI, p.9)
Senior management and	R&D role in portfolio	<i>For R&D, we're more to do</i>	<i>...from the aspect of R&D</i>

⁸⁹ New product launch

^{90, 14} See Figure 2.1.

⁹² The name of FoodCo's computer-based system for supporting new product development process

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
<i>R&D management relationship</i>	management is not dominant. Top management's relationship with R&D is therefore not as intense as that of with marketing	<i>with facilitating their [top management and marketing's] expectations; we don't determine the direction [of the portfolio] (INT-MRD, p.21)</i>	<i>competence, I would say actually in terms of innovation competence, we should admit that we still have gaps, really... (INT-CEO, p.2)</i>
<i>Portfolio management methods</i>	Financial measurements mainly applied Qualitative-based assessments (scoring method) are utilised at the early stages for screening ideas	<i>What we do on creativity days is that the food [samples] are tasted and scored... based on LoA – level of acceptance –... genuineness of ideas, uniqueness... (INT-DM, p.12)</i>	<i>...some of evaluation using a kind of scoring [method]... is submitted to top management, and used for evaluating the attractiveness of a product ...a number of aspects are analysed: internal and external opportunities, and SWOT. (INT-GMM2, p.9)</i>
<i>Organisational structure and support systems</i>	No specific structure is built for enhancing internal communication. In practice, marketing is the leader, coordinating the product development process NPD systems for internal communication system and project management are applied. It seems that only R&D and marketing are those who fully utilise the systems	<i>...marketing is the final decision maker... control, decisions, business calls – they're all marketing's responsibility. (INT-GMMI, p.20)</i> <i>Actually the [product development] SOP already exists in 'GN'⁹³ [system]. 'G' covers everything. However, as I'm new in the sub project, I haven't got access to it – so if I need to fill in a project, marketing and R&D do it for me. (INT-GMMI, p.16)</i>	<i>[marketing] is the coordinator... so actually, marketing is like the little managing director of a company, [managing] one category [of product]. All kinds of questions about product development come back to marketing. (INT-GMM1, p.19-20)</i> <i>New Product Development System ('G') for internal communication and project management (DOC3, p.4, 7)</i>
<i>Selection criteria</i>	Profitability Market size Market growth Competitors	<i>The new management now sees firstly which ones have good profit and which ones have become market leaders, and how to expand them... (INT-GMM1, p.3-4)</i>	<i>From business development and market perspectives, [project prioritisation] is determined by market size, market growth and who the biggest players are – whether we're able to fight them... (INT-GMMI, p.4)</i>
<i>Problems in portfolio management</i>	Limited budget Inadequate launch success rate	<i>Budget... In the end [the problem] is budget. Budget is always lacking... (INT-GMM1, p.19)</i> <i>...we're now developing 21 new SKUs; this year's [projects] are 21... just [developing] that number, gives us a headache. From them, those that are launched are only 10 or 15. (INT-GMM1, p.7)</i>	

⁹³ See footnote 22

7.3.3 Conclusions

This section has responded to RQ 1: *How is new product development portfolio management conducted [at FoodCo]?* The discussion shows that:

- 1) FoodCo's portfolio management practice can be grouped into eight categories (a palette of routines): (1)⁹⁴ Business Planning; (2) Market and Industry Analysis; (4) Ideas provision; (6) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning.
- 2) FoodCo applies formal procedures when developing new products, called a 'seven-stage' framework. However, formal procedures for conducting portfolio management do not yet exist. This seems to indicate that the company pays less attention to the notion of a 'portfolio' when developing a set of new products.
- 3) A product portfolio is initiated from a set of potential product concepts generated from two different streams: market-driven and R&D-driven. The former is generated as a result of the identification by the marketing department of market needs and trends, whereas the latter is an R&D initiative, formulated through activities such as creativity days. The BOD evaluates feasible product concepts, called new product launch (NPL) products, and makes decisions as to whether it is feasible to develop each concept further.
- 4) Project evaluation is based on individual products, looking at the highest contribution in terms of sales and profit.
- 5) FoodCo implements the strategy by moving towards affordable premium products.
- 6) While aiming to balance mass products with affordable premium products, FoodCo still works towards completing the range of products under the existing categories.

7.4 ORGANISATIONAL ROUTINES IN NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 2

This section addresses RQ 2: *What organisational routines can be identified in the new product development portfolio management [at FoodCo]?* Answering this question was

⁹⁴ The number refers to the category number.

based on five analysis stages: (1) First-order coding; (2) Comparing first-order codes to Feldman and Pentland's definition; (3) Forming categories; (4) Discerning the relationships between categories, and (5) Comparison with supporting evidence obtained from the simulation⁹⁵.

7.4.1 First-Order Coding

In this part, the analysis centred on identifying first-order codes from the qualitative data, which references Strauss and Corbin's (1998) notion of *open coding*. The coding was inductive – that is, emergent and not based on any earlier literature (as no previous investigations of portfolio management using the perspective of routines were found).

The first-order coding began by applying line-by-line coding to the data transcripts to draw out initial information related to all activities conducted by managers involved in NPD portfolio management. This is mainly a group rather than an individual activity. It is also regular and ongoing.

For example, Appendix D.1 presents a section of the transcript of the interview with the R&D manager, showing the first-order codes. The italicised text is the transcript and the codes appear in the second column. For example, the *Creativity days* code denotes the R&D initiatives designed to collect new product ideas. In addition, the transcript section also shows the relationship code *Idea screening* → *Developing lab scale prototype* which indicates that the results from *Ideas screening* affects *Developing lab scale prototype* routines. This information is used to reveal the relationships between categories, which is discussed in the next section. The first-order codes and their relationships were stored in NVIVO.

7.4.2 Comparing First-Order Codes to Feldman and Pentland's Definition

The codes which emerged were then refined by identifying those which could be confirmed as routines. This identification⁹⁶ was based on Feldman and Pentland's (2003) definition, which characterises routines by “repetition, a recognisable pattern of

⁹⁵ Simulation data was used to triangulate the data from the field study—interviews, observation and document reviews (see Chapter 5, Research Design).

⁹⁶ The identification process used an *etic* approach. This approach allows a researcher to “...make assessments that are independent of the assessments of the participants in the routines... Thus, the researcher identifies the routine (or process) based on their own, theory-driven criteria” (Pentland and Feldman, 2008b, p.292).

action, multiple participants and interdependent actions” (p.103). Each code which shows adequate evidence associated with these traits was verified as a routine. The specific criteria applied in verifying the codes are shown in Table 7.6.

Table 7.6: Criteria for Verifying the Presence of Routines

Criterion (number of characteristics represented by evidence)	Verified as routines?
Greater than or equal to three ⁹⁷	Verified
Two	Partly verified
One	Not verified
None	Not verified

In total, out of 68 first-order codes, 35 were verified⁹⁸ as routines using Feldman and Pentland’s definition. The results of the verification are presented in Appendix D.2, including the supporting evidence of the routines characteristics from different data sources, that is, first-order codes and the data sources (interviews, observation and documents) from which the evidence was drawn. For example, supporting evidence shows that ‘Product road map prioritisation’ involves all routines traits; whereas for ‘Market research’ only three routines traits were identified.

7.4.3 Forming Categories

The first-order codes were then grouped into categories based on the similarity and adjacency of the activities represented by the codes. The process was conducted iteratively⁹⁹ with the inspection of portfolio management categories in RQ 1. For example, the first line of the transcript of an interview with the R&D manager (Appendix D.1) states, “*In R&D, for the R&D-driven ideas, we have an avenue called ‘creativity days’*”. This was coded as first-order code ‘Creativity days’ which was then classified in the ‘Ideas Provision’ category.

The result of the categorisation is presented in Figure 7.3. This shows that eight categories emerged from the data: (1) Business Planning; (2) Market and Industry

⁹⁷ The codes evidenced in a document represent formal procedures, which show the characteristics of repetition, a recognisable pattern of action, multiple participants, interdependent actions.

⁹⁸ See Appendix D.3 for examples of the first-order codes not confirmed as routines.

⁹⁹ The analysis was also supported by information which emerged from the relationships between the first-order codes, shown in Appendix D.4.

Analysis; (4) Ideas provision; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning. These indicate where routines play a role in portfolio management at FoodCo.

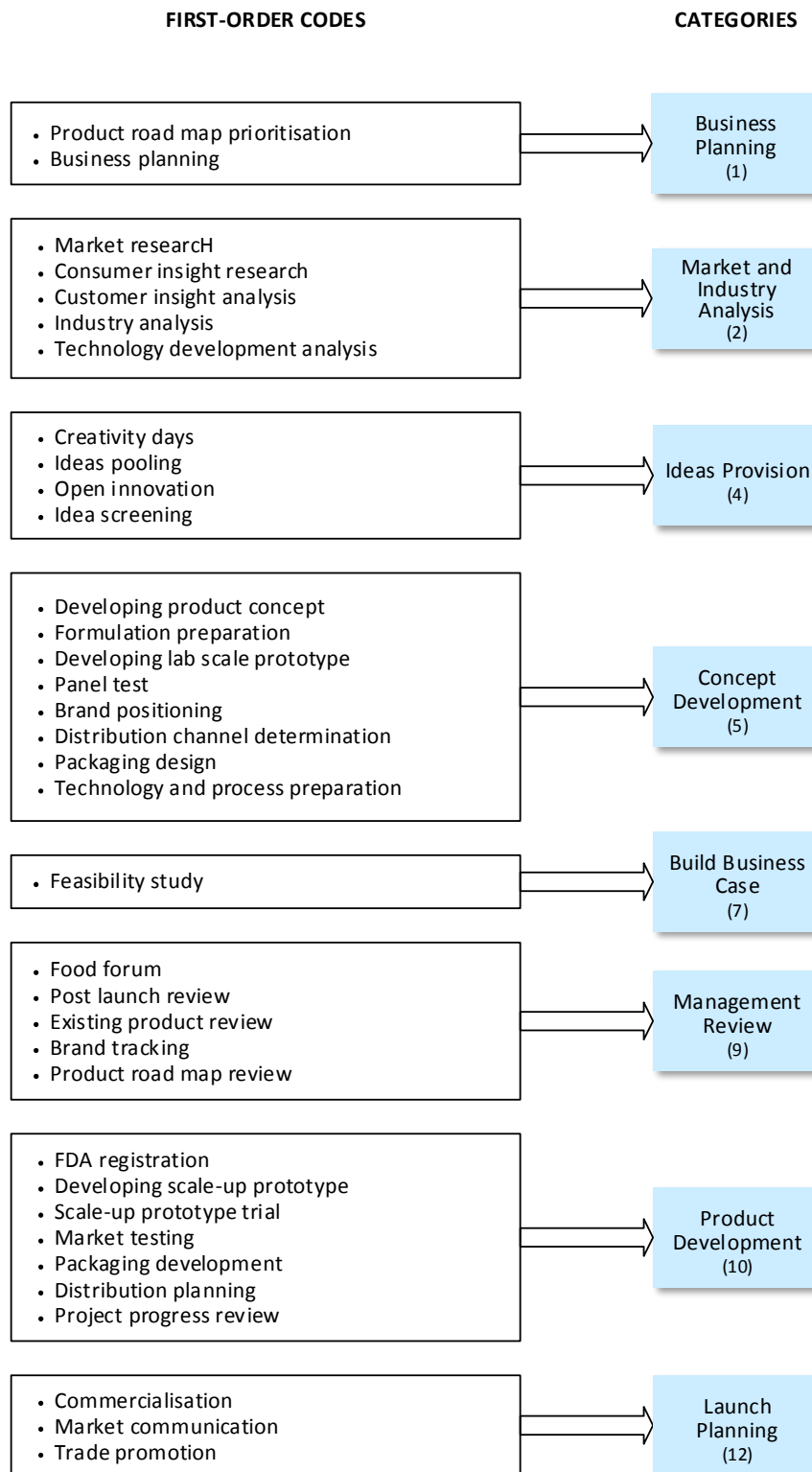


Figure 7.3: Data Structure of Organisational Routines in the NPD Portfolio Management at FoodCo

7.4.4 Relationships between Categories

In this subsection, the analysis referred to Strauss and Corbin's (1998) notion of *axial coding* to address the relationships between categories. These relationships were identified through examining the connections between the first-order codes, as demonstrated in the example in Appendix D.1, which sets out the connection between the codes of 'Idea screening' (under 'Ideas Provision') and 'Developing lab scale prototype' (under 'Concepts Development')¹⁰⁰.

Figure 7.4 shows the relationships between and among the categories. Here, a single-headed arrow represents when one routine affects another; a double-headed arrow denotes interplay between routines. For example, the 'Business Planning' routine affects (represented by the symbol '→') the 'Ideas Provision' routine. An interplay also exists between the 'Ideas Provision' and 'Management Review' routines. These relationships provide information concerning the process occurring, which enabled the process framework to be delineated. This framework shows that¹⁰¹ routines are built by connecting parts; their connections thus establish the existence of the routines (Feldman and Pentland, 2008).

To conclude, evidence from various sources supports the construct of the existence of relationships between routines. This led to the development of the framework of routines in FoodCo's NPD portfolio management, as shown in Figure 7.5.

¹⁰⁰ The connections between first-order codes are shown in Appendix D.4.

¹⁰¹ As described in Chapter 3, Organisational Routines.

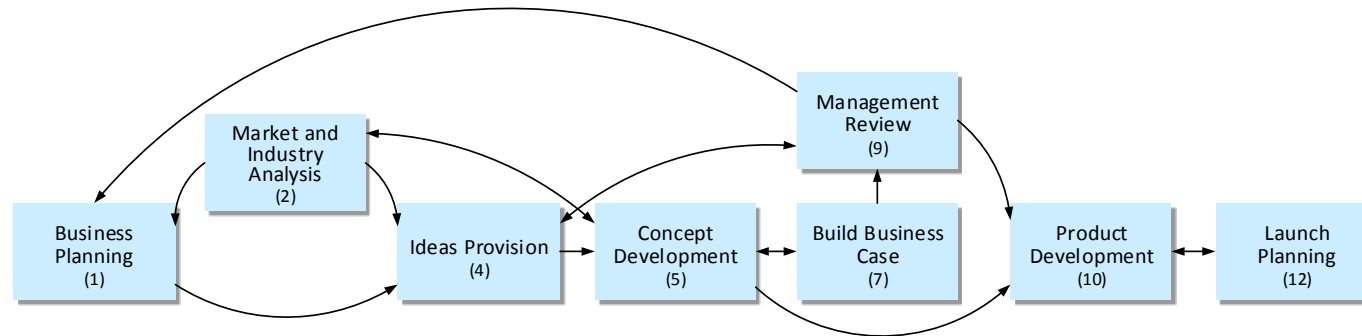


Figure 7.4: Relationships between Categories at FoodCo

ROUTINES CATEGORIES									REPRESENTATIVE QUOTES
	Business Planning	Market and Industry Analysis	Ideas Provision	Concept Development	Build Business Case	Management Review	Product Development	Launch Planning	
1 Business Planning			→						<p>Principally, we decide numbers for [the target of each product group]: “Oh, I want to grow that much. I want to grow certain a percentage in biscuits; I want to grow some additional [per cent] in dairy”. So what sort of products should be [developed]? Then, the ideation begins. What are required by the market? What is the trend is like? (INT-CEO, p.7)</p>
2 Market and Industry Analysis	→		→						<p>...thus we call it the business plan. Every year we can adjust it. Why we should adjust it? Because it depends on market and current [business] conditions. (INT-GMMI, p.7)</p> <p>We keep finding [new ideas], seeking them out from the market insight [research]... [they] might be not new; however, we actually want some of them to be new. (INT-CEO, p.20)</p> <p>When I surveyed kids, [I found that] apparently they don’t look at the content, [instead] they consider the packaging. So, if there’s some that’s new and attractive, they have to try it. Well, because of that we design the packaging to be as cute as possible... (INT-GMMI, p.26)</p> <p>...then marketing develops the product; at that stage the brand is already fixed ... After that we do an in-depth interview... we try to understand that in the positioning area we targeted, how this brand can communicate [the product to the consumers]. (INT-MCNI, p.10)</p>
4 Ideas Provision				→				↔	<p>...once [the ideas] get to R&D, we form a team to screen them based on whether the machinery is available, whether they are aligned with the 22 [priority] categories. After that, we collect all of them together and develop the prototype. When the prototypes are ready, we screen them again in terms of taste and [product] concept. (INT-MRD, p.16)</p> <p>...we collect [ideas] and then those ideas are evaluated informally in the food forum, held every month. (INT-MRD, P.4)</p> <p>...once the turnover starts to become sluggish, [it’s] stable, like this... then at that point we inform the brand [manager], “Your product can’t go up anymore... So if next year you want to have growth, the options are either we push [the sales] with [promotion] programmes...” or you create a</p>

ROUTINES CATEGORIES	Business Planning	Market and Industry Analysis	Ideas Provision	Concept Development	Build Business Case	Management Review	Product Development	Launch Planning	REPRESENTATIVE QUOTES
									<p><i>new product to increase the total turnover". Based on that, normally the brand [manager] will consider launching new SKUs [stock keeping units]. (INT-MTM, p.19)</i></p>
5 Concept Development					↔		→		<p><i>...then we prepare a real FS... how much capacity we want, what kind of product marketing would sell, what the arrangement is like. Well, from there we determine... including the energy cost, depreciation, all are calculated. Finally, we calculate the ROI. Well, those are the important decisions in FS. (INT-DF, p.2)</i></p> <p><i>At the end, the solutions we take are [determining] what kind of costs I should squeeze [and] the formula is adjusted to ensure the cost becomes feasible. (INT-GMM1, p.5)</i></p> <p><i>If the laboratory scale [prototype] is fixed already and everything is OK—the market [evaluation results] are accepted, the cost [analysis results] are appropriate—then [the project] is supposed to get through. [Afterwards] we move to the next level, developing a production scale prototype. (INT-DSP, p.4)</i></p>
7 Build Business Case						→			<p><i>...we prepare the FS, the feasibility study... [then] we regularly present the FS to top management. It normally takes 4 to 5 meetings to get approval, a green light for launching. (INT-DSP, p.5)</i></p>
9 Management Review	→						→		<p><i>...normally when we're gonna launch products... the owner or directors must be looking at the reasons for launching those products. Then [we look into] what the market is like, our capability as far as the distribution level – whether our distribution [capability] is able to sell those products (INT-MD, p.24)</i></p> <p><i>...Up until 2018, the road map is in place; however, new things could happen... we just need to evaluate [the road map], whether it works or not. There could be eventually "Oh, it's not feasible buy machinery; when it's analysed, the investment's too high. We could drop it or postpone it [until later next year]... (INT-GMM1, p.18)</i></p>
10 Product Development								↔	<p><i>Marketing programmes normally should be interconnected [with those the channels]. The timing of when we launch our advertisements and when we exhibit displays should be aligned. (INT-MD, p.15)</i></p>
12 Launch Planning									

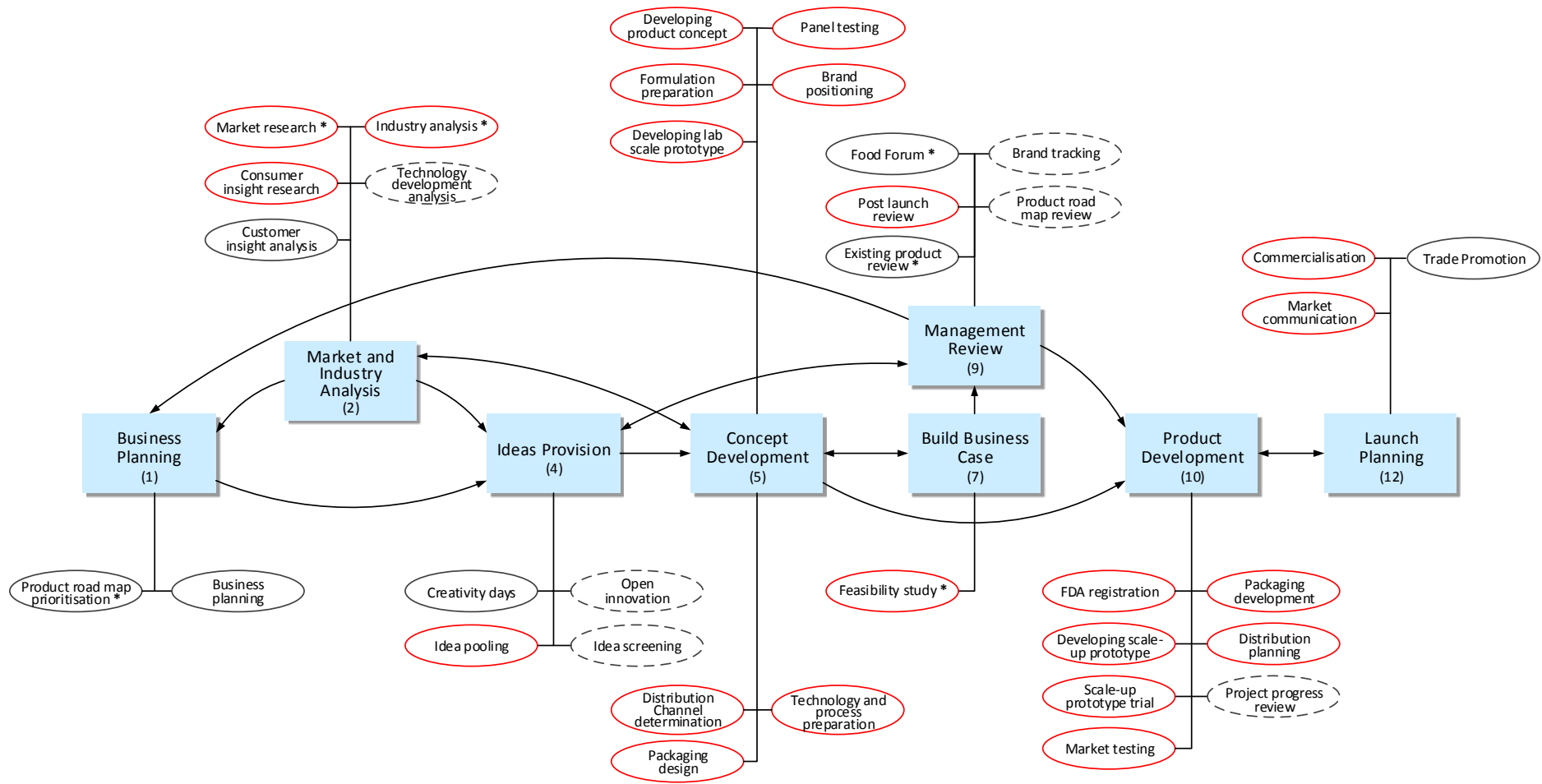


Figure 7.5: Framework of Routines Underlying the NPD Portfolio Management at FoodCo

Note:

- (dashed) – Partly verified
- (red) – Formal (documented) routine
- * – Evidence for this routine was also found in the simulation (explained in Section 6.4.5)

7.4.5 Supporting Evidence from the Simulation

The simulation was designed to stimulate discussion to discover how FoodCo performs portfolio management. As described in Chapter 3, Cohen and Bacdayan (1994) considered that organisational routines are stored as *procedural memory*¹⁰². The simulation was applied to identify *conversations*¹⁰³ which stem from the participants' procedural memories, in which routines in portfolio management are likely to be embodied. By recognising these actions, the corresponding routines thus can be revealed.

Three directors (the finance director, manufacturing director and strategic procurement director), three general managers (of marketing of Product Group #1, marketing of Product Group #2 and marketing insight) and three managers (of finance, supply chain and trade marketing) participated in the simulation. The BOD representatives are permanent board members involved in FoodCo's strategic meetings and food forum; the managers who participated also normally attend the food forum.

The video recording of the simulation and its transcript were analysed to identify where the conversations appeared to indicate the existence of routines. An investigation then sought to determine which actions are seemingly exercised in the routines as part of the company's portfolio management processes. The results, shown in Appendix D.5, show that the simulation confirmed six subroutines. For example, the 'Defining the source of revenue' conversations, enacted by the finance director (DF) and the marketing general manager of Product Group #1 (GMM1) (00:31:55 to 00:32:22) can be considered to constitute part of the 'Product road map prioritisation' routine (which determines the development priority of the products classified as part of the road map). This conversation indicates how, when dealing with how a set of projects should be selected, the director and the manager evoked the procedural memory which stores the 'Product road map prioritisation' routine.

¹⁰² "It is memory for how things are done that is relatively automatic and inarticulate, and encompasses cognitive as well as motor activities" (Cohen and Bacdayan, 1994, p.554).

¹⁰³ "...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events" (Czarniawska, 1997, p.42).

The simulation provided supporting evidence for the existence of specific subroutines in FoodCo's portfolio management process, including the 'Product road map prioritisation', 'Market research', 'Industry analysis', 'Feasibility study', 'Food forum' and 'Existing product review' subroutines. Most conversations were associated with the 'Food forum' subroutine categorised under 'Management Review'. This demonstrates that the simulation typically represents the realm of portfolio selection, under which each potential project business case is evaluated by top managers.

7.4.6 Conclusions

This section has responded to RQ 2: *What organisational routines can be identified in the new product development portfolio management [at FoodCo]?* Based on evidence from the interviews, meeting observation, documents and simulation, it has been shown that portfolio management at FoodCo is built utilising eight routines: (1) Business Planning; (2) Market and Industry Analysis; (4) Ideas Provision; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning. Each routine is based on several interacting subroutines.

7.5 LINKAGE TO ESPOUSED BUSINESS STRATEGY: RESEARCH QUESTION 3

This section addresses RQ 3: *Is [FoodCo's] espoused business strategy considered in new product development portfolio management (as evidenced in routines)?* The discussion is divided into two parts: (1) identifying FoodCo's espoused business strategy and (2) identifying the routines in NPD portfolio management which consider the strategy.

7.5.1 Identifying FoodCo's Espoused Business Strategy

A business strategy should consider the questions¹⁰⁴ "What main goals are we trying to achieve?"; "What markets do we focus on primarily?"; "How do we describe our competitive strategy?" and "Which capabilities do we need to develop?" (Bowman,

¹⁰⁴ This list of questions was partly based on email discussions (18-02-2014) with Cliff Bowman, Professor of Strategic Management at Cranfield School of Management.

1998; Finlay, 2000). Cooper (1984, 2005) did not however consider the target market to be an aspect of business strategy. Adopting this view¹⁰⁵, the three key aspects of business strategy examined in this study were organisational goals, competitive strategy and capabilities.

Questions enquiring into organisational goals, competitive strategy and capabilities were posed only to the FoodCo directors; nevertheless, a number of other managers raised these issues during interview, discussion of which then complemented the data acquired. In the analysis, ‘organisational goals’, ‘competitive strategy’ and ‘capabilities’ were adopted as codes representing key aspects of strategy. The left-hand side of Appendix D.6 shows the results, including the data sources and supporting evidence. For example, ‘growth’ is an organisational goal which emerged from the interview with the sales manager, which was triangulated with company documents (DOC4). To answer RQ 3, it is necessary to examine whether these three key aspects of business strategy are considered by FoodCo as part of the portfolio management process and if so, within which routine(s).

7.5.2 Espoused Business Strategy Considered in the Routines

This subsection analyses whether the routines in FoodCo’s portfolio management process (Figure 7.5) consider the company’s business strategy, in terms of organisational goals, competitive strategy and capabilities. Each routine was examined to ascertain whether these three aspects were mentioned (the results of this investigation are also presented in Appendix D.6). As described earlier, the left-hand side of the table presents FoodCo’s espoused business strategy, whereas the right-hand side of the table (shaded grey) depicts the routines under which the respective espoused business strategy is considered.

It is shown, for example, that the organisational goal ‘sales’ is considered when performing the ‘Product roadmap prioritisation’ subroutine (grouped under the ‘Business Planning’ routine), as discussed by the finance director: *“If we carry out the review strategically, we always look at what we’re after for five years ahead, which is firstly driven by sales... we call it a roadmap. Every year in the planning cycle we*

¹⁰⁵ As also reflected in Figure 2.1.

allocate a roadmap for that particular year (INT-DF, p.4). In contrast, ‘R&D capability’ was not found as part of any routine.

The result of this investigation is presented in Figure 7.6, which shows that different key aspects of business strategy are considered across portfolio management at FoodCo. This figure is discussed in detail in the following passages.

As part of the Business Planning routine, FoodCo defines the organisational goals as those which which pursue ‘sales’, ‘profitability’ and ‘growth’. In order to attain these goals, from the beginning of portfolio management process FoodCo considers a competitive strategy of developing ‘affordable premium products’ and ‘brand positioning’. As part of the Market and Industry Analysis routine, FoodCo appears only to glance at the organisational goals of ‘growth’, whereas it consistently considers the competitive strategies of ‘affordable premium product’ and ‘brand positioning’.

Furthermore, in the Ideas Provision routine, FoodCo focuses on the organisational goals of ‘sales’. In this routine, a competitive strategy of ‘differentiation’ is employed. In addition, the routine considers a capabilities aspect, i.e., ‘innovation capability’. As with Ideas Provision, the Concept Development routine pursues ‘sales’ as the organisational goal; in terms of competitive strategy, it emphasises ‘affordable premium product’.

FoodCo’s Build Business Case routine looks at the organisational goals of ‘profitability’ and ‘growth’. As part of its competitive strategy, besides considering ‘differentiation’, it begins to involve ‘distribution’.

The company’s Management Review routine seems to be the one which incorporates most issues of the company’s business strategy. It also pursues certain organisational goals in regard to the company’s typical performance, namely ‘sales’, ‘profitability’, ‘growth’ and ‘market leadership’. In terms of competitive strategy, FoodCo appears to emphasise ‘affordable premium product’ and ‘distribution’.

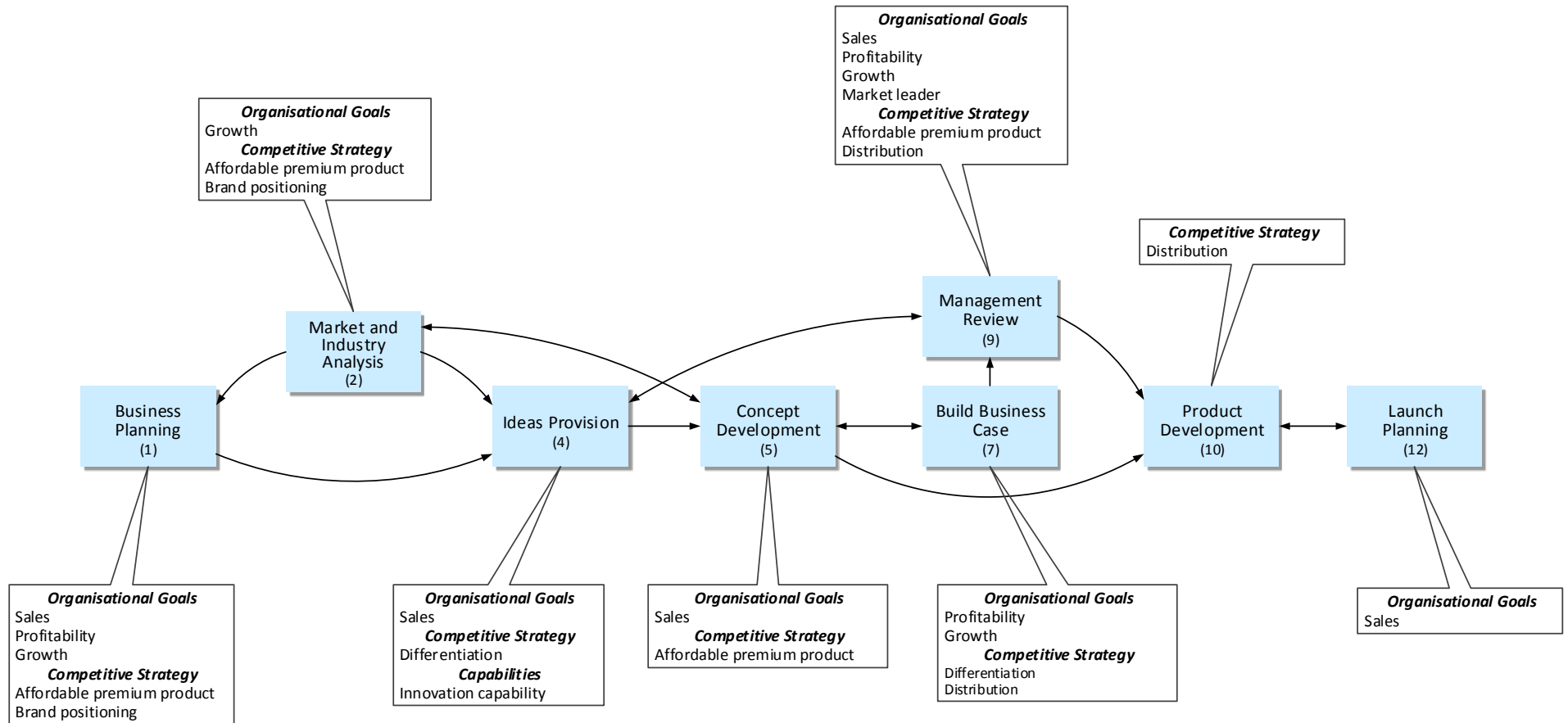


Figure 7.6: Routines and the Key Aspects of Business Strategy at FoodCo

In the Product Development routine, organisational goals are no longer considered, as by this stage the portfolio has been selected. Rather, it focuses on competitive strategy, i.e. 'distribution'. During this stage, it seems that FoodCo's main objective is to ensure the products reach the wholesale points at the right time. Finally, the Launch Planning routine, which relates to the product development routine, appears to continue to concentrate on the 'sales' goal.

In conclusion, the investigation results show that while the organisational goals and competitive strategy are considered in the underlying routines, the capability issue is only observable during the Ideas Provision routine ('innovation capability'). This might relate to the apparent intention of the managers to enhance innovation capability by arranging 'creativity days' and 'open innovation' activities as part of the Ideas Provision routine. In contrast, R&D capability was not addressed in any routines. The issue of R&D capability development may relate to other strategic issues, such as facility investment and human resources development, and it is possible that these are discussed in other senior management forums. Across the portfolio management process, the 'sales' goal was considered as part of all routines except 'Product Development'. The indication here is that FoodCo pays most attention to new products with a potentially high sales value.

7.5.3 Conclusions

This section has responded to RQ 3: *Is [FoodCo's] espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* Based on evidence from the interviews, meeting observation, documents and simulation, three key aspects of FoodCo's espoused business strategy have been identified:

- 1) The organisational goals consist of 'sales', 'profitability', 'growth', 'market leader' and 'market share'.
- 2) The company's competitive strategy comprises the initiatives of 'affordable premium product', 'differentiation', 'distribution' and 'brand positioning'.
- 3) The aspect of capabilities is manifested in terms of the development of 'innovation capability' and 'R&D capability'.

FoodCo's business strategy seems to be considered across the underlying routines of the portfolio management process, particularly in terms of organisational goals and competitive strategy issues. Each routine considers different key issues of business strategy, depending on the nature of the routine. Innovation capability is the only capabilities aspect represented, and this in only one routine.

7.6 SUMMARY

This chapter has presented an analysis of the FoodCo case in response to RQ 1, RQ 2 and RQ 3. It has shown the following:

- RQ 1: *How is new product development portfolio management conducted [at FoodCo]?*

FoodCo applies formal procedures for developing new products; however, procedures for conducting portfolio management do not yet exist within the company. A set of potential product concepts are generated from two different streams, which are market-driven and R&D-driven. The BOD evaluates these and makes decisions as to the feasibility of developing them further. The evaluation is based on individual products, looking at their highest potential contribution in terms of sales and profit. In terms of strategic alignment, FoodCo moves towards affordable premium products. Nevertheless, while aiming to balance the production of these with mass products, FoodCo still works towards completing a range of products under the existing categories.

- RQ 2: *What organisational routines can be identified in new product development portfolio management [at FoodCo]?*

Portfolio management at FoodCo is built utilising seven routines: (1)¹⁰⁶ Business Planning; (2) Market and Industry Analysis; (4) Ideas Provision; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning.

- RQ 3: *Is [FoodCo's] espoused business strategy considered in the new product development portfolio management?*

¹⁰⁶ This indicates the palette number.

Three key issues of business strategy, i.e. organisational goals, competitive strategy and capabilities, are identified at FoodCo. Business strategy seems to be considered across the underlying routines of the portfolio management process, particularly in terms of organisational goals and competitive strategy. In contrast, the capabilities aspect is inadequately represented.

CHAPTER 8 CASE STUDY 3: MULTIPRODUCTCO

8.1 INTRODUCTION

This chapter presents Case Study 3, a company located in Indonesia which manufactures office, health and home care products. The study took place between December 2014 and April 2015, and encompassed interviews, meeting observation, a review of documents and observation of a portfolio selection simulation. The results are presented in the following four main sections:

- The *case description* gives information on the company and the data collected;
- *NPD portfolio management* explains how the company conducts portfolio management and answers Research Question 1 (RQ1);
- *Underlying organisational routines* answers Research Question 2 (RQ2);
- *Link to business strategy* explains how portfolio management impacts strategy and answers Research Question 3 (RQ3).

The chapter closes with a summary.

8.2 CASE DESCRIPTION

8.2.1 Overview of the Company: MultiproductCo

The company is referred to throughout as MultiproductCo¹⁰⁷, a multinational company operating in Indonesia, manufacturing businesses- and consumer-related products. Its products are clustered into five business groups: industrial, electronics and energy, safety and graphics, health care and consumer (interview, technical and R&D director, 29 January 2015). The study centred on the consumer business group which manufactures home care, consumer health care and stationery and office products. This group carries out local new product development to a large extent when compared with others, as the consumer market in Indonesia is dynamic and growing fast. At the time of the research, MultiproductCo was launching around 500 new products per year

¹⁰⁷ Names have been changed to preserve anonymity.

(interview, corporate marketing and business service director, 4 February 2015). In particular, the consumer business group was launching around 50 new products per year (interview, business division head, 20 February 2015).

8.2.2 Data Collection at MultiproductCo

Data collection was conducted through 11 on-site visits. Meeting preparations required two visits, interviews required six visits, the meeting observation and simulation took one visit each, and finally the closing meeting and document collection took one visit. Further details of these visits are given in Appendix L and the data collected is explained below.

8.2.2.1 Interviews

Semi-structured interviews were conducted with 13 participants, covering three directors¹⁰⁸ and ten managers from different functions. The directors were considered each to have a strategic role in the portfolio management team; they were thus interviewed using a set of questions which enquired not only into the portfolio management process but also into issues relating to company strategy¹⁰⁹. In addition, communication via email and WhatsApp messaging was undertaken with some participants after the visits for clarification and confirmation purposes.

Table 8.1 outlines the details of the 13 interviews, specifically the role and responsibility of each participant, the duration, the date it took place and the number of pages of transcription. The total duration of the interviews was nearly 15 hours. All were recorded and were then transcribed, resulting in 342 pages of transcription.

Table 8.1: Interview Details at MultiproductCo

No	Role	Reference-Initials	Interview details		Transcript (no. of pages)
			Duration (hr:min:sec)	Date	
<i>Directors</i>					
1	Director, Consumer Business	INT-DCB	01:23:35	11-02-2015	30
2	Director, Technical and R&D	INT-DTRD	02:01:55	29-01-2015	35
3	Director, Corporate Marketing	INT-DCMBS	02:02:13	04-02-2015	46

¹⁰⁸ The term 'director' used in this report represents an equivalent (but differently named) strategic level at MultiproductCo. This is used to preserve the anonymity of the company.

¹⁰⁹ Interview questionnaires are presented in Appendix I.

No	Role	Reference-Initials	Interview details		Transcript (no. of pages)
			Duration (hr:min:sec)	Date	
and Business Service					
Managers and Specialist					
4	Head, Business Divisions	INT-HBD	00:53:04	20-02-2015	29
5	Manager, Technical	INT-MT	01:30:16	29-01-2015	27
		Email-MT	–	19-04-2016	–
6	Manager, Brand Marketing #1	INT-MBM1	00:55:57	20-02-2015	28
7	Manager, Brand marketing #2	INT-MBM2	01:06:22	02-03-2015	31
8	Product Designer	INT-PD	01:08:38	29-01-2015	26
9	Manager, Sales	INT-MS	01:05:28	10-04-2015	30
10	Manager, Supply Chain	INT-MSC	00:32:16	02-03-2015	13
11	Specialist, Planner	INT-SpPL	00:35:12	02-03-2015	11
12	Engineer, Process	INT-EP	00:38:43	02-03-2015	16
13	Finance Counsel	INT-FC	00:37:38	02-03-2015	20
Total			14:31:17		342

8.2.2.2 Meeting Observation

On the tenth site visit (8th April 2015), a new product introduction (NPI) gate review meeting was observed. Table 8.2 summarises the participants of the meeting: three directors and nine managers. Together they reviewed new projects at the scale-up stage and launch stage¹¹⁰, identified problems and made decisions about further progress. The meeting lasted nearly 1½ hours and the recording resulted in 43 pages of transcription.

Table 8.2: Meeting Participants at MultiproductCo

No	Role	Reference-Initials
1	Director, Consumer Business	OBS-DCB
2	Director, Technical and R&D	OBS-DTRD
3	Director, Corporate Marketing and Business Service	OBS-DCMBS
4	Manager, Technical	OBS-MT
5	Manager, Sales	OBS-MS
6	Manager, Brand Marketing #1	OBS-MBM1
7	Manager, Brand marketing #2	OBS-MBM2
8	Manager, Brand Marketing #3	OBS-MBM3

¹¹⁰ “There aren’t very many NPIs this year, because most of the NPIs were [carried out] last year. So this year [the development processes] are more on scale-up and launch [phases]” (OBS-DTRD, p.2).

No	Role	Reference-Initials
9	Manager, Brand marketing #4	OBS-MBM4
10	Product Designer	OBS-PD
11	Finance and Accounting #1	OBS-FA1
12	Finance and Accounting #2	OBS-FA2

8.2.2.3 Documents

A total of 23 documents were collected during two visits and through emails. Table 8.3 lists their details, including the name and document initial, number of pages, a description and the collection date of each.

Table 8.3: Documents Collected at MultiproductCo

No	Document Name	Reference-Initials	#	Description	Collection Date
1	Company profile	DOC1	17	Overview of the company's businesses and facilities in Indonesia	24-03-2015
2	New product introduction (NPI) process	DOC2	34	Descriptions of NPI and NPI phase details	Sent by email, 24-03-2015
3	NPI – new process flow	DOC3	7	NPI process flow chart	Sent by email, 19-04-2016
4	Organisation structure of consumer retail ¹¹¹	DOC4	1	Organisation structure and personnel of consumer retail business group	Sent by email, 23-06-2016
	Scoring sheets:				08-05-2015
5	Idea and concept phase	DOC5	1	Evaluation scoring form (idea and concept phase)	
6	Feasibility phase	DOC6	1	Evaluation scoring form (feasibility phase)	
7	Development phase	DOC7	1	Evaluation scoring form (development phase)	
8	Scale-up	DOC8	1	Evaluation scoring form (scale-up phase)	
9	Launch	DOC9	1	Evaluation scoring form (launch phase)	
10	Post-launch	DOC10	1	Evaluation scoring form (post-launch phase)	
	NPI forms:				Sent by email, 24-03-2015
11	Initial filter	DOC11	1	New project opportunity	
12	Project charter	DOC12	1	New project description and team	
13	Mini RWW (Real-Win-Worth)	DOC13	1	Real-win-worth evaluation	
14	Marketing probability of success	DOC14	1	Marketing probability of success matrix	

¹¹¹ New organisation structure with new posts and their managers.

No	Document Name	Reference-Initials	#	Description	Collection Date
15	Technical probability of success	DOC15	1	Technical probability of success matrix	
16	Market information	DOC16	1	Estimated sales and marketing indicators	
17	Product design	DOC17	1	Product design information specification	
18	Marketing strategy	DOC18	1	Marketing strategy formulation	
19	Marketing tactics	DOC19	1	Marketing strategy formulation	
20	Launch calendar	DOC20	1	Launch activities schedule	
21	Life cycle management	DOC21	1	Environment, health and safety assessment in the product life stages	
22	Supply chain plan	DOC22	1	Lead time estimation from source, warehouse and end users	
23	Demand plan	DOC23	1	Demand forecast	
24	Financial projections	DOC24	1	Financial indicators projections	

Note: #-Number of pages

8.2.2.4 Simulation

The simulation took place on 20th March 2015. Six participants had been selected, comprising one director¹¹², one division head, three managers and one engineer (see Table 8.4).

Table 8.4: Simulation Participants at MultiproductCo

No	Role	Reference-Initials	
1	Director, Corporate Marketing and Business Service	SIM-DCMBS	
2	Head, Division	SIM-HD	
3	Manager, Brand Marketing #2	SIM-MBM2	
4	Manager, Brand Marketing #3	SIM-MBM3	
5	Manager, Sales	SIM-MS	Joined at minute 27:47
6	Process Engineer	SIM-PE	

As explained in the methodology chapter, participants were assigned a short case study¹¹³ which required them to select an NPD portfolio from seven potential projects¹¹⁴ and with a specific budget.¹¹⁵

¹¹² Note that not all directors were willing to take part in the simulation.

¹¹³ The simulation case is exhibited in Appendix J.1

¹¹⁴ The projects entail the development of three product groups: A, B and C; the projects thus are titled by indicating its respective product group: (A)ntares, (A)sterion, (A)tlas, (B)ellatrix, (B)etria, (C)apella and (C)astor.

The case included a *risk-reward diagram* (in the form of a *bubble diagram*) of these potential projects, to support the participants in analysing the portfolio.

Forty-five minutes were available for the simulation. The decisions and discussion lasted about 41 minutes. The simulation was filmed and the video recording was transcribed, generating a 25-page transcript.

8.3 NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 1

This section addresses RQ 1: *How is new product development portfolio management conducted [at MultiproductCo]?* The question was answered mainly by referring to descriptions from individual managers and company documents, which were triangulated across the statements of other interviewees. However, it should be noted that more detailed information from RQ 2 (organisational routines in portfolio management) informed the analysis, as the analysis process of RQ 1 was iterative. This section presents an overview of MultiProductCo's portfolio management practice, followed by a comparison with theory, and then conclusions.

8.3.1 Overview of MultiproductCo's Practice

Corporate management at MultiproductCo has established two interrelated innovation initiatives: *new technology innovation* (NTI) and *new product introduction* (NPI). While NTI deals with the invention of new technology platforms, NPI involves the development of new products based on the technology platforms invented as part of NTI. Furthermore, MultiproductCo have five classes of NPI: (1) importing and repacking; (2) importing and converting; (3) modifying; (4) developing new products for existing markets, and (5) developing new products for new markets. In Indonesia in particular, MultiproductCo conducts NPI focusing only on classes 1, 2, 3, and 4.

MultiproductCo manage their NPIs through different processes (see Figure 8.1). At the front end of NPI the company has a process it calls *landing review*, as the technical manager explained: “...*the [NPI] sequence is preceded by a landing review...*”

¹¹⁵ This case is a modified version of an innovation portfolio case developed for Cranfield School of Management by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

(INT-MT, p.4). It has a role as “...an initial filter for conducting prioritisation [of projects]. [This is] to determine which projects are indeed necessary to be followed up; and it [also determines] which methods are to be used [for following up the projects]” (INT-MT, p.1).

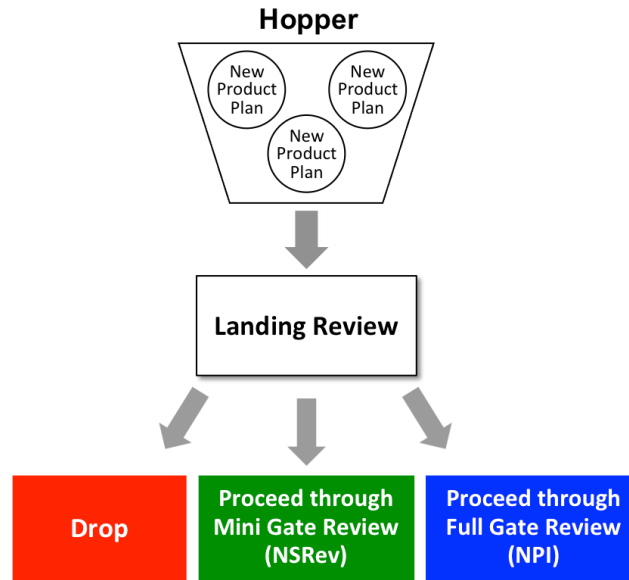


Figure 8.1: High-Level NPI Process Flow at MultiproductCo

Source: NPI-New Process Flow (DOC3, p.2)

This process leads to a management decision about whether to proceed to the next stage: either a mini gate review (also known as a new stock review – NSRev), full gate review (NPI gate review), or the cancellation of the project. As the technical manager confirmed, “The landing review is conducted at the beginning [of the NPI process] to determine the next review stage:... full gate review or mini gate review (NSRev)” (Email-MT, 15-04-2016). Moreover, “...These reviews are more in-depth and concern the projects and their progress” (INT-MT, p.4).

NPI gate review is a corporate-standard NPI process built up over seven stages – ideas, concept, feasibility, development, scale-up, launch and post-launch – and six gate processes (see Figure 8.2). In practice, MultiproductCo modified this framework by grouping the idea, concept and feasibility stages into one stage, namely *feasibility*. This is pointed out by the technical manager: “The complete gates are [at stages] 1, 2, 3, 4, 5, 6, 7 – from idea, concept, feasibility, [development], scale-up, launch to post-launch. We group the first three steps into a feasibility gate. All information related to an idea,

concept and feasibility are thus combined; we then review them at the feasibility gate review stage (INT-MT, p.13).

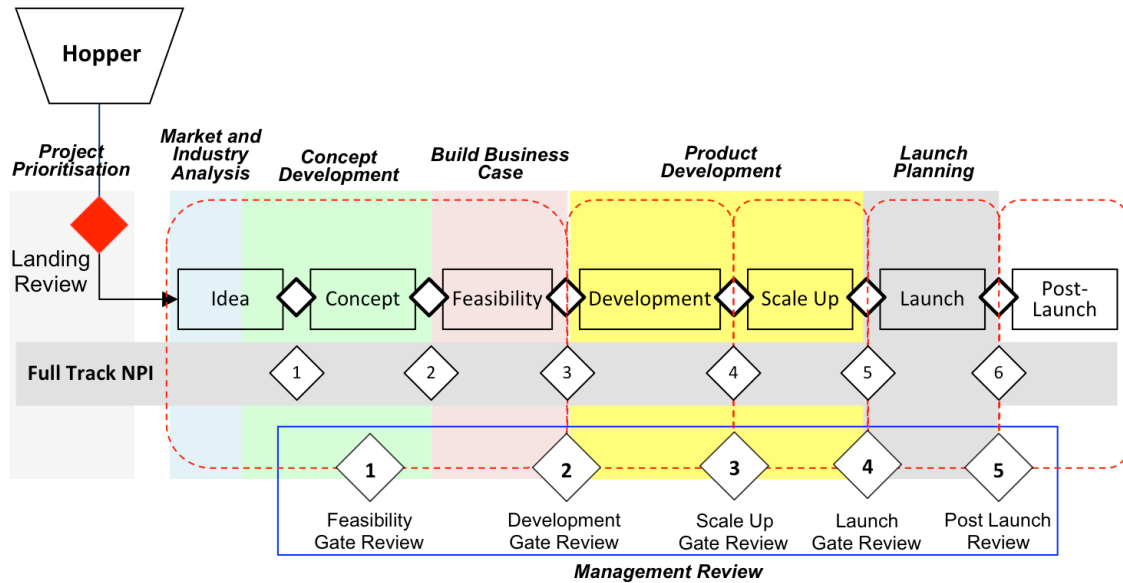


Figure 8.2: New Product Introduction Gate Review Framework at MultiproductCo

Source: *NPI-New Process Flow (DOC3, p.6)*

As shown above, MultiproductCo’s only formal portfolio management process is as part of portfolio selection conducted at the Landing review. Detailed inspection of the interviews, the meeting observation and documents (including those shown in Figure 8.1 and Figure 8.2) revealed how the company manages their portfolio. Based on ideas from the literature¹¹⁶, MultiproductCo’s practice can be grouped into nine categories, arranged in a 3-by-4 matrix (see Figure 8.3; elements of each category are suggested in Figure 8.1 and Figure 8.2): (1)¹¹⁷ Business Planning; (2) Market and Industry Analysis (blue shading); (5) Concept Development (green shading); (6) Design; (7) Build Business Case (light red shading); (8) Project Prioritisation (light grey shading); (9) Management Review; (10) Product Development (yellow shading), and (12) Launch Planning (grey shading). Each category is discussed further in the following sections¹¹⁸.

¹¹⁶ The ideas are also influenced by the results of RQ 2 on organisational routines.

¹¹⁷ This number refers to the category number shown in Figure 8.3

¹¹⁸ Note that in the following sections, example quotes are in most cases given with supporting evidence from different sources (either other managers, observation or a document) to provide triangulation.

Business Planning (1)	(4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	Project Prioritisation (8)	(11)
(3)	Design (6)	Management Review (9)	Launch Planning (12)

Figure 8.3: Categories of Portfolio Management Practice at MultiproductCo

Business Planning

Business planning is conducted every year, as the corporate marketing and business services director confirmed: “*We have a [planning] cycle every year; it’s called business planning, prepared in quarter 4...*” (INT-DCMBS, p.12). It discusses not only what products will be launched but also which need to be discontinued, as pointed out by the technical and R&D director: “*...we look into [the business from various aspects]: “Oh, these are the market needs, and the size is like this.” What products we have, what products we’re able to launch this year”; what products will continue to sell this year, what products we’ll discontinue because, for example, they’re unprofitable*” (INT-DTRD, p.23).

Market and Industry Analysis

This category covers the Ideas phase (Figure 8.2). As the technical and R&D director remarked, this “*... identifies the market opportunity....*” (INT-DTRD, p.18). The analysis also involves gathering “*...Voice of the Market (VOM) input and [identifying] attractive market segments, [as well as] [evaluating] the market opportunity against BU¹¹⁹ strategic direction and BU financial objectives*” (DOC2, p.15).

This category also partly includes the Concept phase (Figure 8.2), which identifies “*...customer needs (VOC)¹²⁰...*” (DOC2, p.16). In doing so, MultiproductCo uses ethnography research. As the consumer business director stated, “*...we carry out*

¹¹⁹ Business unit

¹²⁰ VOC: voice of customer

ethnography research; in conducting FGD, we talk to the consumers. For example, [investigating] what their behaviour when cleaning the house is like, how they store [the cleaning tools], what the cleaning frequency is, who does it..." (INT-DCB, p.8).

Concept Development

The Concept Development category relates to the Concept phase (see Figure 8.2). After gathering data on customer needs, managers need to "...translate [these needs] into ranked product requirements" (DOC2, p.16). From that, the product designer specified, "...we generate the concepts: what materials suit women best, what materials for men are like, from the technology we have which can be used, what ideal production is like... [we prepare] sketches, a mock-up up to the consumer test" (INT-PD, p.2).

Potential product concepts may also emanate from the global portfolio. As the business division head indicated, "Initially, it starts from the [global] portfolio; product portfolio analysis, really... Occasionally there's direction from the global [office], [guiding]... the focus of category to be pushed..." (INT-HBD, p.2). At this stage, the appropriate channels for distributing the products have already been worked out, as the manager of brand marketing #1 stated: "It's been justified from the beginning that the project is designated to penetrate [the market] through the mini market channels". (OBS-MBM1, p.4).

Design

This category appears to be not represented in the framework in Figure 8.2; however, the product designer described how, "...after [obtaining the VOC results] we proceed to a concept... After these there must be the estimations. For example, ...the first design defines weight estimation as being so much, the second design defines weight estimation as so much, the third design defines weight estimation as so much" (INT-PD, p.15). This design is then developed in greater detail: "...then the detail [design], [including] technical drawing, specification detail, material list, [is built]... it will be used by the sourcing team to set up the price" (INT-PD, p.2)

Build Business Case

This category is associated with the Feasibility phase (see Figure 8.2). Its objective, among others, is "to develop the business case for the project" (DOC2, p.17). It

presents “...*the synthesis of the idea, concept and feasibility [analysis]...*” (technical manager, INT-MT, p.13). The business case contains, among others, a sales estimation and profitability forecast. As the consumer business director said, “...*we then prepare the business case; for example, how many [pieces] we would [be likely to] sell [of the product]*” (INT-DCB, p.14); Moreover, “...[the finance counsel] *normally ... calculates the profitability...*” (corporate marketing and business services director, INT-DCMBS, p.28).

Project Prioritisation

This category includes the Landing Review phase (see Figure 8.2). This is carried out by a panel made up of representatives of the technical and R&D group, business groups as the project owners and a business services group. As the technical and R&D director stated, “*For the landing review, I reserve one day in each month, for which [the project owners] can come to me, Mr. ‘H’ [technical manager] and Mr. ‘G’ [corporate marketing and business services group director]...*” (INT-DTRD, p.26).

In the light of the project evaluation criteria considered by the panel, the technical manager stated, “*Well, the bases for determining [the projects] are the measures which include margin, sales estimation, and then the probability of success, either from a marketing or technical point of view*” (INT-MT, p.18). They also mentioned a specific metric: “...*the filters we use [or] the parameters [involved include]... the real-win-worth¹²¹ score. [For example,] [in terms of the parameter of] time [needed to complete the project], certainly, the shorter the time, the higher the score we give*” (INT-MT, p.5).

Management Review

The Management review represents a *full gate review* (or *NPI gate review*) as shown within the blue line in Figure 8.2. Such reviews are only conducted for top NPI projects, categorised as class 3 (‘modifying’), 4 (‘developing new product for existing markets’), and 5 (‘developing new product for new markets’). As the technical and R&D director

¹²¹ “R-W-W [real-win-worth] guides a development team to dig deeply for the answers to six fundamental questions: Is the market real? Is the product real? Can the product be competitive? Can our company be competitive? Will the product be profitable at an acceptable risk? Does launching the product make strategic sense?” (Day, 2007 , p.114).

indicated, “... we therefore only focus on [what constitutes] top projects for the company. For the gate review, everyone [involved in conducting the review] is a top level [manager]” (INT-DTRD, p.24); alongside this, the technical manager stated “The next review applies to class 3, 4 or 5 [projects] [and is called the] NPI gate review, [that is,] the new product introduction gate review” (INT-MT, p.13).

Product Development

This category involves the Development and Scale Up phases. The Development phase leads to product prototypes designed to match the approved concept. Its objective is to “Develop a robust (insensitive to noise) product that is optimised to customer requirements”, after which it conducts tests on those products to “Verify product capability against the customer tolerances” (DOC.p.18). This is supported by the technical and R&D director, who stated that “...we really do have machines for conducting tests on the brushes [for example]; [this enables] us to know how many thousand or ten thousand times they are run until the weight of their bristles reduces. We have the complete data on that” (INT-DTRD, p.29).

The Scale Up phase is incorporated in this category, which has as its aim to prepare the production system for operating at production scale, as described in the company’s document Scale Up phase objective: “Optimize the process at the targeted manufacturing site and demonstrate long term capability” (DOC2, p.19). The process replicates the prototype in order to examine the reliability of the production system, as the process engineer confirmed: “So from one piece we replicate it into a small quantity of products – perhaps 10, depending on its difficulty level... [We then decide], “OK, let’s make a decision preparing the mass production plan”” (INT-PE, p.2).

Launch Planning

The company document indicates that this category mainly consists of the Launch phase (Figure 8.2) which has as its objective, among others, to “Execute the launch plan...” (DOC2, p.20). The interviews with managers also identified other activities related to distribution preparation, as the technical manager indicated: “...Then the launch plan: when they do the launch, have they arranged the listing to the intended stores?” (INT-MT, p.14).

8.3.2 Comparison of MultiproductCo’s Practice with Theory

This section compares MultiproductCo’s current practice with key theory, notably *portfolio management goals* – value maximisation, balanced portfolio and strategic alignment (Cooper et al., 1997a, 2001) – and *effective portfolio management* (e.g., senior management’s role in selection decisions) (Cooper et al., 2001). The results of the comparison are presented in Table 8.5, which comprises the aspects of portfolio management from which the practice is viewed, comments, a representative quote and triangulation notes.

Table 8.5: Analysis of MultiproductCo's Portfolio Management Practice

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
1 Formal procedures	‘Landing review’ is a formal procedure applied for project prioritisation. Procedures for portfolio review are still overlooked	<i>So basically, the landing review is an initial filter for prioritising [projects]. [It’s used] to determine which projects are indeed necessary to be followed up... (INT-MT, p.1)</i> <i>...for example, if we’ve decided to develop five products, we normally proceed anyway. So once we go ahead with those five products, there’s no longer any portfolio consideration. (INT-MBM1, p.21)</i>	NPI Process Flow (DOC3, p.2-4)
2 Portfolio management goals			
<i>Value maximisation</i>	Prioritisation is not only based on financial valuation. Besides this, decisions refer to sales targets	<i>...to prioritise: which one is given priority and which ones are second, third. We use parameters (such as a 12-month projection of financial impact), then gross margin, RWW scores, [development] time, [product] class... marketing probability of success, technical probability of success, the resources required... (INT-MT, p.3)</i>	[the target] isn’t a number of projects, but new product sales... Actually, we want to minimise the number of projects. (INT-DTRD, p.20)
<i>Balanced portfolio</i>	NPD distinguishes between high- and low-risk projects. However, no specific policy exists regarding portfolio composition	<i>There are two categories [of project]. The high-risk projects [which] get through the gates... and the low-risk ones... (INT-DCMBS, p.29)</i>	
<i>Strategic alignment</i>	Portfolio decisions should conform to the global corporate goals, driven by financial targets Product portfolio should be aligned with the global portfolio.	<i>...the short term [objective] is, frankly, to achieve the global corporate goal, ...as I mentioned earlier... what the main office does is more about finance-driven targets (INT-DCMBS, p.1).</i> <i>...the guideline is that [our portfolio] should be aligned with the global portfolio. Although here we also have room for developing [our own</i>	<i>...because the strategic direction was not solely about the top line anymore, we have to really take care of profitability. And it does indeed affect the way we develop NPI (INT-MBM1, p.15-16).</i>

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
		products] <i>as long as</i> [they] <i>are still</i> [aligned with the policy] (INT-DTRD, p.33)	
3 Strategic portfolio decision ¹²²	The company establishes a 'portfolio expansion' plan. However, it is not always applied.	<i>So MultiproductCo has what is called a portfolio expansion... it [shows] the year then the category; there's a cycle 1, zone 1. So that's one that they sell first – for example a particular product. And then it also shows the level of [improvement]... However, as for whether we have the [development] path which exactly follows what's shown on the road [map]... well, sometimes we don't</i> (INT-DCMBS, p.42)	
4 Tactical portfolio decisions ¹²³			
<i>Stage-gate process</i>	'NPI gate review' is employed to evaluate high value projects; other projects are reviewed via an electronic platform.	<i>We focus only on top projects which qualify to undergo the gate reviews. Other than that, we use e-NPI [electronic NPI] (INT-DTRD, p.24).</i>	
<i>Portfolio review</i>	No formal portfolio review process.	<i>...for example, if we've decided to develop five products, we normally proceed anyway. So once we go ahead with those five products, there's no longer any portfolio consideration. (INT-MBM1, p.21)</i>	
	Conducted informally when identifying potential products and evaluating existing products.	<i>I normally... analyse the current situation in the Indonesia market. From the product portfolio we have, we identify each category potential. And then we decide which category we're going to focus on to push forward in Indonesia. (INT-HBD, p.2)</i>	<i>...so we certainly should review the existing products regularly. I and my team normally review the total portfolio. We have what's called an SKU rationalisation (INT-DCB, p.26)</i>
Effective portfolio management			
<i>Senior management role in selection decisions</i>	Project selection is tackled by the business group and technical and R&D's senior management. For top projects in particular, final approval is given by the top management team, including the managing director.	<i>...actually, [selection decisions] can be made at a business group [level]; however, sometimes they [need] to go up as far as the managing director. (INT-DCMBS, p.25)</i>	<i>[A portfolio is determined] at division head [level]... except if the products are from classes 3, 4 or 5, [then the decision] should be made in the directors' forum... Ms. 'D' [technical and R&D director] and other [directors] are there... (INT-HBD, p.12)</i>
<i>Senior management and R&D management relationship</i>	A senior management member leads the technical and R&D group; s/he therefore manages the communication between technical and R&D, and management.	<i>[The reviews] are held monthly. The schedule of the top 20 or 10 [project reviews] is controlled by Ms. 'D' [technical and R&D director] (INT-DCMBS, p.27)</i>	

¹²² See Figure 2.1.

¹²³ Ibid.

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
<i>Portfolio management methods</i>	In the Landing and NPI gate reviews, various methods are applied to assess project proposals: NPV, scoring method, RWW. ¹²⁴	<i>...the filters we use [or] the parameters [involved], for example, ...and then the real-win-worth score. (INT-MT, p.5)</i>	<i>Concept Core Deliverable Definitions: Business Opportunity Assessment A refinement of the previous business assessment using data generated in this phase. Includes a full RWW analysis although calculations such as unit cost, NPV, sales etc. are broad brushstroke estimates at best in this phase (DOC2, p.25) Mini real-win-worth (DOC13, p.1); marketing probability of success matrix (DOC14, p.1); technical probability of success (DOC15, p.1)</i>
<i>Organisational structure and support systems</i>	Technical and R&D group led by senior management member organise every stage of product development. The company applies e-NPI ¹²⁵ to review low-risk NPI projects	<i>The role of R&D is developing products, starting from the idea, concept, feasibility, development, scale-up launch and post-launch; after that mass-pro is in place... [the process] between scale-up and mass-pro comes under the technical department. (INT-DTRD, p.2) Corporate Standards: Customizable Electronic Database. Lotus Notes-based databases (eNPI and eNTI) are supported by Lab IT for corporate use. Their use is recommended but not mandated. (DOC2, p.7)</i>	<i>...normally, Ms. 'D' [technical and R&D director] or Mr. 'H' [technical manager] compile the entire corporate NPI [projects]. From that they select, let's say, the top 20 [projects]. (INT-HBD, p.27) ...as I mentioned[before], e-NPI is based on systems... (INT-DTRD, p.33)</i>
5 Selection criteria	Profitability Sales Marketing probability of success Technical probability of success Local vs. import Outsourced vs in-house Competitors	<i>Well, the bases for determining [projects] are the measures we use here [in the landing review], ranging from profit, margin, sales estimation; then probability of the success, either in terms of marketing or technical. After they come out, then a collective decision is made. (INT-MT, p.18)</i>	<i>...one of the criteria is the opportunity size; then whether the product is imported or developed locally... whether the production is outsourced of in-house. Then... how much the profit is; whether competitors are there... (INT-DCMBS, p.29)</i>
7 Problems in portfolio management	Limited resources Too many products to be	<i>...the resources are limited. The marketers, besides managing new products, also still manage existing products, launch programmes, carry out on-going selling... that's one of the factors which make them unable to focus or speed up on completing their new projects. (INT-MT, p.22) 10,000¹²⁶ products are too many. Ideally... I once</i>	<i>...it's hard to memorise [the items]... in the past, at</i>

¹²⁴ Real-win-worth it method.

¹²⁵ Electronic new product introduction.

Portfolio Management Aspect	Comments	Representative Quote	Triangulation Notes (Examples)
	managed	<i>calculated that, in Indonesia, we're supposed to have only 5,000 [products] – half of what we have now. (INT-DCMBS, p.10)</i>	<i>the beginning, I used to know every product by heart. Now however... I don't, really. (INT-MS, p.19)</i>
	Inadequate project management	<i>Project management becomes an issue as new projects might be less prioritised than daily operations; therefore [the projects] are prolonged. (INT-MT, p.22)</i>	

Formal Procedures

In terms of procedure formality, MultiproductCo applies formal and documented procedures (particularly for project prioritisation) as part of its portfolio management. However, the company appears not to have a formal portfolio review process.

Portfolio Management Goals

The literature emphasises the need to consider value maximisation, a balanced portfolio and strategic alignment. MultiproductCo does not just refer to the maximum value of the projects; rather, it evaluates a number of projects and prioritises them based on the parameters of financial impact projection, gross margin, RWW scores, development time, product class, marketing probability of success, technical probability of success and resources required. Overall however, any decision is geared towards achieving the sales target.

Moreover, portfolio prioritisation appears not to be based on budget, which is allocated to advertising and promotion, rather than being based on whole product development projects. According to the corporate marketing and business services director: “...what I know is that there’s only a promotion [budget]” (INT-DCMBS, p.32).

MultiproductCo classifies its NPD projects into high- and low-risk projects. Each goes through different review processes: NPI gate review and new stock review. Nevertheless, there is no specific policy on portfolio composition which reflects the pursuit towards a *balanced portfolio*.

¹²⁶ The entire product range managed by all business groups.

In terms of the *strategic alignment* goal, company decisions regarding the product portfolio should be aligned with the global portfolio – that is, the global corporate goals, driven by financial targets.

Strategic Portfolio Decision

As shown in Figure 2.1, strategic portfolio decisions can include defining a *product road map* and committing to the allocation of resources into *strategic buckets*. MultiproductCo comes close to having a product road map with its ‘portfolio expansion plan’; however, in practice, the company’s portfolio decisions do not always refer to this plan. The company also appears not to allocate a special budget for whole product development projects, but only for advertising and promotion activities in connection with the new products launched.

Tactical Portfolio Decisions

As Figure 2.1 shows, tactical portfolio decisions are made by implementing portfolio stage-gate processes and portfolio reviews. MultiproductCo’ formal stage-gate process, the ‘NPI gate review’, is employed to evaluate high value projects; other projects are reviewed via an electronic platform. However, there is no formal portfolio review process in place at MultiproductCo, merely an informal review process used to identify new potential products and when reviewing the existing portfolio.

Senior Management Role in Selection Decisions

Portfolio selection involves decisions regarding small value projects taken at a business group level; it can even be done by business division heads. With high value projects, final approval is given in a senior management forum which includes the managing director.

Senior Management and R&D Management Relationship

The technical and R&D division plays a central role in the company’s new product development projects. As a result, the leader of this division (who is also a member of senior management) manages the relationships between technical and R&D management, and senior management, as well as with other divisions.

Portfolio Management Methods

Project evaluation is conducted firstly as part of the Landing review and NPI gate review, and applies various methods: NPV, a scoring method, real-win-worth it, a marketing probability of success matrix and a technical probability of success matrix.

Organisational Structure and Support Systems

The technical and R&D division has a role in organising the whole product development process. In addition, a computer-based system, e-NPI, is used to manage low risk NPI projects.

Selection Criteria

MultiproductCo employs various selection criteria to evaluate new product development projects, including profitability, sales, marketing probability of success and technical probability of success. The company also considers whether to utilise local in-house development products or to import them from other subsidiary companies, whether to manufacture the products using in-house facilities or produce the product using an external manufacturer, and how hard the competition is.

Problems in Portfolio Management

When the company's limited resources are taken into consideration, MultiproductCo appears to be attempting too many projects at the same time, possibly affecting its capability to manage these projects. With a high number of projects up and running, the managers seem unable to understand the entire portfolio range sufficiently. This indicates that the manager may have a capacity boundary to the *portfolio mindset*¹²⁷, which is a capability required during the portfolio management process and which is essential to achieving effective effective portfolio decision-making (Kester et al., 2011).

8.3.3 Conclusions

This section has responded to RQ 1: *How is new product development portfolio management conducted [at MultiproductCo]?* The discussion shows that:

¹²⁷ "A complete understanding of all of the projects in the NPD portfolio and how each is aligned to the firm's strategy" (Kester et al., 2011, p. 647).

- 1) MultiproductCo's portfolio management practice can be grouped into eight categories (a palette of routines): (1)¹²⁸ Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (12) Launch Planning.
- 2) MultiproductCo applies formal procedures for developing new products and prioritising projects, called 'landing review'. However, no formal procedures for conducting a portfolio review exist. This indicates an inadequate consideration of 'portfolio' characteristics when developing a set of new products.
- 3) Project evaluation is based on individual products. MultiproductCo evaluates a new product proposal not only from a financial aspect (NPV) but also strategic aspects (RWW, marketing probability of success and technical probability of success).
- 4) MultiproductCo distinguishes the review processes based on the class of product. Full (or NPI) gate review tackles top NPD projects, whereas a new stock review using a computer-based system handles low-risk projects.

8.4 ORGANISATIONAL ROUTINES IN NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 2

This section addresses RQ 2: *What organisational routines can be identified in the new product development portfolio management [at MultiproductCo]?* Answering this question was based on five analysis stages: (1) First-order coding; (2) Comparing first-order codes to Feldman and Pentland's definition; (3) Forming categories; (4) Discerning the relationships between categories, and (5) Comparison with supporting evidence obtained from the simulation¹²⁹.

8.4.1 First-Order Coding

The first-order coding began by applying line-by-line coding to the data transcripts to draw out initial information related to all activities conducted by managers involved in NPD portfolio management. This is mainly a group rather than an individual activity. It is also regular and ongoing.

¹²⁸ The number refers to the category number.

¹²⁹ Simulation data was used to triangulate the data from the field study—interviews, observation and document reviews (see Chapter 5, Research Design).

Appendix E.1 presents a section of the transcript of the interview with the technical and R&D director, showing the first-order codes. The italicised text is the transcript and the codes appear in the second column. For example, the *Market research* code denotes the marketing initiatives to identify the market trend. The section also shows the relationship code *Market research*→*Potential product identification* which indicates that the results from *Market research* affects *Potential product identification* routines. This information is used to reveal the relationships between categories, discussed in the next section. The first-order codes and their relationships were stored in NVIVO.

8.4.2 Comparing First-Order Codes to Feldman and Pentland's Definition

The codes which emerged were then refined by identifying those which could be confirmed as routines. This identification¹³⁰ was based on Feldman and Pentland's (2003) definition, which characterises routines by "repetition, a recognisable pattern of action, multiple participants and interdependent actions" (p.103). Each code with three or more characteristics was verified as a routine. The specific criteria applied in verifying the codes are shown in Table 8.6.

Table 8.6: Criteria for Verifying the Presence of Routines

Criterion (number of characteristics represented by evidence)	Verified as routines?
Greater than or equal to three ¹³¹	Verified
Two	Partly verified
One	Not verified
None	Not verified

In total, out of 41 first-order codes, 30 were verified¹³² as routines using Feldman and Pentland's definition. The results of the verification are presented in Appendix E.2, including supporting evidence of the routines characteristics from different data sources, that is, first-order codes and the data sources (interviews, observation and documents)

¹³⁰ The identification process used an *etic* approach. This approach allows a researcher to "...make assessments that are independent of the assessments of the participants in the routines... Thus, the researcher identifies the routine (or process) based on their own, theory-driven criteria" (Pentland and Feldman, 2008b, p.292).

¹³¹ The codes evidenced in a document represent formal procedures, which show the characteristics of repetition, a recognisable pattern of action, multiple participants, interdependent actions.

¹³² See Appendix E.3 for examples of the first-order codes not confirmed as routines.

from which the evidence was drawn. For example, supporting evidence shows that ‘Business Planning’ involves three routine traits, whereas for ‘Invention Submission’ only two routine traits were identified.

8.4.3 Forming Categories

The first-order codes were then grouped into categories based on the similarity and adjacency of the activities represented by the codes. The process was conducted iteratively with the inspection of portfolio management categories in RQ 1. For example, the first line of the transcript of an interview with the technical and R&D director (Appendix E.1) states, “*They [marketing] will look at how the trend looks. They’ll classify the customers then determine their target market*”. This was coded as first-order code ‘Market research’ which was then classified in the ‘Market and Industry’ category.

The result of the categorisation is presented in Figure 8.4. This shows that eight categories emerged from the data: (1)¹³³ Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (7) Build Business Case; (8) Project Prioritisation; (9) Management Review; (10) Product Development, and (12) Launch Planning. These indicate where routines play a role in portfolio management at MultiproductCo.

¹³³ This number refers to the routines category number.

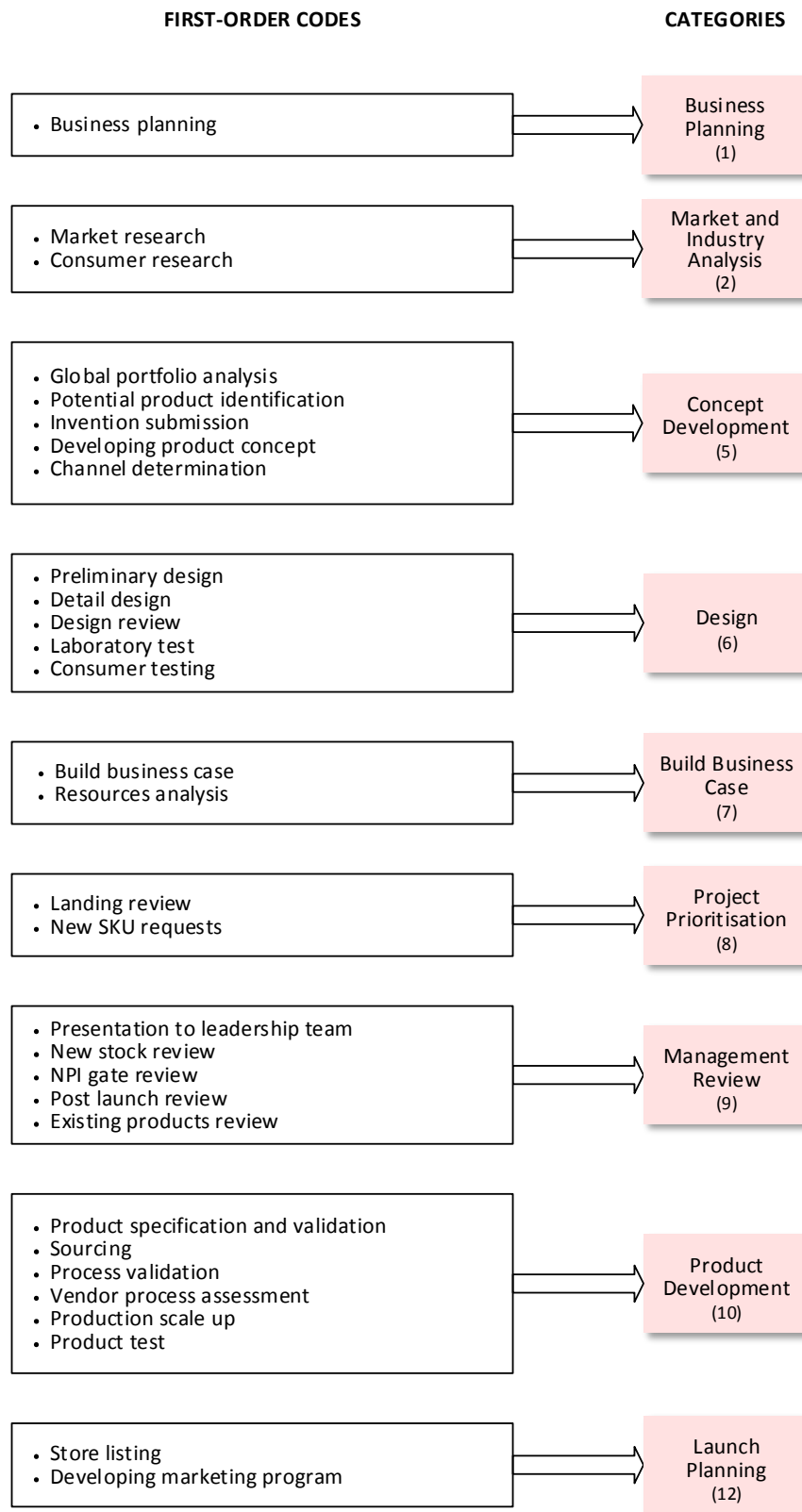


Figure 8.4: Data Structure of Organisational Routines in the NPD Portfolio Management at MultiproductCo

8.4.4 Relationships between Categories

In this subsection, the analysis referred to Strauss and Corbin's (1998) notion of *axial coding* to address the relationships between categories. These relationships were identified through examining the connections between the first-order codes, as demonstrated in the example in Appendix E.1, which sets out the connection between the codes of 'Market Research' (under 'Market and Industry Analysis') and 'Potential Product Identification' (under 'Concept Development')¹³⁴.

Figure 8.5 shows the relationships between and among the categories. Here, a single-headed arrow represents when one routine affects another; a double-headed arrow denotes interplay between routines. For example, the 'Market and Industry Analysis' routine affects (represented by the symbol '→') the 'Business Planning' routine. Interplay also exists between the 'Business Planning' and 'Concept Development' routines. These relationships provide information concerning the process occurring, enabling the process framework to be delineated. This framework shows that¹³⁵ routines are built by connecting parts; their connections thus establish the existence of the routines (Feldman and Pentland, 2008).

To conclude, evidence from various sources supports the construct of an existence of relationships between routines. This led to the development of the framework of routines in MultiproductCo's NPD portfolio management, as shown in Figure 8.6.

¹³⁴ The connections between first-order codes are shown in Appendix E.4.

¹³⁵ As described in Chapter 3, Organisational Routines.

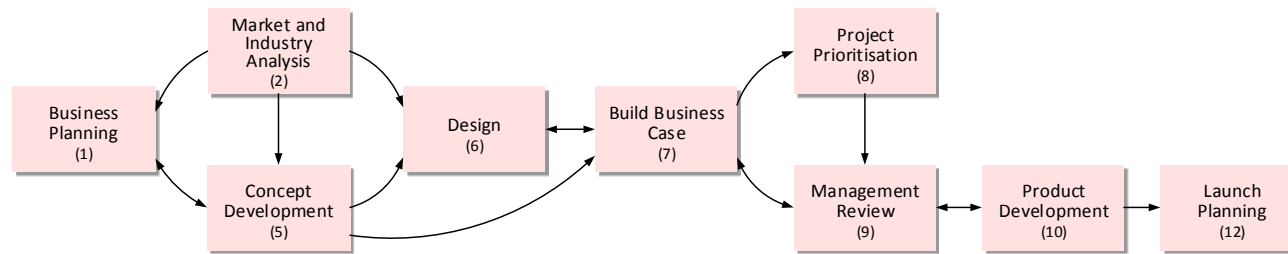


Figure 8.5: Relationship between Categories at MultiproductCo

ROUTINES CATEGORIES	1 Business Planning	2 Market and Industry Analysis	5 Concept Development	6 Design	7 Build Business Case	8 Project Prioritisation	9 Management Review	10 Product Development	12 Launch Planning	REPRESENTATIVE QUOTE
1 Business Planning	→	↔								<p><i>We have a [planning] cycle every year, it's called business planning... as we have a plan, we can see what we're looking for... what sort of products would be introduced... We might get [product ideas] from a global [portfolio] – we have a new product, really; [if] it succeeds in Argentina, for example, [then the thinking is, well,] Indonesia's market is similar to that of Argentina's, so let's offer it". (INT-DCMBS, p.12)</i></p> <p><i>...if they finalise the business plan final, [they] come up with a list of the sources of growth, either from the share gain or new products... (INT-DTRD, p.32-33)</i></p>
2 Market and Industry Analysis	→	→								<p><i>... I see when they make a business plan, they propose a new product development plan based on market needs [and] based on the opportunity they see. (INT-DCMBS, p.22)</i></p> <p><i>Then they'll look into what the current trend is like; they need to come up with 'this is the product portfolio that we have this year'... (INT-DTRD, p.11)</i></p>

ROUTINES CATEGORIES	1 Business Planning	2 Market and Industry Analysis	5 Concept Development	6 Design	7 Build Business Case	8 Project Prioritisation	9 Management Review	10 Product Development	12 Launch Planning	REPRESENTATIVE QUOTE
				→						Sometimes we ask for help, for some big projects, from a third party. So, [we go] to MarketResearchCo ¹³⁶ , or ones like the ethnography experts [to see] what their insight is like; sometimes we also throw [the consumers] our product [to see] what the inputs they give are like. From that, [we proceed] to preliminary design. (INT-PD, p.2)
5 Concept Development				→		→				So marketing has requirements [about how new products should be], then the team of Ms. 'D' [technical and R&D director] is the one who develops the specifications. (INT-DCB, p.19) [There's] NPI [new product introduction], the identification of the superior product concept to meet the customer needs; then what's the feasibility [analysis]? Certainly, we look at whether it's feasible to build this product. (INT-DTRD, p.22)
6 Design				↔						The R&D and technical team discuss with manufacturing: "Oh, if the specification's like this, then to manufacture it, it should be like this; what kind of materials are [required]?" Then the cost emerges. After that, [R&D] comes back to marketing [to discuss]: "If the cost of those is that much, does it fit [with the budget]? Well, it's too high. OK, do it again – [revise] the design." (INT-DCB, p.19)
7 Build Business Case					→		↔			So, [the managers] prepare an NPI proposal. Then the proposal's submitted and reviewed in the landing review session. (INT-MT, p.1) Then we prepare the business case, for example, how many [units] approximately are we able to sell. Well, that'll be... we call it a gate review. There are regular reviews: there could be, if I'm not mistaken, three, four or five gate reviews; that [project] will be discussed by everyone together, involving personnel up to the MD ¹³⁷ , depending on the scale of the project. (INT-DCB, p.14) ...From the first step, we look at the business first; if it's OK, [we look at] whether the cost is OK. Normally [the scores] are red, yellow and green. Green means OK, 'go'. But, Red means there's something making us unsure – so it's either improved or killed. Yellow usually means there's something, [maybe the feasibility analysis], which should be revised. (INT-DCB, p.16)
8 Project Prioritisation						→				...see, the result from this landing review..., this is an initial stage [at which] we can really drop or delay a project or

¹³⁶ A market research company.

¹³⁷ MD: Managing director

ROUTINES CATEGORIES	1 Business Planning	2 Market and Industry Analysis	5 Concept Development	6 Design	7 Build Business Case	8 Project Prioritisation	9 Management Review	10 Product Development	12 Launch Planning	REPRESENTATIVE QUOTE
										<p><i>new product proposal. And then at the second [outlet], we can proceed the project to the mini gate review, or we call it NSREV [new stock review]; then this third one is [for] the project which [should go] through full gate review or NPI review. (INT-MT, p.1)</i></p>
9 Management Review								↔		<p><i>...[for example] I want to develop a pen with a certain price and design. When we scale up, [we find out that] for example, OK, this can match [the requirements]. In the gate review then we'll adjust [the product] with [management's] approval... After [the adjustments needed] for the scale-up are clear, then we'll have a direction. OK, we can continue. The cost is appropriate; the features will be appropriate by doing this or that. We'll proceed... to continue to scale up again, then go to the last scale-up... (INT-EP, p.9)</i></p>
10 Product Development									→	<p><i>In the launch plan, the final price is actually there. When [the product is to be launched] we already know [the price] of the scale-up [state]. (INT-DTRD, p.29)</i></p>
12 Launch Planning										

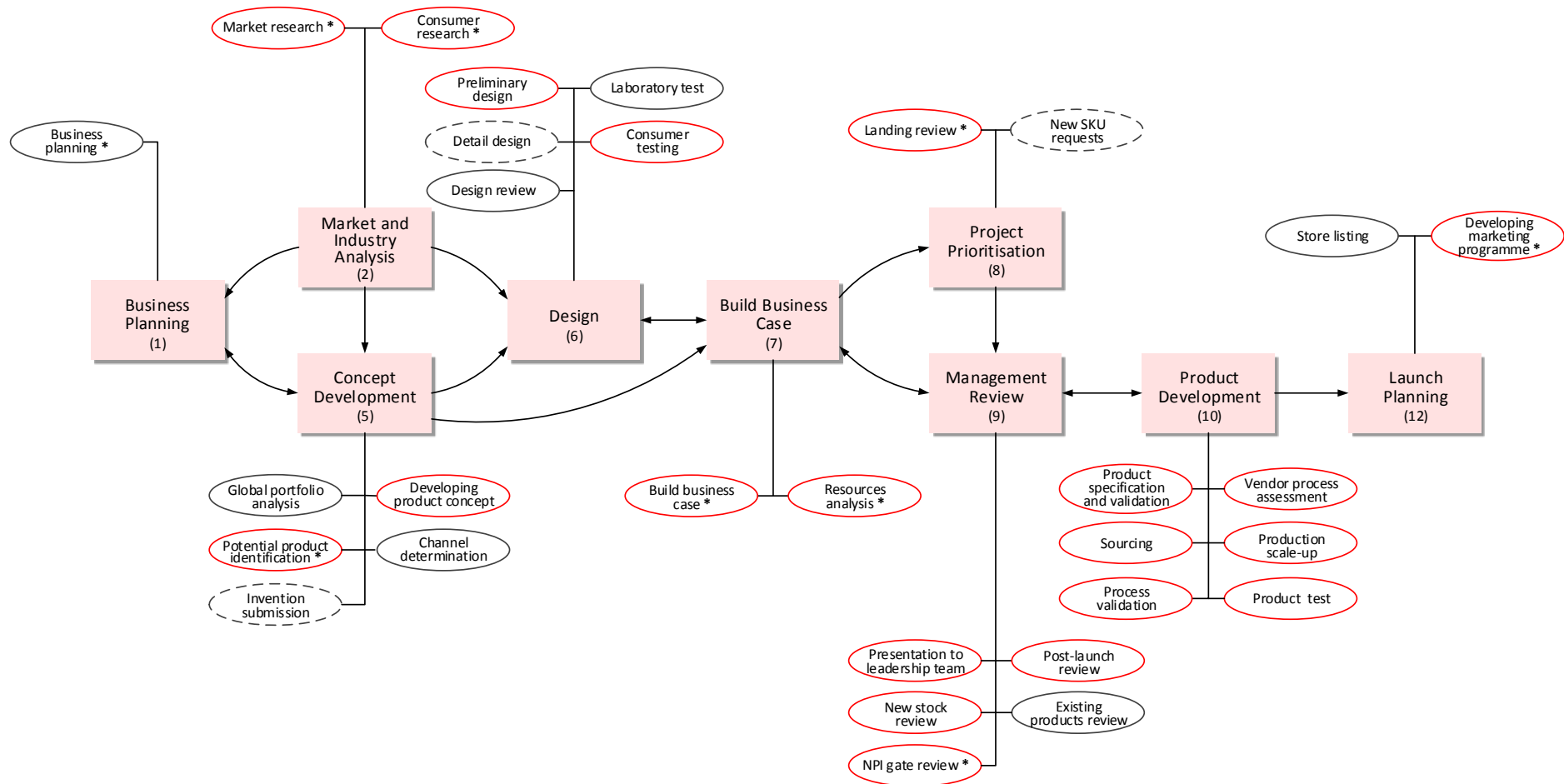


Figure 8.6: Framework of Routines Underlying the NPD Portfolio Management at MultiproductCo

Note:

- (dashed) – Partly verified
- (solid) – Formal (documented) routine
- * – Evidence for this routine was also found in the simulation (explained in Section 8.4.5)

8.4.5 Supporting Evidence from the Simulation

The simulation was designed to stimulate discussion to discover how MultiproductCo performs portfolio management. As described in Chapter 3, Cohen and Bacdayan (1994) considered that organisational routines are stored as *procedural memory*¹³⁸. At MultiproductCo the simulation was applied to identify *conversations*¹³⁹ which stem from the participants' procedural memories and in which routines in portfolio management are likely to be embodied. By recognising these actions, the corresponding routines thus can be revealed.

One MultiproductCo director (the corporate marketing and business services director), three managers (of brand marketing #2, brand marketing #3 and sales) and a process engineer participated in the simulation. The director representative is a permanent board member¹⁴⁰ who also participates in in MultiproductCo's strategic meetings and NPI gate meetings. The managers also normally present their new project proposals in board meetings.

The video recording of the simulation and its transcript were analysed to identify where the conversations appeared to indicate the existence of routines. An investigation then sought to determine which actions are seemingly exercised in the routines as part of the company's portfolio management processes. The results, shown in Appendix E.5, show that the simulation confirmed six subroutines. For example, the 'Entry point to new market' conversations, enacted by the sales manager (SM) (00:36:29 to 00:36:37) can be considered to constitute part of the 'Potential product identification' routine (which identifies potential new products). This conversation indicates how, when dealing with how a set of projects should be selected, the director and the manager evoked the procedural memory which stores the 'Potential product identification' routine.

The simulation provided supporting evidence for the existence of specific subroutines in MultiproductCo's portfolio management process, including the 'Business

¹³⁸ "It is memory for how things are done that is relatively automatic and inarticulate, and encompasses cognitive as well as motor activities" (Cohen and Bacdayan, 1994, p.554).

¹³⁹ "...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events" (Czarniawska, 1997, p.42).

¹⁴⁰ In MultiproductCo, board members are referred to as the leadership team.

planning’, ‘Market research’, ‘Consumer research’, ‘Potential product identification’, ‘Build business case’, ‘Resource analysis’, ‘Landing review’, ‘NPI gate review’, ‘Existing product review’ and ‘Developing marketing Programme’ subroutines. Most conversations were associated with the ‘Landing review’ subroutine categorised under ‘Project Prioritisation’. This demonstrates that the simulation typically represents the realm of portfolio selection, under which each potential project business case is evaluated by top managers¹⁴¹.

8.4.6 Conclusions

This section has responded to RQ 2: *What organisational routines can be identified in the new product development portfolio management [at MultiproductCo]?* Based on evidence from the interviews, meeting observation, documents and simulation, it has been shown that portfolio management at MultiproductCo is built utilising nine routines: (1) Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (6) Design; (7) Build Business Case; (8) Project Prioritisation; (9) Management Review; (10) Product Development, and (12) Launch Planning. Each routine is based on several interacting subroutines.

8.5 LINKAGE TO ESPOUSED BUSINESS STRATEGY: RESEARCH QUESTION 3

This section addresses RQ 3: *Is [MultiproductCo’s] espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* The discussion is divided into three parts: (1) identifying MultiproductCo’s espoused business strategy; (2) identifying the routines in NPD portfolio management which consider the strategy, and (3) identifying supporting evidence from the simulation showing whether or not managers consider the strategy when conducting portfolio selection.

¹⁴¹ In MultiproductCo, the Landing Review involves the directors of the technical and R&D department and corporate marketing business service, and the technical manager.

8.5.1 Identifying MultiproductCo's Espoused Business Strategy

A business strategy should consider the questions¹⁴² “What main goals are we trying to achieve?”; “What markets do we focus on primarily?”; “How do we describe our competitive strategy?” and “Which capabilities do we need to develop?” (Bowman, 1998; Finlay, 2000). Cooper (1984, 2005) did not however consider the target market to be an aspect of business strategy. Adopting this view¹⁴³, the three key aspects of business strategy examined in this study were organisational goals, competitive strategy and capabilities.

Questions enquiring into organisational goals, competitive strategy and capabilities were posed only to the MultiproductCo directors; nevertheless, a number of other managers raised these issues during interview, discussion of which then complemented the data acquired. In the analysis, ‘organisational goals’, ‘competitive strategy’ and ‘capabilities’ were adopted as codes representing elements of strategy. The left-hand side of Appendix E.6 shows the results, including the data sources and supporting evidence. For example, ‘Profitability’ is an organisational goal which emerged from the interview with the business division head, which was triangulated with the interview with the Brand marketing #2 manager. To answer RQ 3, it is necessary to examine whether these three key aspects of business strategy are considered by MultiproductCo as part of the portfolio management process and if so, within which routine(s).

8.5.2 Espoused Business Strategy Considered in the Routines

This subsection analyses whether the routines in MultiproductCo's portfolio management process (see Figure 8.6) consider the company's business strategy in terms of organisational goals, competitive strategy and capabilities. Each routine was examined for any mention of these three aspects (see Appendix E.6). As described earlier, the left-hand side of the table presents MultiproductCo's espoused business strategy, whereas the right-hand side of the table (shaded grey) depicts the routines under which the respective espoused business strategy is considered.

¹⁴² This list of questions was partly based on email discussions (18-02-2014) with Cliff Bowman, Professor of Strategic Management at Cranfield School of Management.

¹⁴³ As also reflected in Figure 2.1.

It is shown, for example, that the organisational goal of ‘profitability’ is considered as part of the ‘Potential product identification’ subroutine (grouped under the Conceptual Development routine). As the brand marketing #1 manager stated: “*We see... how much the potential sales are, then how much the costs are; we consider what the profitability is... We see from those things... [how] to prioritise the products to be developed* (INT-MBM1, p.7). In contrast, the ‘People’ capability was not found as part of any routine.

The results of this investigation are presented in Figure 8.7, which shows that different key aspects of business strategy are considered across portfolio management at MultiproductCo. This figure is discussed in detail in the following passages.

As part of the Business Planning routine, MultiproductCo pursues the organisational goals of ‘business size’, ‘profitability’ and ‘market share’. To achieve these, the company considers the competitive strategy of establishing appropriate distribution ‘channels’. In the Market and Industry Analysis routine, MultiproductCo appears merely to glance at the organisational goals of ‘business size’ and sales, whereas it gives serious consideration to the competitive strategies of ‘channel’, ‘product portfolio’ and ‘communication’.

Furthermore, as part of the Concept Development routine, MultiproductCo considers the organisational goals of ‘business size’, ‘sales’, ‘profitability’ and ‘market share’. In this routine, a competitive strategy of ‘technology innovation’, ‘channel’ and product portfolio are used. In particular, the Design routine pursues ‘brand position’ as the organisational goal; however, it does not relate its activities to any competitive strategy.

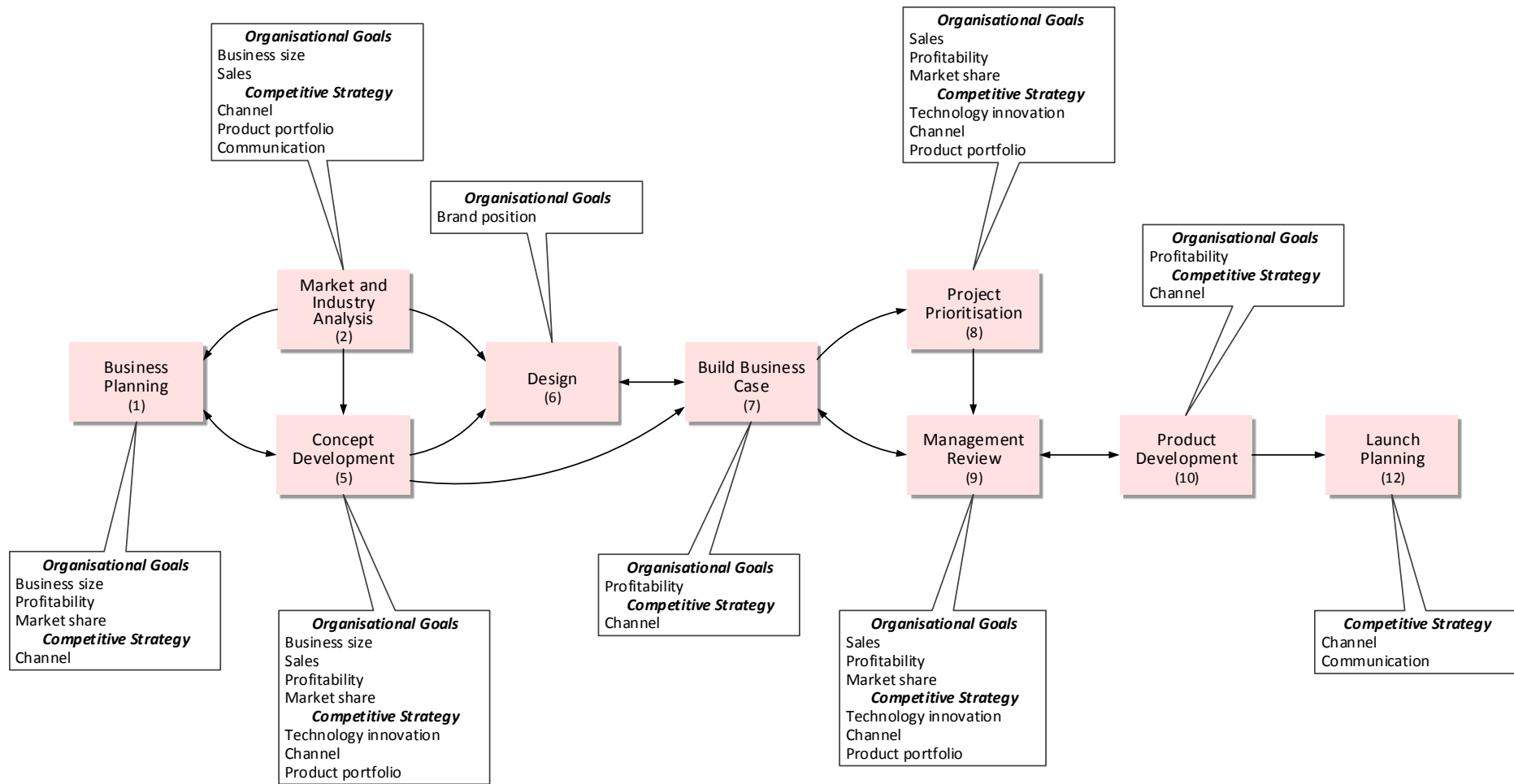


Figure 8.7: Routines and the Key Aspects of Business Strategy at MultiproductCo

MultiproductCo's Build Business Case routine looks only at the organisational goal of 'profitability' and the competitive strategy of 'channel'. The Project Prioritisation routine considers the organisational goals of 'sales', 'profitability' and 'market share'. The routine regards 'technology innovation', 'channel', and 'product portfolio' as the competitive strategy.

The Management Review routine incorporates 'sales', 'profitability' and 'market share' as the organisation'. In terms of competitive strategy, MultiproductCo appears to focus on 'technology innovation', 'channel' and 'product portfolio' as the competitive strategy.

In the Product Development routine, 'profitability' is the only organisational goal considered. It focuses on the distribution 'channel' as the competitive strategy. During this stage, MultiproductCo views appropriate distribution channels as the key elements in attaining its goal. Finally, the Launch Planning routine no longer involves an organisational goal. Rather, it concentrates on the competitive strategy of channel and communications: those dealing with delivery of the products to consumers. Capabilities issues appear not to be addressed by any routine.

In conclusion, the investigation results show that while the organisational goals and competitive strategy are considered in all the underlying routines, the capability aspect was unobservable across the routines. Issues around capability development also appear not to be considered in the portfolio management forum. Across the portfolio management process, the 'profitability' goal dominantly influences the activities across the routines, demonstrating how the company's strategic direction strongly influences the portfolio management process. As mentioned by the brand marketing #1 manager, "...because the strategic direction was not solely about the top line¹⁴⁴ anymore, we have to really take care of profitability. And it does indeed affect the way we develop NPI (INT-MBM1, p.15-16).

8.5.3 Conclusions

This section has responded to RQ 3: *Is [MultiproductCo's] espoused business strategy considered in the new product development portfolio management (as evidenced in*

¹⁴⁴ A term referred to as 'sales'.

routines)? Based on evidence from the interviews, meeting observation, documents and simulation, three key aspects of MultiproductCo's espoused business strategy have been identified:

- 1) The organisational goals comprise 'business size', 'sales', 'profitability', 'market share' and 'brand position'.
- 2) The company's competitive strategy encompasses initiatives which emphasise 'technology innovation', 'channel', 'differentiation', 'product portfolio' and 'communication'.
- 3) The aspect of capabilities are not addressed in any routine in the portfolio management process

The key aspects of business strategy, particularly, organisational goals and competitive strategy, appears to be considered across the underlying routines of the portfolio management process. Each routine considers different key aspects, depending on the nature of the routine.

8.6 SUMMARY

This chapter has presented an analysis of the MultiproductCo case in response to RQ 1, RQ 2 and RQ 3, and has shown the following:

- RQ 1: *How is new product development portfolio management conducted [at MultiproductCo]?*

Formal procedures are applied when developing new products and for prioritising projects. However, formal procedures for conducting portfolio review do not yet exist. The evaluation of the project is based on individual products. There are two review processes, distinguished according to the class of the products – top (high-risk) projects and low-risk projects.

- RQ 2: *What organisational routines can be identified in the new product development portfolio management [at MultiproductCo]?*

Portfolio management at MultiproductCo is built utilising nine routines: (1) Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (6) Design; (7) Build Business Case; (8) Project Prioritisation; (9) Management Review; (10)

Product Development, and (12) Launch Planning. Each routine is based on several interacting subroutines.

- RQ 3: *Is [MultiproductCo's] espoused business strategy considered in the new product development portfolio management?*

Three key aspects of business strategy, i.e. organisational goals, competitive strategy and capabilities, were identified at MultiproductCo. The key aspects of business strategy considered across the underlying routines of the portfolio management process are organisational goals and competitive strategy. In contrast, the capabilities aspect was not found.

CHAPTER 9 CASE STUDY 4: AUTOCOMPCO

9.1 INTRODUCTION

This chapter presents Case Study 4, which examines a company located in Indonesia and which manufactures automotive components. The study was conducted between December 2014 and April 2015, and encompassed interviews, a meeting observation, a review of documents, and observation of a portfolio selection simulation. The results are presented in the following five main sections:

- The *case description* provides information on the company and the data collected;
- *NPD portfolio management* explains how the company conducts portfolio management and answers Research Question 1 (RQ1);
- *Underlying organisational routines* answers Research Question 2 (RQ2);
- *Link to business strategy* explains how portfolio management impacts strategy and answers Research Question 3 (RQ3).

The chapter closes with a summary.

9.2 CASE DESCRIPTION

9.2.1 Overview of the Company: AutocompCo

The company is referred to throughout as AutocompCo¹⁴⁵, an affiliated company of GroupCo, a large group company in the automotive sector. AutocompCo is a manufacturer of plastic injection components for two-wheel and four-wheel vehicles. It deals with three types of NPD projects: own product¹⁴⁶, request for design and development part (RDDP), and non-RDDP¹⁴⁷ (interview, R&D manager, 3 February 2015). The markets for this type of product are vehicle manufacturers and end users in

¹⁴⁵ Names have been changed to preserve anonymity.

¹⁴⁶ 'Own product' is a type of product which is designed and manufactured based on the company's own market needs identification.

¹⁴⁷ Product drawings are provided by the customer; AutocompCo is responsible for the manufacturing of the products.

the aftermarket, AutocompCo can be classified as a large company in terms of turnover¹⁴⁸.

9.2.2 Data Collection at AutocompCo

Data collection was conducted during 16 on-site visits¹⁴⁹ and one visit to make the initial approach. Interviews required nine visits, during which documents were collected. The introductory meetings needed three visits; meeting observations took two visits (only one meeting related to product development); the simulation and progress report meeting took one visit each. In addition, certain company documents were received via email. Further details of these visits are provided in Appendix L and the data collected is explained below.

9.2.2.1 Interviews

Semi-structured interviews were conducted with 16 participants, four senior management members, 11 managers and one coordinator from different functions. Senior management members were each considered to have a strategic role in the portfolio management team; they were thus interviewed using a set of questions which enquired into not only the portfolio management process but also into issues relating to company strategy¹⁵⁰. In addition, communication via email and Whatsapp messaging was conducted with some participants after the visits, for clarification and confirmation of points raised.

Table 9.1 outlines the details of each interview, specifically the role and responsibility of each participant, the duration of each interview, the date it took place and the number of pages of the transcription. The total duration of the interviews was more than 16 hours. They were recorded and then transcribed, resulting in 347 pages of transcription.

¹⁴⁸ A large company is one with a turnover of more than US\$5.6 million (Bank Indonesia, 2011)

¹⁴⁹ One visit was to meet with one of the GroupCo directors to negotiate access to conduct the study

¹⁵⁰ Interview questionnaires are presented in Appendix I.

Table 9.1: Interview Details at AutocompCo

No	Role	Reference-Initial	Interview details		Transcript (no. of pages)
			Duration (hr:min:sec)	Date	
Senior Management					
1	Chief Operating Officer (COO)	INT-COO	00:57:50	26-02-15	19
2	Division Head ¹⁵¹ , Engineering and Marketing	INT-DHEM	01:28:12	25-03-15	28
3	Division Head, Plant	INT-DHP WAM ¹⁵² -DHP	01:07:39	25-03-15 22-08-16 11-11-16	22
4	Division Head, QC and HSE	INT-DHQC	01:01:17	03-03-15	17
Managers					
5	Manager, R&D	INT-MRD	01:30:57	30-02-15	29
6	Manager, Marketing and Technical	INT-MMT	01:00:59	23-01-15	23
7	Manager, Engineering Project	INT-MEPJ	01:21:48	09-02-15	28
8	Manager, Engineering Process	INT-MEPC	01:03:32	21-01-15	23
9	Manager, Cost Control	INT-MCC	01:05:02	16-02-15	25
10	Manager, Purchasing	INT-MPR	01:13:14	16-02-15	26
11	Manager, Production Planning and Inventory Control (PPIC)	INT-MPPIC	00:55:44	30-01-15	25
12	Manager, Production #1	INT-MP1	00:54:01	21-01-15	24
13	Manager, Production #2	INT-MP2	01:18:18	21-01-15	22
14	Manager, Finance and Accounting	INT-MFA	00:57:06	30-01-15	21
15	Manager, Productivity Improvement	INT-MPI	00:25:38	15-02-15	11
16	Coordinator, Product Development	INT-CPD	00:06:41	15-04-15	4
Total			16:27:58		347

9.2.2.2 Meeting Observation

On the fifteenth site visit (16 April 2015), an RDDP ('request for design and development process') project review meeting held by the R&D department was observed. Table 9.2 summarises the participants of the meeting: R&D manager, two section heads, one project leader and seven members of various functions. Together they reviewed the progress of the development of a new product, identified problems

¹⁵¹ In a business unit such as AutocompCo the division head can be considered a director.

¹⁵² WhatsApp messaging.

and made decisions regarding further progress. The meeting lasted nearly two hours and the recording resulted in 43 pages of transcription.

Table 9.2: Meeting Participants at AutocompCo

No	Role	Reference-Initial
1	Manager, R&D	OBS-MRD
2	Section Head, Procurement	OBS-SHP
3	Section Head, Laboratory	OBS-SHL
4	Leader, Engineering Project	OBS-LEP
5	Project Controller, Product Development	OBS-PCPD
6	Marketing, 4-Wheel Products	OBS-MFWP
7	Design Engineer #1	OBS-DE1
8	Design Engineer #2	OBS-DE2
9	Staff, Procurement	OBS-PROC
10	Staff, Production Planning and Inventory Control (PPIC)	OBS-PPIC
11	Staff, Supplier Development	OBS-SD

9.2.2.3 Documents

A total of ten documents were collected during two visits and via email. Table 9.3 lists their details, including the name and document initial, number of pages, a brief description of the contents and the collection date of each.

Table 9.3: Documents Collected at AutocompCo

No	Document Name	Reference-Initial	#	Description	Collection Date
1	Company profile	DOC1	34	Overview of about the company's structure, businesses achievements	Sent by email, 25-04-2015
2	Organisation structure chart	DOC2	2	Organisation structure and the personnel	Sent by email, 25-04-2015
3	Product development scheme	DOC3	1	New product development stages	03-02-2015
4	Development process chart-Product #1	DOC4	1	Example of new product development activities on product #1	03-02-2015
5	Development process chart-Product #2	DOC5	1	Example of new product development activities on product #2	03-02-2015
6	Development process chart-Product #3	DOC6	1	Example of new product development activities on product #3	03-02-2015
7	Product development achievement chart	DOC7	1	Exposition of products already developed	03-02-2015
8	Minutes of meeting:	DOC8	2	Minutes of project review meeting,	09-02-2015

No	Document Name	Reference-Initial	#	Description	Collection Date
	engineering project department weekly review			consisting of problems raised, counter measures and person in charge	
9	GroupCo's company profile	DOC9	38	Company profile of group company to which AutocompCo is affiliated	07-01-2013 ¹⁵³
10	GroupCo's company profile brochure	DOC10	10	Group company brochure presenting short profile of affiliated companies	07-01-2013

Note: #—Number of pages

9.2.2.4 Simulation

The simulation took place on 19th March 2015. There were six participants, comprising five managers¹⁵⁴ and one marketing officer (see Table 9.3).

Table 9.4: Simulation Participants at AutocompCo

No	Role	Reference-Initial
1	Manager, Marketing and Technical	SIM-MMT
2	Manager, Engineering Project	SIM-MEPJ
3	Manager, Engineering Process	SIM-MEPC
4	Manager, Project Cost Control	SIM-MCC
5	Manager, Purchasing	SIM-MPR
6	Marketing Officer	SIM-MO

As explained in the methodology chapter, each participant was assigned a short case study which provided them with a specific budget and required them to select an NPD portfolio from seven potential projects. Each participant was provided with a *risk-reward diagram* (in the form of a *bubble diagram*) of these potential projects, to support them in analysing the portfolio.

Forty-five minutes were available for the simulation. The portfolio decisions and discussions lasted about 60 minutes. The simulation was filmed and the video recording was transcribed, generating a 23-page transcription.

¹⁵³ The first approach meeting with a GroupCo HR director and discussed research access to one of GroupCo's affiliated companies.

¹⁵⁴ Note that all directors were not willing to take part in the simulation; nevertheless, managers who participated were those who have a significant role in product development.

9.3 NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 1

This section addresses RQ 1: *How is new product development portfolio management conducted [at AutocompCo]?* The question was answered mainly by referring to descriptions from individual managers and company documents, which were triangulated across the statements of other interviewees. However, it should be noted that more detailed information from RQ 2 (organisational routines in portfolio management) informed the analysis, as the analysis process of RQ 1 was iterative. This section presents an overview of the portfolio management practice, followed by a comparison with theory, and then conclusions.

9.3.1 Overview of AutocompCo's Practice

Product development at AutocompCo is still dominated by customer-driven projects, as remarked upon by the COO: “...almost 90% of projects are actually customer-driven” (INT-COO, p.6). This leaves limited resources for company-initiated projects, which they call ‘own products’. For managing their product development projects, AutocompCo has a formal framework (see Figure 9.1). This framework does not include anything on NPD portfolio management, as the R&D manager explained: “*That [scheme] demonstrates what stage we’re at in developing [products], whereas [procedures] for making portfolio decisions are not available yet*” (INT-MRD, p.10).

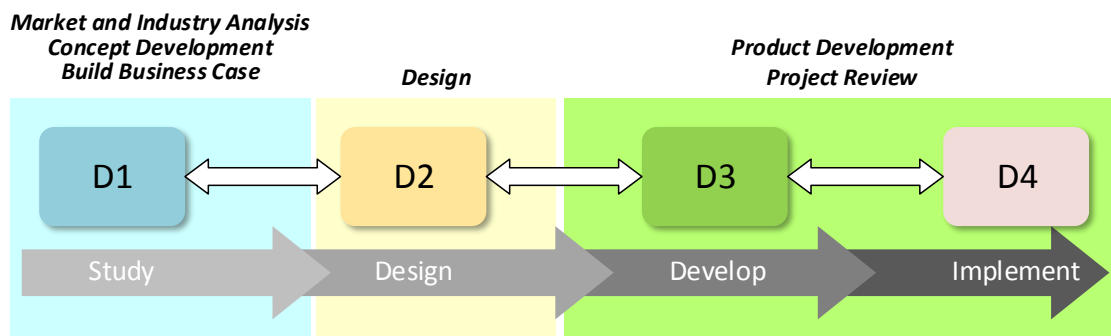


Figure 9.1: Product Development Framework at AutocompCo

Sources: *Product Development Scheme (DOC3, p.1)*

This is understandable, because according to the nature of customer-driven projects, AutocompCo mainly develops products tailored to specific customer requirements. As the plant division head pointed out, “*Requests for quotations [RFQs]*

are quite numerous, and actually we aren't in a position to choose. All of them are considered to be opportunities" (INT-DHP, p.14). Nevertheless, in practice AutocompCo prioritises projects that are aligned with the company's objective, as the marketing and technical manager indicated: *"...if we receive, [for example], RFQs for 100 parts, we'll see which ones are aligned with our policy... In other words, we look for ones which fit our core business: modular parts"*. In addition, the cost aspect is considered when reviewing RFQs, as the manager added: *"...next, we see which ones have the most appropriate target costs"* (INT-MMT, p.1)

As described earlier, AutocompCo also develops its own products from scratch, based on its market needs studies and ideas generation initiatives. Here, informal product concepts selection activities occur as the R&D manager stated, *"In the [ideas] screening we should show that this [concept] is feasible to be developed"* (INT-MRD, p.16).

Further detailed inspection of the interviews, meeting observation and documents (such as that presented in Figure 9.1) brought to light how AutocompCo manages its portfolio. The company's informal practices can be grouped into seven categories as shown in Figure 9.1 (sections of the categories are suggested in Figure 9.1, using different colours): (1)¹⁵⁵ Business planning; (2) Market and Industry Analysis (blue shading); (5) Concept Development (blue shading); (6) Design (light yellow shading); (7) Build Business Case; (9) Management Review; (10) Product development (green shading), and (11) Project Review (green shading). Each category is discussed further in the following sections¹⁵⁶.

Business Planning

AutocompCo conducts an annual meeting in which the company draws up a working plan for the following year, defining the company's target(s). The engineering and marketing division head stated that *"...we have [an annual] meeting in December to [discuss] the following year's [plan]. We determine [the company's] targets..."* (INT-DHEM, p.10). Preceding this, internal division meetings are held to prepare proposals

¹⁵⁵ This number refers to the category numbers used in summarising the cross-case results, shown in Figure 9.2.

¹⁵⁶ Note that in the following sections, example quotes are given in most cases with supporting evidence from different sources (either another manager, observation or document) – data triangulation was always conducted.

for new products to be developed, as the R&D manager explained: “... *If an agreement is reached in one division that, “Oh, OK next year we’ll develop these customers with these products, with a budget of so much”, then we bring it to [an annual] meeting”*. (INT-MRD, p.7)

Business Planning (1)	(4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	(8)	Project Review (11)
(3)	Design (6)	Management Review (9)	(12)

Figure 9.2: Categories of Portfolio Management Practice at AutocompCo

Source: Analysis of interviews, documents and observation¹⁵⁷

The development plan resulting from an annual meeting is then presented to GroupCo’s¹⁵⁸ board of directors for their approval: “...*next, [the results] from [an annual] meeting are brought in to GroupCo; the management should present them, and decide “We’ll do these [projects] next year”... ”* (R&D manager, INT-MRD, p.7).

Market and Industry Analysis

AutocompCo conducts market research when it develops its own products, as the R&D manager stated: “*Normally this [market] study is purposed mainly for own products”* (INT-MRD, p.10). For RDDP products, AutocompCo identifies the latest consumer needs, which may emerge as the vehicle makers create new models, as the engineering project manager remarked: “...*for RDDP products, we ask marketing what the new models starting next year¹⁵⁹ up until 2017 are like. We’ll try to map [the potential products]...*” (INT-MRD, p.7).

¹⁵⁷ Supplemented by insights which emerged as part of the process of answering RQ 2.

¹⁵⁸ GroupCo is a parent company to which AutocompCo is affiliated.

¹⁵⁹ This interview was conducted in 2015; the speaker is thus referring here to the year 2015.

Concept Development

Based on information obtained from studying the market, R&D prepares concept designs in anticipation of RDDP product orders from customers. As the PPIC manager stated: “...we receive [product] drawings from customers, and also do our own research and development... For example, for the products from [customers] ‘H’ and ‘T’¹⁶⁰, [R&D] have already had the [products] drawings; so we just need to follow those drawings...” (INT-MPPIC, p.1).

Meanwhile, R&D also conducts its own product research and concept design to fulfill the vehicle makers’ needs, as the product development coordinator indicated: “...well, we start [drawing up] the concept design; later we design it, then we offer it to the car manufacturers... Although they haven’t requested it, we offer them that design...” (INT-CPD, p.1). The product concepts generated are then screened by the marketing and engineering teams based on their feasibility, as the R&D manager remarked: “In the [ideas] screening we need to show that this [concept] is feasible to be developed... Firstly, we call marketing to screen them; then we call our colleagues in engineering to screen them again...” (INT-MRD, p.16).

Design

After receiving a letter of intent (LOI) from customers, indicating that they accept AutocompCo’s quotation, R&D develops detail drawings¹⁶¹ to guide further development of the production. The engineering project manager explained that “...in R&D, there are steps to translate conceptual design into a detail drawing – drawing for mass production...” (INT-MEPJ, p.16). He added “...R&D creates detail drawings... following us receiving an LOI. So, [it shows] what the dimensions are... (INT-MEPJ, p.5).

“At the detail drawing stage, R&D carries out what is called a design review...” (INT-MEPJ, p.5), the engineering project manager explained. This drawing is reviewed by different internal teams: “...[The design review] involves an internal team from

¹⁶⁰ Researcher’s abbreviations denoting two car manufacturers.

¹⁶¹ A large scale drawing – parts, machine etc. – with dimensions and other information for use in production

engineering project, quality and workshop teams who develop the mold, and marketing which examines the business aspects” (INT-MEPJ, p.5).

Build Business Case

This category relates to activities which bridge customer orders with AutocompCo’s development processes. For example, for an own product, the concepts developed in R&D are presented to customers to get their acceptance, as the production #1 manager remarked: “... *our colleagues [in R&D] make a number of designs then submit them to me, which then I bring in to the customers... [From those models] they select one or two... ” (INT-MP2, p.7).*

For an RDDP product, the process begins as AutocompCo receives RFQs from customers, which the marketing and engineering project teams then follow up by preparing quotations. For example, as the engineering and marketing division head described, “*Normally we receive an RFQ – a request for quotation – two to three months before [submitting the quotation]... (INT-DHEM, p.11). XX*

In accordance with the quotation preparation, AutocompCo conducts a feasibility study which analyses the feasibility of the project including the figure of cost of goods manufactured, as the marketing and technical manager explained, “...*when we [in marketing] receive an RFQ, we send a letter to engineering [project] asking for the preparation of the feasibility study, including how much the COGM¹⁶² is” (INT-MMT, p.8).* From that COGM figure, then “...*marketing just needs to determine the selling price; how much the price estimation (INT-MEPJ, p.10), added the engineering project team manager.*

Management Review

Management is also involved in evaluating the projects, as asserted by the COO “...[decisions about projects are determined by] *collective consensus. Initially marketing will make [the decisions], but we, board of director, must say, ‘OK, how much is the profitability, if we take [the project]’ ... ” (INT-COO, p.9).*

¹⁶² COGM: Cost of goods manufactured

For both own product and RDDP, a project officially starts once the customers issue letter of intent [LOI], showing that they accept the quotation offered. The engineering project manager linked this stage to a kick-off meeting, “...as LOI is released, marketing will hold a kick-off [meeting], declaring that the product we offered the other day... [has got] LOI” (INT-MEPJ, p.5). “...marketing is one who leads the kick-off meeting...” (INT-MMT, p.18), continued the marketing and technical manager. In the meeting, marketing will present sales figures, time frame and team members of the project, as the engineering project manager pointed out, “marketing will present the market views [of the project]: how the future sales are like, how much additional sales are generated for AutocompCo; then how about the time frame, milestones; who will be involved in the team...” (INT-MEPJ, p.5)

Product Development

In this stage, infrastructure for production is set up and developed (DOC3, p.1). For example, the R&D manager explained, “In the Develop [stage], we develop the tooling, mold, CF [checking fixtures], jig...” (INT-MRD, p.11). Meanwhile, “...The engineering project team starts preparing the loading capacity...”, remarked the marketing and technical manager (INT-MMT, p.12).

Purchasing starts seeking suppliers for providing supporting tools, as the purchasing manager stated, “...after LOI, the works are mainly purchasing’s jobs. Tooling and other things mostly aren’t done in-house; there are few which are done in-house. Therefore, they are subcontracted, really. Well, then we are one who follows up [the processes] to supplier”. Further, purchasing monitors and controls the supply progress, as the manager specified, “... after that [we do] monitoring and controlling the development progress.” (INT-MPR, p.6-7).

Before starting mass production, AutocompCo conducts trials by producing samples and evaluating them, as the plant division head described: “In the development phase, there are... what is called, in ‘T’¹⁶³ [terms], a low volume production trial and a high volume production trial – LVPT and HVPT. [These are performed] to see [to what

¹⁶³ Researcher’s abbreviations denoting a car manufacturers

extent the gap is] *between what we quote and [what we achieve] during development phase and trial.* (INT-DHP, p.15).

Project Review

As development proceeds, regular project reviews are conducted to evaluate progress, as the engineering project manager pointed out “...we have weekly meeting to follow up the achievement progress of the development [of the project]... (INT-MEPJ, p.6). The COO further explained that “...in that [meeting, the review] is more one of scheduling... [whereas] the costing department simultaneously conducts a costing [review] in a different meeting...” (INT-COO, p.11). In the cost review meeting, explained the cost control manager, “...we compare the [product cost] with the FS [feasibility study] or, as we would say, the COGM...” (INT-MCC, p.1).

9.3.2 Comparison of AutocompCo’s Practice with Theory

This section compares AutocompCo’s current practice with key theory, notably *portfolio management goals* – value maximisation, balanced portfolio and strategic alignment – (Cooper et al., 1997a, 2001) and *effective portfolio management* (e.g., senior management’s role in selection decisions) (Cooper et al., 2001).

The results of this comparison are presented in Table 9.5, comprising the portfolio management aspects from which the practice is viewed, comments, representative quotes and triangulation notes.

Table 9.5: Analysis of AutocompCo's Portfolio Management Practice

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
1 Formal procedures	No formal procedures.	<i>That [scheme] shows our [products] development stages, whereas [procedures] for making portfolio decisions are not available yet.</i> (INT-MRD, p.10)	
	Selection decisions are limited. Product development is still dominated by customer-driven projects	<i>...almost 90% of projects are actually customer-driven projects.</i> (INT-COO, p.6)	
2 Portfolio management goals			
<i>Value maximisation</i>	Evaluation is on individual projects, looking at the cost projection and potential profitability	<i>...so engineering [project] calculates first what the quotation is like. Then marketing will analyse whether the cost matches [with the</i>	<i>...if we receive, [for example], RFQ for 100 parts, we will see which ones aligned with our policy... next, we see</i>

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
		customer's target cost], then [they calculate] how much the percentage profit or loss would be. From that, we submit the quotation to the customer; we'll see what their decision's like. [When we receive the decision], we analyse [the order] again to decide whether we go or not (INT-MP1, p.7)	which one having most suitable target costs. In other words, we look for ones which are aligned with our core business: modular parts. (INT-MMT, p.1)
Balanced portfolio	No consideration on balanced projects. The company considers all requests from customers.	Requests for quotation [RFQs] are quite numerous, and actually we aren't in a position to choose. All of them are considered to be opportunities. (INT-DHP, p.14)	
	There are small portion in the NPD portfolio which is based on company's own initiative	...the project's based on the customer [request], meaning that the drawings coming from the customer are more than those from RDDP and own products; that's how it's been until now... (INT-MEPJ, p.2)	
Strategic alignment	Focus on gaining cost reduction and profitability	"...if we receive, [for example], RFQs for 100 parts, we'll see which ones aligned with our policy... In other words, we look for ones which fit our core business: modular parts...Next, we see which ones have the most suitable target costs" (INT-MMT, p.1)	
3 Strategic portfolio decision	The road map directs to focus on modular parts and mirror products	...so the future direction – towards modular parts – is clear. We concentrate on mirrors; that becomes our [product] road map. (INT-MEPJ, p.24)	
	R&D budget is not clearly allocated	...one of our challenges is... a budget problem. Because... an R&D budget has not as yet been clearly defined. (INT-MRD, p.26)	
4 Tactical portfolio decisions:			
Stage-gate process	No stage-gate process	That [scheme] shows our [products] development stages, whereas [procedures] for making portfolio decisions are not available yet. (INT-MRD, p.10)	
Portfolio review	No portfolio review process		
5 Effective portfolio management			
Senior management role in selection decisions	Marketing team plays important role in making decision, but COO's approval is required, especially for projects which need high investment	...[decisions about a project are determined by] collective consensus. Initially, marketing makes [the decisions], but we, the board of directors, must say, 'OK, how much is the profitability if we take [the project]...' (INT-COO, p.9)	
Senior management and R&D management relationship	R&D, marketing and engineering project departments, structurally, are under engineering and marketing division.	AutocompCo's Organisation structure (DOC2, p.1)	

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
	<p>Communication between R&D and senior management take places through the division head.</p> <p>In product development, intensive communication occurs between departments. R&D interacts mainly with engineering project department</p>		
<i>Portfolio management methods</i>	Financial methods applied for evaluating individual projects, conducted in feasibility study	<i>...ultimately the output of FS is the payback period... and IRR – what the percentage is. We have a standard [for those indicators] – within what range [they are acceptable] according to the company policy (INT-MEPJ. p.10</i>	
<i>Organisational structure and support systems</i>	Marketing and engineering project departments lead the product development process. Marketing bridges the customer's requirements and the company's capabilities; engineering project coordinates the project development processes within the company.	<i>... there are two [marketing groups]: marketing project and marketing regular. Marketing project group's task is to pursue projects, calculate COGM, seek opportunities... Marketing regular [group's task] is to manage customers. To ensure the supply ability is healthy... (INT-MMT, p.5)</i>	<i>In project development, the engineering project team is at the frontline of new product development... They are in charge [in the projects]... their role is very significant towards the success of the projects (INT-MEPJ, p.27)</i>
6 Selection criteria	<p>Profitability</p> <p>Target cost</p> <p>Payback period</p>	<p><i>The margin on accessories is on average substantial enough, so the company looks at just the profit. (INT-MMT, p.3)</i></p> <p><i>What's the priority? The priority is based on which new products have the greatest [potential] fit with the target cost. For example, if there are 10 mirrors, and two of them, after the calculation, require development costs which don't make sense, then it's only the remaining eight which we are after. (INT-MMT, p.2)</i></p> <p><i>...for example, we can sell a product for four years EBIT¹⁶⁴ period; if the payback period is five years, [the project] isn't feasible... the accepted payback period for us is two to three years. Principally, it's not more than four years. (INT-MEPJ, p.10)</i></p>	
8 Problems in portfolio management	Limited resources	<i>[The first problem] is resources; our resources aren't enough... Resources can be manpower and facilities... (INT-MEPJ, p.25)</i>	

¹⁶⁴ EBIT: Earnings before interest and taxes

Portfolio Management Aspect	Comments	Representative Quotes	Triangulation Notes (Examples)
	Communication and coordination between different functions are problematic	...[one of challenges is managing] <i>communication between divisions; between departments</i> . [This occurs] <i>because each of them has their own [goals and] workload</i> . (INT-MMT, p.15)	<i>...actually the challenges [faced]... in the situation where [we deal with] various new products... at the same time, are certainly coordination and manpower...</i> (INT-MPR, p.21)
	Unsmooth transfer from a single project to mass production	<i>The main challenge is the transition from a single project to mass production... well, [this involves] the transfer of information as these are two different things</i> . (INT-MPPIC, p.20)	

Formal Procedures

The existing process at AutocompCo is focused on managing single products; procedures for managing a portfolio do not exist. Selection decisions are limited; moreover, product development was still dominated by customer-driven projects.

Portfolio Management Goals

The literature emphasises the need to consider value maximisation, a balanced portfolio and strategic alignment. In AutocompCo, project selection is based on the evaluation of individual projects by looking at the cost projection and potential profitability.

AutocompCo appears not to address the notion of portfolio balance. While the company considers all requests from customers, at the same time it strives towards numbers. In terms of the *strategic alignment* goal, AutocompCo always considers cost reduction and profitability measures in its evaluation of projects.

Strategic Portfolio Decisions

As shown in Figure 2.1, strategic portfolio decisions can include defining a *product road map* and committing to allocating resources into *strategic buckets*. AutocompCo has a road map which directs project selection to focus on modular parts (in response to customer requests) and mirror products (as part of the company’s own-initiative product development).

The customer-driven nature of development at AutocompCo indicates that the company appears not to apply the strategic bucket approach. Meanwhile, the R&D

budget, which provides the resources for the company's own-initiative product development, is not clearly defined.

Tactical Portfolio Decisions

As shown in Figure 2.1, tactical portfolio decisions are made by implementing portfolio stage-gate processes and portfolio reviews. Neither instrument was found at AutocompCo during the study.

The research reviewed each of the company's projects individually; a portfolio perspective was not applied. Review of customer-driven projects is carried out at the RFQ evaluation and quotation preparation stages, conducted by the marketing, engineering project and R&D departments. In addition, the project cost review is conducted during the product development stage.

Senior Management's Role in Selection Decisions

The role of the chief operating officer is significant in making the final decision about projects, especially those which are high value.

Senior Management and R&D Management Relationship

The R&D, marketing, and engineering project teams provide an important function in new product development in AutocompCo. Structurally, these departments are under the engineering and marketing division led by a division head, who is a senior management member and through whom communication between R&D and senior management is conducted.

Portfolio Management Methods

AutocompCo applies financial methods in order to evaluate individual projects, including payback period and internal rate of return (IRR).

Organisational Structure and Support Systems

AutocompCo assigns the marketing and engineering project departments to manage the product development process. Marketing's important task is to align customer requirements with the company's capability. Meanwhile, the engineering project team coordinates the project execution within the company.

Selection Criteria

Consistent with the company's objectives (see the discussion on strategic alignment, Table 9.5), the project selection criteria include profitability, cost and payback period.

Problems in Portfolio Management

Manpower at AutocompCo, and the facilities needed to tackle projects, appear limited. In addition, communication and coordination across functions seem to challenge the company in terms of accomplishing its projects according to customer requirements. This includes the transfer from single project to mass production.

9.3.3 Conclusions

This section has responded to RQ 1: *How is new product development portfolio management conducted [at AutocompCo]?* The discussion shows that:

- 5) AutocompCo deals with two types of product development, based on customer-order products and the company's own-initiative product.
- 6) AutocompCo's portfolio management practice can be grouped into eight categories (a palette of routines): (1)¹⁶⁵ Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development, and (11) Project Review.
- 7) AutocompCo's existing product development framework is dedicated to managing single product development; procedures for managing a portfolio had not been put in place.
- 8) AutocompCo evaluates new projects using payback period and IRR criteria.
- 9) The marketing and engineering project departments lead the product development process. Marketing deals with customers; the engineering project team coordinates project execution within the company. Meanwhile, for the company's own-initiative products, development is initiated by R&D.

¹⁶⁵ The number refers to the category number.

9.4 ORGANISATIONAL ROUTINES IN NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 2

This section addresses RQ 2: *What organisational routines can be identified in the new product development portfolio management [at AutocompCo]?* Answering this question was based on five analysis stages: (1) First-order coding; (2) Comparing first-order codes to Feldman and Pentland's definition; (3) Forming categories; (4) Discerning the relationships between categories, and (5) Comparison with supporting evidence obtained from simulation¹⁶⁶.

9.4.1 First-Order Coding

The first-order coding process began by applying line-by-line coding to the data transcripts to draw out initial information related to all activities conducted by managers involved in NPD portfolio management. This is mainly a group rather than an individual activity. It is also regular and ongoing.

Appendix F.1 presents a section of the transcript of the interview with the R&D manager, showing the first-order codes. The italicised text is the transcript and the codes appear in the second column. For example, the *Product research and concept design* code denotes R&D initiatives to investigate a competitor's portfolio which can be imitated. In addition, the transcript section also shows the relationship code *Mapping potential customers and products* → *Product research and concept design* which indicates that the results from *Mapping potential customers and products* affects *Product research and concept design* routines. This information is used to reveal the relationships between categories, which is discussed in the next section. The first-order codes and their relationships were stored in NVIVO.

9.4.2 Comparing First-Order Codes to Feldman and Pentland's Definition

The codes which emerged were then refined by identifying those which could be confirmed as routines. This identification¹⁶⁷ was based on Feldman and Pentland's

¹⁶⁶ Simulation data was used to triangulate the data from the field study – interviews, observation and document reviews (see Chapter 5 Research Design).

¹⁶⁷ The identification process used an *etic* approach. This approach allows a researcher to "...make assessments that are independent of the assessments of the participants in the routines... Thus, the researcher identifies the routine (or process) based on their own, theory-driven criteria" (Pentland and Feldman, 2008b, p.292).

(2003) definition, which characterises routines by “repetition, a recognisable pattern of action, multiple participants and interdependent actions” (p.103). Each code which three or more characteristics was verified as a routine. The specific criteria applied in verifying the codes are shown in Table 9.6.

Table 9.6: Criteria for Verifying the Presence of Routines

Criterion (Number of characteristics represented by evidence)	Verified as routines?
Greater than or equal to three ¹⁶⁸	Verified
Two	Partly verified
One	Not verified
None	Not verified

In total, out of 27 first-order codes, 56 were verified¹⁶⁹ as routines using Feldman and Pentland’s definition. The results of the verification are presented in Appendix F.2, including the supporting evidence of the routines characteristics from different data sources, that is, first-order codes and the data sources (interviews, observation and documents) from which the evidence was drawn. For example, supporting evidence shows that ‘Market research’ indicates all routines traits, whereas for ‘Mapping potential customers and products’ only three routines traits were identified.

9.4.3 Forming Categories

The first-order codes were then grouped into categories based on the similarity and adjacency of the activities represented by the codes. The process was conducted iteratively¹⁷⁰ with the inspection of portfolio management categories in RQ 1. For example, the first line of the transcript of an interview with the R&D manager (Appendix F.1) states, “...*Where we’re going to go to, really. [we’re going to develop] Mirror [products]; we map it. OK, the one likely to be on-trend is like this. We realise we’re not a leader in the mirror industry*”. This was coded as first-order code ‘Annual meeting’ which was then classified in the ‘Business Planning’ category.

¹⁶⁸ The codes evidenced in a document represent formal procedures, which show the characteristics of repetition, a recognisable pattern of action, multiple participants, and interdependent actions.

¹⁶⁹ See Appendix F.3 for examples of the first-order codes not confirmed as routines.

¹⁷⁰ The analysis was also supported by information which emerged from the relationships between the first-order codes, shown in Appendix F.4.

The result of the categorisation is presented in Figure 9.3. This shows that eight categories emerged from the data: (1)¹⁷¹ Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (7) Build Business Case; (9) Management Review; (10) Product Development; (11) Project Review. These indicate where routines play a role in portfolio management at AutocompCo.

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¹⁷¹ This number refers to the routines category number.

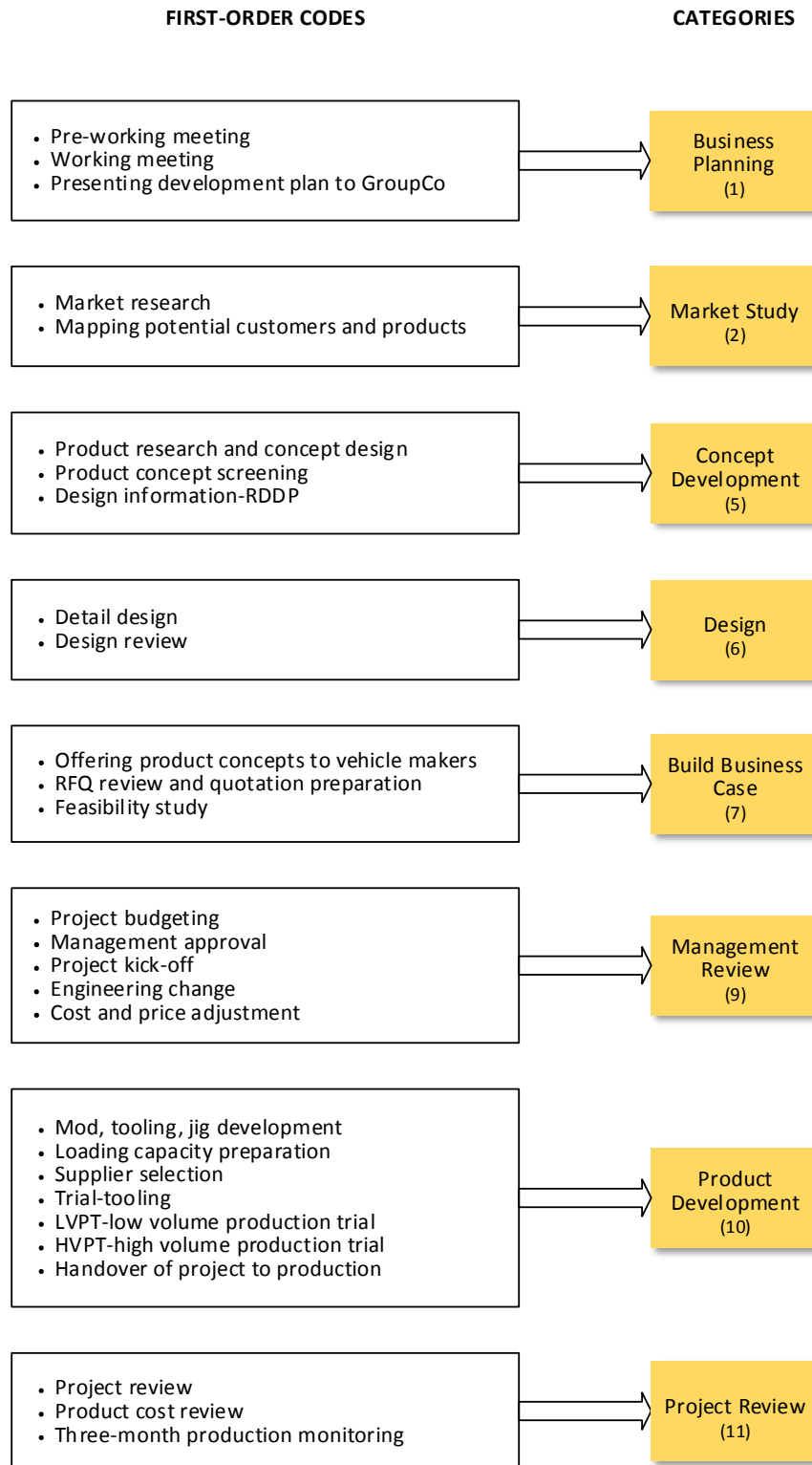


Figure 9.3: Data Structure of Organisational Routines in the NPD Portfolio Management at AutocompCo¹⁷²

¹⁷² Note that these categories match those shown in Figure 9.2, indicating the iterative nature of the way that RQ 1 and RQ 2 were answered.

9.4.4 Relationships between Categories

In this subsection, the analysis referred to Strauss and Corbin's (1998) notion of *axial coding* to address the relationships between categories. These relationships were identified through examining the connections between the first-order codes, as demonstrated in the example in Appendix F.1, which sets out the connection between the codes of 'Mapping potential customers and products' (under 'Market and Industry Analysis') and 'Product research and concept design' (under 'Concepts Development')¹⁷³.

Figure 9.4 shows the relationships between and among the categories. Here, a single-headed arrow represents when one routine affects another; a double-headed arrow denotes interplay between routines. For example, the 'Market and Industry Analysis' routine affects (represented by the symbol '→') the 'Business Planning' routine. Interplay also exists between the 'Concept Development' and 'Build Business Case' routines. These relationships provide information concerning the process occurring, which enabled the process framework to be delineated. This framework shows that¹⁷⁴ routines are built by connecting parts; their connections thus establish the existence of the routines (Feldman and Pentland, 2008).

To conclude, evidence from various sources supports the construct of the existence of relationships between routines. This led to the development of the framework of routines in AutocompCo's NPD portfolio management, as shown in Figure 9.5.

¹⁷³ The connections between first-order codes are shown in Appendix F.4.

¹⁷⁴ As described in Chapter 3, Organisational Routines.

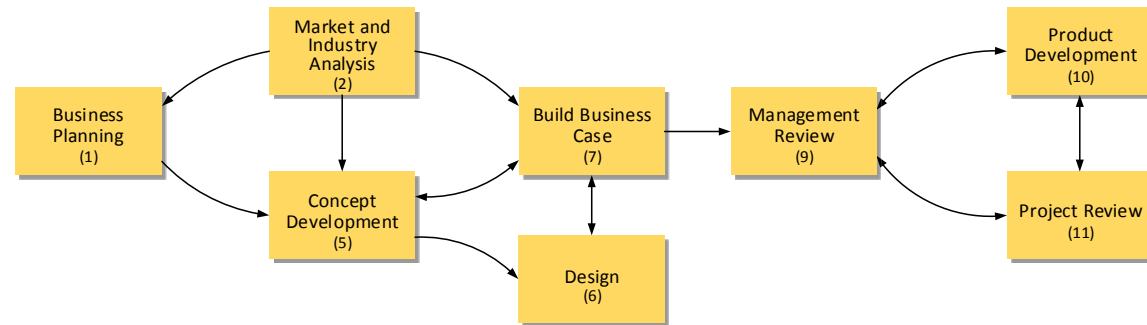


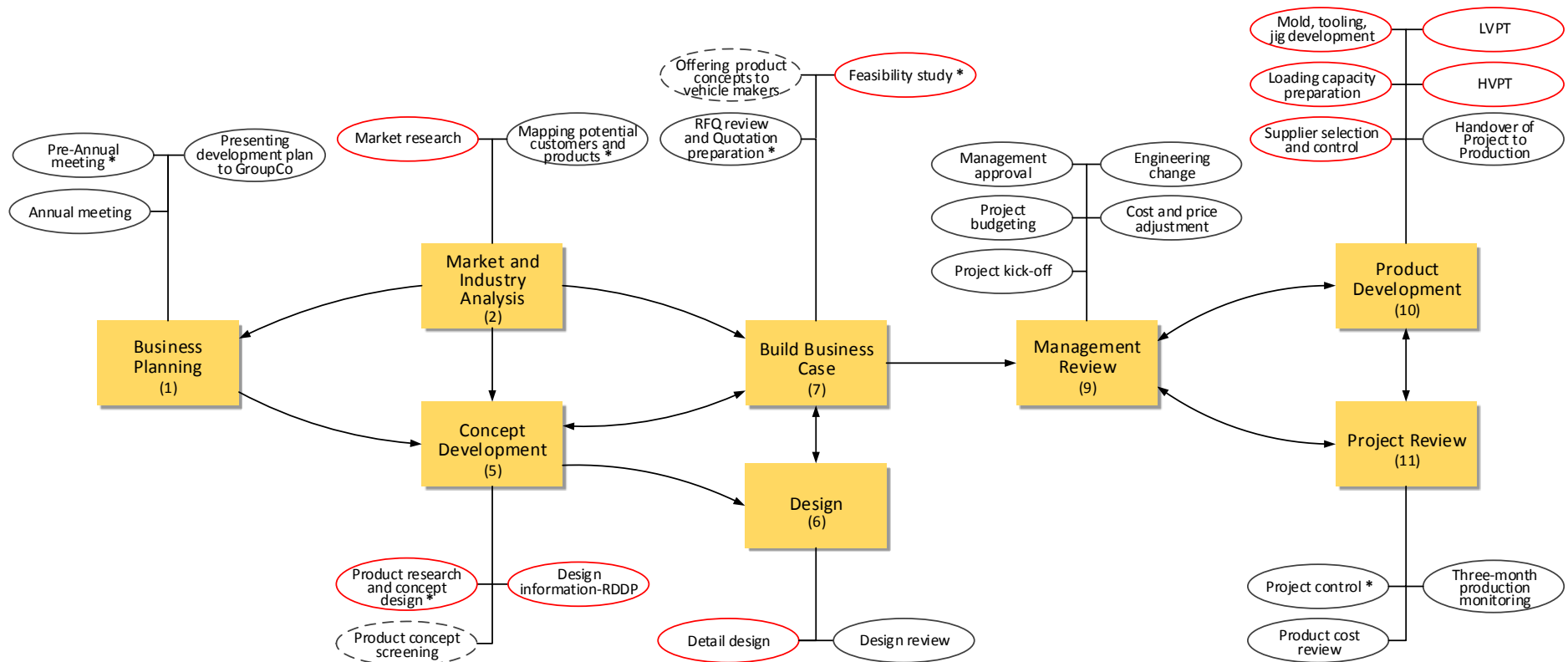
Figure 9.4: Relationships between Categories at AutocompCo

Routines Categories	1 Business Planning	2 Market Study	5 Concept Development	6 Design	7 Build Business Case	9 Management Review	10 Product Development	11 Project Review	Representative Quotes
1 Business Planning			→						<i>In the beginning of the year, we already have guidance as to what kind of products we should develop, including own products. (INT-MRD, p.16)</i>
2 Market and Industry Analysis	→		→		→				<i>I'm responsible for mapping what kind of products are to be developed, and whether they are aligned with the planning of marketing. That happens in a pre-[annual] meeting, in which discussions between divisions occur... (INT-MRD, p.7)</i> <i>...after that, we went to several automotive exhibitions, studying whether one form of 'IL'¹⁷⁵ can be applied to different brand makers, different car makers... So we started developing 'RL'¹⁷⁶ last year. (INT-MRD, p.17)</i> <i>Normally this [market] study is purposed mainly for [the company's] own products. We have to study the market on our own, even though we once did a study with another GroupCo business unit, investigating what the customer requests were, what kind of specifications were required, what value we could provide. From this study, normally the feasibility [of the project] will emerge. (INT-MRD, p.10)</i>
5 Concept Development				→					<i>...for example, now we're designing a front fender ...we start with a concept design, then later we design it... (INT-CPD, p.1)</i>

¹⁷⁵ A product category.

¹⁷⁶ A product categorised as 'IL'.

Routines Categories	1 Business Planning	2 Market Study	5 Concept Development	6 Design	7 Build Business Case	9 Management Review	10 Product Development	11 Project Review	Representative Quotes
					↔				After [receiving] an RFQ, we conduct a FS. Well, we ask R&D to release the design info; showing the position of the part and what the space is like. The design info released by R&D is our reference for preparing FS. (INT-MEPJ, p.3)
6 Design					↔				...for example, now we are designing front fender ...well we start with a concept design, later we design it. Then, we offer it to the car manufacturers... Although they haven't requested, we offer them that design... (INT-CPD, p.1)
7 Build Business Case						→			Based on ISO standard, from FS we should go up to management approval. What should we consider in terms of cost; because from the FS we can identify [the product] that need high investments, and one which has lower cost but can generate high profit. (INT-MPPIC, p.2)
9 Management Review							↔		<p>...supplier selection also creates challenges. Purchasing [department] suggests one that offers a low price; however, the customer prefers one which offers more expensive [materials]; then, marketing [department] should take responsibility in negotiating [the appropriate cost] with the customer and purchasing department ... (INT-MMT, p.15)</p> <p>...supplier selection is also problematic. Purchasing [department] suggests one that offers a low price; however, the customer prefers one which offers expensive [materials]. We try to find a solution by negotiating with purchasing and negotiating with the customer... (INT-MMT, p.15)</p> <p style="text-align: center;">↔</p> <p>...meanwhile, if we analyse new [products], then we refer and compare them to the FS; or you could say the initial COGM. (INT-MCC, p.1)</p> <p>For this project, our plan is the data should go back to FS. This is the initial COGM, which is 297 grams. Our quotation was also 297 and the actual [data], shows 387 grams; so, our colleagues in engineering need to [verify it] and return it back here. (INT-MCC, p.8)</p>
10 Product Development									
11 Project Review							↔		...I haven't been involved yet in [reviewing] tooling cost... from the first trial, after the tools are ready, I will start have a look at [the cost of the process]... (INT-MCC, p.10)



Note:

--- - Partly verified

○ - Formal (documented) routine

* - Evidence for this routine was also found in the simulation (explained in Section 9.4.5)

Figure 9.5: Framework of Routines Underlying the NPD Portfolio Management at AutocompCo

9.4.5 Supporting Evidence from the Simulation

The simulation was designed to stimulate discussion to discover how AutocompCo performs portfolio management. As described in Chapter 3, Cohen and Bacdayan (1994) considered organisational routines to be stored as *procedural memory*¹⁷⁷. The simulation was applied to identify *conversations*¹⁷⁸ which stem from the participants' procedural memories, in which routines in portfolio management are likely to be embodied. By recognising these actions, the corresponding routines thus can be revealed.

Five managers (of the marketing and technical, engineering project, engineering process, project cost control and purchasing departments) and a marketing officer participated in the simulation. The managers are key actors in AutocompCo's new product development process.

The video recording of the simulation and its transcript were analysed to identify where the conversations appeared to indicate the existence of routines. An investigation then sought to determine which actions are seemingly exercised in the routines as part of the company's portfolio management processes. The results, shown in Appendix F.5, show that the simulation confirmed seven subroutines. For example, the 'Considering market changes' conversations, enacted by the cost control manager (MCC) (00:12:29 to 00:12:44) can be considered to constitute part of the 'Market research' subroutine (which analyses the market situation). This conversation indicates how, when dealing with how a set of projects should be selected, the manager evoked the procedural memory which stores the 'market research' subroutine.

The simulation provided supporting evidence for the existence of specific subroutines in AutocompCo's portfolio management process, including the 'Pre-Annual meeting', 'Market research', 'Mapping potential customers and products', 'Product research and concept design', 'RFQ review and quotation preparation', 'Feasibility study' and 'Project control' subroutines. Most conversations were associated with the

¹⁷⁷ "It is memory for how things are done that is relatively automatic and inarticulate, and encompasses cognitive as well as motor activities" (Cohen and Bacdayan, 1994, p.554).

¹⁷⁸ "...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events" (Czarniawska, 1997, p.42).

‘Considering risk’ subroutine categorised under ‘Feasibility study’. This demonstrates that the simulation typically represents the realm of portfolio selection, under which each potential project business case is evaluated by top managers.

9.4.6 Conclusions

This section has responded to RQ 2: *What organisational routines can be identified in the new product development portfolio management [at AutocompCo]?* Based on evidence from the interviews, meeting observation, documents and simulation, it has been shown that portfolio management at AutocompCo is built utilising eight routines: (1) Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (6) Design; (7) Build Business Case; (9) Management Review; (10) Product Development, and (11) Project Review. Each routine is based on several interacting subroutines.

9.5 LINKAGE TO ESPOUSED BUSINESS STRATEGY: RESEARCH QUESTION 3

This section addresses RQ 3: *Is [AutocompCo’s] espoused business strategy considered in new product development portfolio management (as evidenced in routines)?* The discussion is divided into two parts: (1) identifying AutocompCo’s espoused business strategy and (2) identifying the routines in NPD portfolio management which consider the strategy.

9.5.1 Identifying AutocompCo’s Espoused Business Strategy

A business strategy should consider the questions¹⁷⁹ “What main goals are we trying to achieve?”; “What markets do we focus on primarily?”; “How do we describe our competitive strategy?” and “Which capabilities do we need to develop?” (Bowman, 1998; Finlay, 2000). Cooper (1984, 2005) did not however consider the target market to be an aspect of business strategy. Adopting this view¹⁸⁰, the three key aspects of business strategy examined in this study were organisational goals, competitive strategy and capabilities.

¹⁷⁹ This list of questions was partly based on email discussions (18-02-2014) with Cliff Bowman, Professor of Strategic Management at Cranfield School of Management.

¹⁸⁰ As also reflected in Figure 2.1.

Questions enquiring into organisational goals, competitive strategy and capabilities were posed only to the AutocompCo senior management; nevertheless, a number of other managers raised these issues during interview, discussion of which then complemented the data acquired. In the analysis, ‘organisational goals’, ‘competitive strategy’ and ‘capabilities’ were adopted as codes representing key aspects of strategy. The left-hand side of Appendix F.6 shows the results, including the data sources and supporting evidence. For example, ‘Cost’ is an organisational goal which emerged from the interview with the COO. To answer RQ 3, it is necessary to examine whether these three key aspects of business strategy are considered by AutocompCo as part of the portfolio management process and if so, within which routine(s).

9.5.2 Espoused Business Strategy Considered in the Routines

This subsection analyses whether the routines in Autocomp’s portfolio management process (Figure 9.5) consider the company’s business strategy in terms of organisational goals, competitive strategy and capabilities. Each routine was examined to ascertain whether these three aspects were mentioned (the results of this investigation are also presented in Appendix F.6). As described earlier, the left-hand side of the table presents AutocompCo’s espoused business strategy, whereas the right-hand side of the table (shaded grey) depicts the routines under which the respective espoused business strategy is considered

It is shown, for example, that the organisational goal ‘cost’ is considered when performing the ‘Feasibility study’ subroutine (grouped under the Build Business routine), as the engineering project manager stated: *“From the design information, we breakdown the costs to obtain the COGM... for the production... we collaborate [with other departments] in working on it... we form a FS committee, lead by the engineering project [manager] (INT-MEPJ, p.4).* In contrast, ‘Operational excellence’ was not found as part of any routine.

The results of this investigation are presented in Figure 9.6, which shows that AutocompCo considers different key aspects of business strategy across portfolio management. This figure is discussed in detail in the following passages.

In the Business Planning routine, AutocompCo pursues only the organisational goal: ‘product-based development’; no competitive strategy is discussed. In the Market

and Industry Analysis routine, AutocompCo appears to aim to adhere to the organisational goals of 'profitability' and 'sales', whereas it merely considers the competitive strategies of 'design'. Further, 'engineering and design' is taken into account as a competitive strategy in the Concept Development routine.

In the Build Business Case routine, besides considering 'profitability', AutocompCo includes 'cost' as an organisational goal. In this routine, the company emphasises 'design' as a capability needing be developed. The Design routine, in particular, pursues 'costs' as an organisational goal and uses the 'engineering and design' competence as its competitive strategy.

AutocompCo takes into consideration only organisational goals, i.e. 'cost' and 'profitability'; no competitive strategy or capabilities are applied during the Management Review routine. As with Management Review, the Product Development and Project Review routines also only involve 'cost' and 'profitability' as the organisational goals.

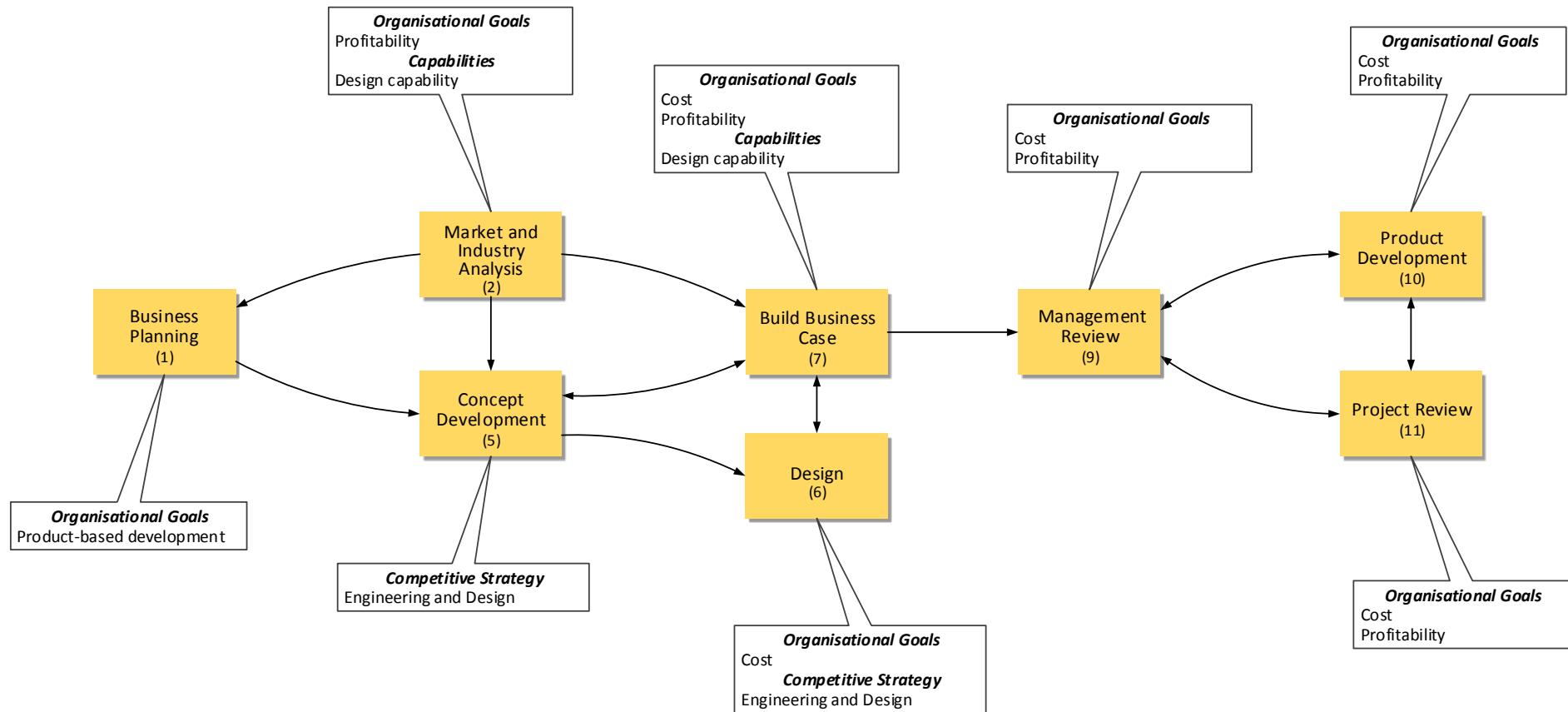


Figure 9.6: Routines and the Key Aspects of Business Strategy at AutocompCo

9.5.3 Conclusions

This section has responded to RQ 3: *Is [AutocompCo's] espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* Based on evidence from the interviews, meeting observation, documents and simulation, three key aspects of AutocompCo's espoused business strategy have been identified:

- 1) The company's organisational goals comprise 'new product-market market development', 'product-based development', 'cost', 'profitability' and 'operational excellence'. 'New product-market market development' and 'operational excellence' are under-represented in any routine.
- 2) The company's competitive strategy encompasses initiatives that place reliance on 'engineering and design' and 'production facility'. However, the 'production facility' strength seems not to be considered in any routine.
- 3) The aspects of capabilities pursued by AutocompCo are 'design capability' and 'market research capability'; however, these two elements are not involved in any routine.

The key aspects of business strategy (organisational goals, competitive strategy and capabilities) appear to be considered across the underlying routines of the portfolio management process. Each routine considers different key aspects, depending on the nature of the routine.

9.6 SUMMARY

This chapter has presented an analysis of the AutocompCo case in response to RQ 1, RQ 2 and RQ 3. It has shown the following:

- RQ 1: *How is new product development portfolio management conducted [at AutocompCo]?*

AutocompCo deals with two types of product development, based on customer order products and the company's own-initiative products. Marketing and engineering project departments play important roles in managing customer order projects, whereas the latter projects are initiated by R&D. The existing product development

framework is appropriate for managing single product development, whereas procedures for managing portfolio were not available.

- *RQ 2: What organisational routines can be identified in the new product development portfolio management [at AutocompCo]?*

Portfolio management at AutocompCo is built utilising eight routines: (1) Business Planning; (2) Market and Industry Analysis; (5) Concept Development; (6) Design; (7) Build Business Case; (9) Management Review; (10) Product Development, and (11) Project Review. Each routine is based on several interacting subroutines.

- *RQ 3: Is [AutocompCo's] espoused business strategy considered in the new product development portfolio management?*

Three key aspects of business strategy, i.e. organisational goals, competitive strategy and capabilities, are identified at AutocompCo, where the company considers all key aspects of business strategy across the underlying routines of the portfolio management process.

CHAPTER 10 CROSS-CASE ANALYSIS

10.1 INTRODUCTION

This chapter presents cross-case analysis to identify the generic attributes of portfolio management. The identification is based on a comparison of the findings of each of the within-case study analyses (see chapters 6, 7, 8 and 9). It uses evidence from the case studies to identify ‘uniformity or disparity’ across the cases (Stake, 2006, p.40). Further, cross-case synthesis is carried out by aggregating the findings across the individual cases (Yin, 2009). The discussion of this analysis is divided into three sections: RQ1, RQ2 and RQ 3 answers.

10.2 NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 1

This answers RQ 1: *How is new product development portfolio management conducted?* It compares the different case companies’ portfolio management practices, draws conclusions about key aspects, and allows a comprehensive picture of all of the components of portfolio management practice to be formed.

10.2.1 Cross-Case Comparison of the Case Company Portfolio Management Practice

Table 10.1 compares NPD portfolio management practice at all four case companies (comparing results of tables 6.5, 7.5, 8.5 and 9.5). As can be seen, Table 10.1 includes key aspects of portfolio management practice (e.g., categories of portfolio management practices, formality of portfolio management, portfolio management goals) and findings from the case companies. This leads to general conclusions, presented in the last column. These conclusions are discussed in more detail below.

Table 10.1: Cross-Case Comparison of NPD Portfolio Management Practice

PORTFOLIO MANAGEMENT PRACTICE ASPECTS	COSMETICSCO				FOODCO				MULTIPRODUCTCO				AUTOCOMPCO				CONCLUSIONS
1 Categories of Portfolio Management practices	(1)	(4)	Build Business Case (7)	Product Development (10)	Business Planning (1)	Ideas Provision (4)	Build Business Case (7)	Product Development (10)	Business Planning (1)	(4)	Build Business Case (7)	Product Development (10)	Business Planning (1)	(4)	Build Business Case (7)	Product Development (10)	A composite of portfolio management categories is formed by incorporating all categories involved across four case companies. It consists of 12 different categories, later, in answering RQ 2, called routines ¹⁸¹ . This composite of categories is therefore termed a 'palette' of routines, as shown in Figure 10.1.
	Market and Industry Research (2)	Concept Development (5)	(8)	(11)	Market and Industry Analysis (2)	Concept Development (5)	(8)	(11)	Market Analysis (2)	Concept Development (5)	Project Prioritisation (8)	(11)	Market and Industry Analysis (2)	Concept Development (5)	(8)	Project Review (1.1)	
	New Product Research (3)	(6)	Management Review (9)	Launch Planning (12)	(3)	(6)	Management Review (9)	Launch Planning (12)	(3)	Design (6)	Management Review (9)	Launch Planning (12)	(3)	Design (6)	Management Review (9)	(12)	No case company utilises all 12 routines. All case companies employ five common routines: Market and Industry Analysis; Concept Development; Build Business Case; Management Review, and Product Development.
	Business Planning, Ideas Provision, Design, Project Prioritisation and Project Review are under-represented				New Product Research, Design, Project Prioritisation and Project Review are under-represented				New Product Research, Ideas Provision and Project Review are underrepresented				New Product Research, Ideas Provision, Project Prioritisation and Launch Planning are underrepresented				
	Ideas Provision-related activity is associated with the 'Product selection' subroutine carried out within the Concept Development category				Design-related activity is associated with the 'Formula preparation' subroutine, carried out within the Concept Development category								Build Business Case, to a certain extent, is performed in quotation preparation; however, in contrast, it sets out for fulfilling the customers' requirements				
	Design-related activity is associated with the 'Formula development' subroutine, carried out within the Product Development category				Project Review-related activity is associated with the 'Project progress review', carried out within the Product Development category								Launch planning is not relevant in this type industry, as each project has specific customer				
	Project Review-related activity is partly associated with the 'Product development progress coordination' subroutine, carried out within the Product Development category																
Number of products developed each year (SKU)	150				21				50				30 (6 internally sponsored projects)				
2 Formality of portfolio	No formal procedures Ideas selection is carried out				No formal procedures Ideas selection formally conducted in				Project prioritisation is formally conducted (Landing Review).				No formal procedures. Selection decisions are limited.				No case company has comprehensive formal portfolio management

¹⁸¹ The process of answering RQ 1 was conducted iteratively with the identification of routines in RQ 2

PORTFOLIO MANAGEMENT PRACTICE ASPECTS	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	CONCLUSIONS
management	informally in Concept Development Project proposals are evaluated in Management Review	Ideas Provision Product concepts are evaluated in Management Review	Management review formally assesses the project selected. No formal portfolio review session	Product development is still dominated by customer-driven projects	procedures. MultiproductCo is the only case company which employs formal project prioritisation; the other case companies conduct ideas selection informally.
3 Portfolio management goals					
<i>Value maximisation</i>	Evaluation is of individual products, not based on project valuation approaches. Selection is based on highest sales and profit Prioritisation is not based on budget allocation. Budget is allocated according to department	Evaluation is of individual products. Selection is based on highest contribution in terms of sales and profit Project valuation is only applied for new product development which needs new facilities	Evaluation is of individual products, based on project valuation approaches	Evaluation is on individual projects; however, it is not used for the selection purposes. Project valuation methods are applied	All case companies evaluate individual products mainly utilising project valuation approach (NPV)
<i>Balanced portfolio</i>	Allocating highest proportion to the biggest brand (in term of sales) or having largest consumer base	Balancing mass and premium products On the other hand, still aiming at completing a range of products in the existing category, rather than finding right composition of categories	NPD distinguishes between high risk and low risk projects. However, no specific policy exists on portfolio composition	No consideration given to balanced projects; company considers all requests from customers A small portion of the NPD portfolio is based on company's own initiative	All case companies have policy on different types of products launched; however, they do not determine specific composition in the portfolio
<i>Strategic alignment</i>	A particular proportion is dedicated for 'colour trend' products, which represent company's strategy on providing innovation	Implementing company strategy by moving towards affordable premium products	Portfolio decisions should conform to the global corporate's goals, driven by financial targets	Focus is on obtaining cost reduction and profitability	All case companies by nature align their portfolio decision to the company's strategy. Nevertheless, they never evaluate to what extent the alignment have been achieved
4 Strategic portfolio decisions	Top management determines the prioritised brands	Establishes a product road map containing 22 priority items	Establishes a 'portfolio expansion' plan	Focuses on modular items	All case companies have product road map; however, only FoodCo has definite and implemented product map
5 Tactical portfolio decisions:					
<i>Stage-gate process</i>	No formal stage-gate process	Stage-gate process is not clearly defined in the formal new product development process	Stage-gate process is formally conducted in NPI (new product introduction) gate review.	No stage-gate process	Complete and formal stage-gate is implemented only by MultiproductCo

PORTFOLIO MANAGEMENT PRACTICE ASPECTS	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	CONCLUSIONS
<i>Portfolio review</i>	No portfolio review process	No portfolio review process	No portfolio review process	No portfolio review process	No case company has portfolio review. This is aligned with the finding that all company evaluate their individual product (see conclusion for the 'Value maximisation' aspect, stated above)
6 Effective portfolio management					
<i>Senior management role in selection decisions</i>	Board of directors makes approval decisions on the portfolio proposed	CEO makes final decisions on product portfolio	Project selection is tackled by R&D's senior management and the project's final approval is made by top management team including the managing director.	Marketing play important role in making decision, but COO's approval is required, especially for projects which need high investment	In all case companies, senior management approval is required in selection decisions.
<i>Senior management and R&D management relationship</i>	Structurally, R&D management is under sales and marketing director. The director intensely leads the NPD portfolio management processes, working together with R&D and marketing	R&D role in portfolio management is not dominant. Therefore, top management's relationships with R&D are not as intense as that of with marketing.	A senior management member leads R&D group; therefore, R&D's initiatives are aligned with the management's strategic direction.	In product development, intensive communication occurs between departments. R&D interacts mainly with engineering project department. Nevertheless, as R&D is under engineering and marketing division head. Communication with senior management take places through the division head.	At CosmeticsCo and MultiproductCo, R&D plays important role in product development. This leads to strong relationships between senior management and R&D. At FoodCo and AutocompCo, On the other hand, the R&D's role is less dominant.
<i>Portfolio management methods</i>	Only financial measurements applied	Financial measurements mainly applied. Qualitative-based assessments (scoring method) are utilised in early stages for screening ideas	Various methods are applied in Landing Review and NPI Gate Review for assessing projects proposals: NPV, scoring method and RWW ¹⁸²	Financial methods applied for evaluating individual projects, conducted in feasibility study	All case companies use financial methods for evaluating projects. MultiproductCo, in particular, applies more comprehensive methods.
<i>Organisational structure and support systems</i>	R&D and marketing are structurally under Sales and Marketing Director, enabling the alignment of their activities to occur naturally. In	No specific structure built for enhancing internal communication. In the practice, marketing is the leader, coordinating the product development	Technical and R&D group, led by a senior management member, organises the whole product	Marketing and engineering project lead the product development process. Marketing bridges customer's stakes and the company's capabilities;	CosmeticsCo and MultiproductCo grant their R&D, besides marketing, important roles in the

¹⁸² See footnote 11 (Chapter 8)

PORTFOLIO MANAGEMENT PRACTICE ASPECTS	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	CONCLUSIONS
	addition, Innovation Centre division supports in facilitating this alignment and establishing cooperation with external research institutions	process. NPD systems for internal communication system and project management are applied. It seems only R&D and marketing fully utilise the systems	development steps. The company applies e-NPI ¹⁸³ for reviewing low risk NPI projects	whereas, engineering project coordinates the project development processes within the company	portfolio management processes. In customer-driven project nature, marketing has a role as an interface between customers and the company, whereas engineering project manages the internal processes
7 Selection criteria	Profitability Market share Product mix Production capabilities	Profitability Market size Market growth Competitors	Profitability Sales Marketing probability of success Technical probability of success Local vs import Outsourced vs in-house Competitors	Profitability Target cost Payback period	Profitability is the common selection criteria for all companies. Only Multiproduct includes risk factors in the criteria
8 Problems in portfolio management	Overwhelmed coping with the speed of design changes with existing resources Company's pioneering innovation is unfit for market needs	Limited budget Launch success rate is inadequate	Limited resources Too many products to be managed Inadequate project management	Limited resources Communication and coordination between different functions are problematic Unsmooth transfer from project to mass production	Most companies face lacking resources (budget, manpower and facilities)

¹⁸³ Electronic new product introduction.

10.2.1.1 Portfolio Management Categories

Across the case companies, the research identified 12 different categories of routine (see Figure 10.1). This is termed a ‘palette of routines’.

Business Planning (1)	Ideas Provision (4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	Project Prioritisation (8)	Project Review (11)
New Product Research (3)	Design (6)	Management Review (9)	Launch Planning (12)

Figure 10.1: ‘Palette of Routines’ Identified across the Case Companies

A palette of routines is analogous to an artist’s palette, referred to as ‘an ordered set of colours’ (Wijffelaars et al., 2008, p.1). In an art context, the combination of colours selected determines the character of the ‘picture’ expressed (Wijffelaars et al., 2008). As with a palette of colours, the palette of routines contains a set of routines which can be utilised to build an NPD portfolio management capability.

Note that no case company has all 12 routines. Interestingly, in all of the case companies five common routines prevail: Market and Industry Analysis (2), Concept Development (5), Build Business Case (7), Management Review (9) and Product Development (10). The implication is that these are ‘core’ routines which should be in place in any NPD portfolio management process. In addition to these, as shown in Table 10.1, each case company has distinct routines matching the context of the company. The distinct routines at each case company are explained in the following sub-sections.

CosmeticsCo

CosmeticsCo has seven routines (the smallest number), with two other routines alongside the core ones, i.e., New Product Research and Launch Planning. New Product Research is only employed in CosmeticsCo. As the finding¹⁸⁴ suggests, this matches the

¹⁸⁴ For example: ‘Formula collection and research’ routine (see Figure 6.6).

way the company continuously conducts research to discover new formulas and ingredients for new products. In addition, Launch Planning is typically performed as part of the new product development process when the products are about to be launched (and this routine is also performed by FoodCo and MultiproductCo).

On the other hand, CosmeticsCo does not utilise five out of the 12 composite routines: Business Planning, Ideas Provision, Design, Project Prioritisation and Project Review. Design activities, in particular, are partly covered as part of the Product Development routine¹⁸⁵.

FoodCo

With eight routines, in addition to the core ones FoodCo has three extra: Business Planning, Ideas Provision and Launch Planning. Ideas Provision is peculiar to FoodCo and is not employed by the other three case companies. The findings¹⁸⁶ show that through this routine, FoodCo gives every member of the organisation – in R&D, marketing and other staff – the opportunity to propose new product ideas. In addition, through the Business Planning routine, FoodCo determines their product road map (this routine is also carried out at MultiproductCo and AutocompCo).

In contrast, as the first row of Table 10.1 shows, there are four routines which FoodCo does not utilise: New Product Research, Design, Project Prioritisation and Project Review.

MultiproductCo

MultiproductCo utilises nine routines with four extra routines as well as the core ones: Business Planning, Design, Project Prioritisation and Launch Planning. In particular, Project Prioritisation is a routine only performed by this case company. This routine functions as a means to select potential projects before being reviewed by senior management as part of the Management Review routine. The Design routine is also conducted at AutocompCo.

Meanwhile, three routines were not found as part of the company's routines: New Product Research, Ideas Provision and Project Review. MultiproductCo is part of a

¹⁸⁵ The activities are represented by, for example, 'Formula development' routine (see Figure 6.6).

¹⁸⁶ For example: 'Creativity days', 'Idea pooling' routines (see Figure 7.5).

global company and normally utilises *new technology innovation* available in other global subsidiaries¹⁸⁷, rather than establishing New Product Research routine.

AutocompCo

AutocompCo carries out eight routines: core routines, plus Business Planning, Design and Project Review. The routine peculiar to AutocompCo is Project Review, a routine dedicated to controlling the project costs incurred in the undergoing projects.

Four routines (New Product Research, Ideas Provision, Project Prioritisation and Launch Planning) were not found at AutocompCo. The Project Prioritisation routine in particular (which undertakes project selection process) is not available, as the nature of NPD is based mainly on customer orders; the proportion of the company's own product development is small. This makes a Launch Planning routine irrelevant.

10.2.1.2 Formality of Portfolio Management

All four case companies have no comprehensive formal procedures for portfolio management. MultiproductCo in particular employs a landing review process which prioritises and select projects. Even though it conducts a NPI¹⁸⁸ gate review, this is applied to individual projects, thus under-representing the portfolio review.

10.2.1.3 Portfolio Management Goals

Value maximisation

All four case companies evaluate their individual NPD projects by utilising project valuation methods (NPV, IRR, payback period). However, they do not compare the values of each project to that of others, or seek the highest value projects. In addition, they do not have a specific development budget to constrain the number of projects selected.

Balanced portfolio

All the case companies typically have a policy to develop different types of products; for example, CosmeticsCo and FoodCo develop products for mass and premium

¹⁸⁷ This is conducted in the 'Global portfolio analysis' routine (see Figure 8.6).

¹⁸⁸ New product introduction.

markets. However, they do not define a specific proportion of their products to be of these different types.

Strategic alignment

The findings show that by nature, all case companies align their portfolio decisions with the company's strategy. Nevertheless, no company evaluates to what extent the products launched fit their strategy.

10.2.1.4 Strategic Portfolio Decisions

As Figure 2.1 shows, strategic portfolio decisions can be associated with decisions about the product road map and strategic buckets. Of the four case companies, only FoodCo formally defines its product road map (prioritising 22 items) and refers its product selection decisions to it. In term of strategic buckets, none of the four case companies employed the strategic bucket approach, which involves committing to a specific allocation of resources for a number of NPD project types

10.2.1.5 Tactical Portfolio Decisions

As was shown in Figure 2.1, tactical portfolio decisions result from the stage-gate process and portfolio review. Of the four case companies, only MultiproductCo formally employs a stage-gate process (called NPI gate review), to evaluate NPD project proposals. None of the four companies conducts a portfolio review either formal or informal. This shows that all companies still review individual NPD project rather than reviewing the whole projects.

10.2.1.6 Effective Portfolio Management

Senior management role in selection decision

In all four case companies, NPD projects are prepared mainly by the marketing and R&D departments; final selection decisions are made by senior management. At FoodCo and AutocompCo in particular, the CEO (the COO¹⁸⁹ at AutocompCo) makes the final selection decisions.

¹⁸⁹ AutocompCo is a business unit within GroupCo. The chief operating officer at GroupCo plays a role as CEO at its business unit.

Senior management and R&D management relationship

The relationship between senior management and R&D management depends on the role of R&D in the NPD processes, which differs between the companies. At CosmeticsCo and MultiproductCo, R&D plays an important role, and this relationship appears closer than at FoodCo and AutocompCo.

Portfolio management methods

In *portfolio management method*¹⁹⁰ suggested by Cooper et al. (1999), most companies merely apply financial methods to evaluate their projects. In contrast, MultiproductsCo also employs a scoring model and the notion of RWW (real-win-worth).

Organisational structure and support systems

From an organisation structure view, MultiproductCo positions R&D at strategic level, headed by the technical and R&D director. This position enables R&D to play an important role in coordinating the portfolio management processes. At CosmeticsCo, R&D is under the sales and marketing director, who leads the NPD processes. This structure allows R&D to engage in intensive communication with senior management. CosmeticsCo has also established its Innovation Centre division which coordinates the R&D and marketing activities, and facilitates cooperation with external research institutions.

10.2.1.7 Selection Criteria

All companies use a common bottom-line indicator (i.e. potential profitability) as selection criteria. CosmeticsCo and MultiproductCo in particular are also concerned with top-line indicators, such as potential sales and market share. FoodCo, in addition to profitability, takes market opportunity criteria into consideration, i.e. market size and market growth. Moreover, MultiproductCo incorporates risk-related measurements using technical and market success probabilities.

¹⁹⁰ “Financial models and financial indices, probabilistic financial models, open pricing theory, strategic approaches, scoring model and checklists, analytical hierarchy approaches, behavioural approaches, mapping approaches or bubble diagram” (Cooper et al., 1999, p.335).

10.2.1.8 Problems in Portfolio Management

Limited resources (budget, manpower, facilities) is the main problem faced by all four case companies. This leads to (1) CosmeticsCo being overwhelmed by the requirement for fast design changes, (2) FoodCo suffering low success rates, and (3) MultiproductCo's struggling with needing to manage too many projects. Cooper et al. (1997a) indicated this situation as one of key problems in portfolio management.

In addition, CosmeticsCo's pioneering innovation strand receives poor response from the market, denoting it to be unfit for market needs. In AutocompCo particularly, communication and coordination is lacking between the functions involved in portfolio management.

10.2.2 Conclusions

A composite category of routines in NPD portfolio management was identified across the four companies. This 'palette' consists of 12 routines: (1) Business Planning; (2) Market and Industry Analysis; (3) New Product Research; (4) Ideas Provision; (5) Concept Development; (6) Design; (7) Build Business Case; (8) Project Prioritisation; (9) Management Review; (10) Product Development; (11) Project Review, and (12) Launch Planning.

None of the case companies has comprehensive formal portfolio management procedures in place. MultiproductCo is the only case company which employs formal project prioritisation; the other three conduct ideas selection informally. All of the companies still look at individual projects, based on financial-based project valuation, rather than viewing the whole portfolio of projects. In addition, a balanced portfolio is, to some extent, being achieved without formally defining a specific portfolio composition (also known as a 'golden ratio'). By nature, all four case companies align their portfolio decisions with the company's strategy, without carrying out a definite evaluation of the extent to which the products launched fit their strategy.

All the case companies grant senior management the role of making final decisions regarding portfolio selection. The importance at the role level of R&D in the NPD process affects the extent of the relationship between R&D and senior management. This role is also represented in the organisation structure.

All of the case companies use profitability as a selection criterion. In addition, FoodCo considers the criterion of market opportunity. Only MultiproductCo incorporates risk-related measurements using technical and market success probabilities. Finally, the main problem encountered by all the case companies in practicing NPD portfolio management is that of limited resources (budget, manpower or facilities).

10.3 ORGANISATIONAL ROUTINES IN NPD PORTFOLIO MANAGEMENT: RESEARCH QUESTION 2

This section addresses the cross-case analysis of the answers to RQ 2: *What organisational routines can be identified in the new product development portfolio management in companies?* The analysis is to compare the routines in NPD portfolio management of case companies' portfolio management practices, and to draw conclusions on each routines detail. Further, a composite of routines and the relationships between the routines are assembled.

The analysis is to compare the routines in NPD portfolio management of case companies' portfolio management practices, and to draw conclusions on each routines detail. In addition, a composite of routines and the relationships between them has been put together.

10.3.1 Cross-Case Comparison of Routines in NPD Portfolio Management

Details of the routines underlying NPD portfolio management at the four case companies are presented in Table 10.2. This table refers to the composite routines and subroutines (shown in Appendix G.1), and the cross-case comparison of the connections between routines (Appendix G.2), and presents its conclusions in the last column. These are discussed in more detail below.

Table 10.2: Cross-Case Comparison Routines in the NPD Portfolio Management

Routines Details	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	Conclusions
Routines and subroutines					
Routines identified (plus the palette number) ¹⁹¹	7 routines Market and Industry Analysis (2) New Product Research (3) Concept Development (5) Build Business Case (7) Management Review (9) Product Development (10) Launch Planning (12)	8 routines Business Planning (1) Market and Industry Analysis (2) Ideas Provision (4) Concept Development (5) Build Business Case (7) Management Review (9) Product Development (10) Launch Planning (12)	9 routines Business Planning (1) Market and Industry Analysis (2) Concept Development (5) Design (6) Build Business Case (7) Project Prioritisation (8) Management Review (9) Product Development (10) Launch Planning (12)	8 routines Business Planning (1) Market and Industry Analysis (2) Concept Development (5) Design (6) Build Business Case (7) Management Review (9) Product Development (10) Project Review (11)	Across the four case companies, 12 routines (with associated subroutines) were identified. These are termed a 'palette of routines' (Figure 10.2).
Number of subroutines ¹⁹²	29	35	30	27	The composite of subroutines totals 52 (interchangeable subroutines found across the cases). These subroutines are incorporated into the palette of routines (Figure 10.2)
Number of formal subroutines ¹⁹³ (and the percentage in terms of total subroutines)	11 out 29 (38%)	22 out of 35 (63%)	20 out of 30 (67%)	10 out of 27 (37%)	FoodCo and MultiproductCo employ a higher proportion of formal routines than CosmeticsCo and AutocompCo.
Routines and the number of constituted formal subroutines	Market and Industry Analysis: 3 New Product Research: 1 Concept Development: 2	Market and Industry Analysis: 3 Ideas Provision: 1 Concept Development: 8	Market and Industry Analysis: 2 Concept Development: 2 Design: 2	Market and Industry Analysis: 1 Concept Development: 2 Design: 1	In all four cases, formalisation is applied mostly in the Product Development routine.

¹⁹¹ Routines presented constitute the categories of the first-order codes of routines identified in chapters 6, 7, 8, and 9. The routines categories and their palette numbers are identical to the portfolio management categories identified in RQ 1.

¹⁹² 'Subroutines' refer to the first-order codes resulting from routines identification in chapters 6, 7, 8, and 9.

¹⁹³ Routines described in the company's documents are presented in Table 6.7 (CosmeticsCo), Appendix D.2 (FoodCo), Appendix E.2 (MultiproductCo) and Appendix F.2 (AutocompCo).

Routines Details	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	Conclusions
	Product Development: 5	Build Business Case: 1 Management Review: 1 Product Development: 6 Launch Planning: 2	Build Business Case: 2 Project Prioritisation: 1 Management Review: 4 Product Development: 6 Launch Planning: 1	Build Business Case: 1 Product Development: 5	
Subroutines identified in the simulation	3 out of 29 (10%) New Product Research: Formula and collection research (F) Build Business Case: Business feasibility proposal Management Review: Business proposal evaluation	6 out of 35 (17%) Business Planning: Product road map prioritisation Market and Industry Analysis: Market research (F) Industry analysis (F) Build Business Case: Feasibility study (F) Management Review: Food forum Existing product review	9 out of 30 (30%) Business Planning: Business planning Market and Industry Analysis: Market research (F) Consumer research (F) Concept Development: Potential product identification (F) Build Business Case: Build business case (F) Resource analysis (F) Project Prioritisation: Landing review (F) Management Review: NPI gate review (F) Launch Planning: Developing marketing programme (F)	6 out of 27 (22%) Business Planning: Pre-working meeting Market and Industry Analysis: Mapping potential customers and products Concept Development: Product research and concept design (F) Build Business Case: RFQ review and quotation preparation Feasibility study (F) Project Review: Project control	MultiproductCo enacted the highest proportions of conversations corresponding to subroutines in NPD portfolio management. CosmeticsCo's conversations correspond to only three of the 29 subroutines.
Number of formal subroutines identified in simulation	1 out of 3 (33%)	3 out of 6 (50%)	8 out of 9 (89%)	2 out of 6 (33%)	At MultiproductCo almost all conversations which emerged correspond to formal subroutines At CosmeticsCo the conversations which emerged mostly do not correspond to formal subroutines

Note: (F)–Formal subroutines

10.3.1.1 Routines and Subroutines

Between seven and nine routines were found to underlie NPD portfolio management in the case companies. *CosmeticsCo* has seven routines; *MultiproductCo* employs nine routines. *FoodCo* and *AutocompCo* each have eight routines.

Between 27 and 35 subroutines were identified in the NPD portfolio management practices of the case companies. At *FoodCo* and *MultiproductCo*, 63% and 67% respectively are formal¹⁹⁴ subroutines; at *CosmeticsCo* and *AutocompCo*, formal subroutines represent only 10-11%.

The simulation revealed nine corresponding routines emerging from the conversations at *MultiproductCo*, the highest number of the four cases. Eight of them, moreover, correspond to formal subroutines. In contrast, in the *CosmeticsCo* enacted only three corresponding routines in the simulation (only one of which corresponds to a formal subroutine). It appears that *MultiproductCo*'s portfolio management practice is more often employed, indicated by the spontaneous use of routines by the company's managers in their approach to the simulation (as a result of them being in their procedural memory).

These findings show that *MultiproductCo* and *FoodCo* account for the largest proportion of formal subroutines (67% and 63% respectively). In particular, at *MultiproductCo* 89% of conversations enacted in the simulation correspond to formal subroutines. This could be an indication that the formal routines at *MultiproductCo* are stored largely in the memory of its individuals. Moreover, in *MultiproductCo*'s case it seems that formal subroutines are stored better than informal ones. This did not occur at other case companies.

10.3.2 Connections between Routines

As described in Chapter 3, routines are built and reinforced by connecting parts, and the existence and the strength of routines are determined by their connections (Feldman and Pentland, 2008). It is therefore important to analyse the aspects of connections between

¹⁹⁴ Subroutines identified in company documents.

routines at each case company¹⁹⁵. The connections found to be in place are reviewed to discern their implications in terms of the portfolio management processes. Table 10.3 presents a comparison of connection attributes, including the number of connections at each of the case companies and those routines having highest connections.

FoodCo and MultiproductCo's framework of routines is based on them having highest number of connections (i.e., 12), CosmeticsCo's framework has eight connections, the lowest number. Three of the case companies (excepting CosmeticsCo) have a balanced number of sequential and reciprocal connections. Thompson (1967) suggested that a reciprocal connection is more complex than a sequential one. The implication seems to be that the portfolio management processes at CosmeticsCo occur in a more straightforward fashion than at the three other companies. This might be enabled by the presence of an innovation centre division which has a role to ensure the alignment of marketing and R&D activities. This seems to apply in organisations in which marketing and R&D play a dominant role in the portfolio management processes.

Furthermore, Table 10.3 shows that Concept Development is the most connected routine at most of the case companies. At MultiproductCo in particular, the Market and Industry Analysis, Concept Development, Design, Build Business Case and Management Review routines have the highest number of connections. In the case of AutocompCo, the Build Business Case routine has the same number of connections as that of Concept Development, which relates to Feldman and Pentland's (2008) argument that the strength and stability of routines are facilitated by their connections. The most inter-connected routines are thus potentially the most established ones in the whole portfolio management process. This is supported by Feldman and Rafaeli's (2002) explanation that connections enable communication to occur, through which shared understandings are developed.

¹⁹⁵ See the connections between categories (routines) at each case company: Figure 6.5, Figure 7.5, Figure 8.5 and Figure 9.5.

Table 10.3: Cross-Case Comparison of the Connections between Routines

Connections Between Routines ¹⁹⁶	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	Conclusions
Number of connections	8	12	12	11	Relationships between routines in the composite routines constitute 25 connections (14 sequential and 11 reciprocal), as depicted in the composite routines framework shown in Appendix G.3
<i>Sequential</i>	6	8	8	6	
<i>Reciprocal</i>	2	4	4	5	
					Except in CosmeticsCo and MultiproductCo, the proportion of sequential and reciprocal connections at all case companies is balanced
Number of connections attached to each routine (sequential and reciprocal*)					Number of connections attached to each routine for the composite routines shown in Appendix G.3
1 <i>Business Planning</i>	–	3 (3s)	2 (1s, 1r)	2 (2s)	4 (4s)
2 <i>Market and Industry Analysis</i>	2 (1s, 1r)	3 (2s, 1r)	3 (3s)	3 (3s)	6 (5s, 1r)
3 <i>New Product Research</i>	2 (1s, 1r)	–	–	–	2 (2s)
4 <i>Ideas Provision</i>	–	4 (3s, 1r)	–	–	4 (3s, 1r)
5 <i>Concept Development</i>	4 (4s)	4 (2s, 2r)	4 (3s, 1r)	4 (3s, 1r)	6 (5s, 1r)
6 <i>Design</i>	–	–	3 (2s, 1r)	2 (1s, 1r)	6 (3s, 3r)
7 <i>Build Business Case</i>	2 (2s)	2 (1s, 1r)	4 (2s, 2r)	3 (1s, 2r)	5 (2s, 3r)
8 <i>Project Prioritisation</i>	–	–	2 (2s)	–	2 (2s)
9 <i>Management Review</i>	2 (1s, 1r)	4 (3s, 1r)	3 (1s, 2r)	3 (1s, 2r)	7 (2s, 5r)
10 <i>Product Development</i>	3 (2s, 1r)	3 (2s, 1r)	2 (1s, 1r)	2 (2r)	5 (2s, 3r)
11 <i>Project Review</i>	–	–	–	2 (2r)	2 (2r)
12 <i>Launch Planning</i>	1 (1s)	1 (1r)	1 (1s)	–	1 (1r)
Routines with the highest number	Concept Development (4)	Concept Development (4)	Build Business Case (4);	Concept Development (4);	In MultiproductCo, five out of nine

¹⁹⁶ See Figures 6.5, 7.5, 8.5 and 9.5.

Connections Between Routines ¹⁹⁶	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	Conclusions
of connections (plus the number of connections)			Market and Industry Analysis (3); Concept Development (3); Design (3); Management Review (3)	Build Business Case (4)	routines have the highest number of connections. Concept Development is the core routine with the highest number of connections across all case companies .

Note: s–sequential; r–reciprocal

MultiproductCo employs five out of the nine key routines, which are highly connected. This implies that at MultiproductCo, key routines are distributed more evenly across the processes, compared to those at other case companies, which are concentrated solely on the Concept Development routine.

Further inspection found that the connections attached to key routines mostly comprised the links between formal subroutines. For example in MultiproductCo, the Design routine has three connections which connect its formal subroutine, that is, 'preliminary design' with the 'consumer research', 'potential product identification' and 'build business case' subroutines¹⁹⁷. These last three are also formal subroutines, categorised as part of the Market and Industry Analysis, Concept Development and Build Business Case routines (see Appendix E.2 and Appendix E.4). In addition, detailed inspection of the portfolio management practice across the case companies (see Table 10.1) revealed that at Multiproduct Co, the level of formality of portfolio management processes is higher than that of other case companies.

10.3.3 Composite Routines, Subroutines and the Connections

The formation of a composite framework of routines and the subroutines is presented in Appendix G.1 and was used to produce Figure 10.2. It is identical to the composite portfolio management categories¹⁹⁸ (Figure 10.1), and is termed a 'palette of routines'. The palette comprises 12 routines and 52 subroutines.

Connections denote a sequence of actions that can be constructed into a network of actions (Pentland, 1999). The connections between routines across the case companies accordingly can be assembled by aggregating the whole number of routines in the palette along with the connections attached. Appendix G.2 presents a table listing all the connections in place at every case company, along with the composite ones; together, these were then converted into a composite routines framework (see Appendix G.3). This figure shows that the composite of routines is assembled from the 25 connections (14 sequential and 11 reciprocal) between routines. The role of connections within the palette is discussed in Chapter 11.

¹⁹⁷ See connection between routines at MultiproductCo in Appendix E.4.

¹⁹⁸ The identifications of portfolio management practice categories and routines in NPD portfolio management were conducted iteratively.

<p>Business Planning (1)</p> <ul style="list-style-type: none"> Product road map prioritisation Business planning 	<p>Ideas Provision (4)</p> <ul style="list-style-type: none"> Creativity days Idea pooling Open innovation Idea screening 	<p>Build Business Case (7)</p> <ul style="list-style-type: none"> Business feasibility proposal Market testing Resource analysis 	<p>Product Development (10)</p> <ul style="list-style-type: none"> Product development kick-off Product specification validation Process validation Developing scale up prototype Scale up prototype trial Sourcing Supplier selection and control Packaging development Market testing PD progress coordination Handover project to production
<p>Market and Industry Analysis (2)</p> <ul style="list-style-type: none"> Market research Consumer research Industry analysis Technology development analysis 	<p>Concept Development (5)</p> <ul style="list-style-type: none"> Potential products identification Developing product concepts Product concept evaluation Formulation preparation Developing laboratory scale prototype Product testing Brand positioning Channel determination Packaging design Technology and process preparation 	<p>Project Prioritisation (8)</p> <ul style="list-style-type: none"> Landing review 	<p>Project Review (11)</p> <ul style="list-style-type: none"> Project control Product cost review 3-month production review
<p>New Product Research (3)</p> <ul style="list-style-type: none"> New product research Formula collection and research Cooperation with external institutions 	<p>Design (6)</p> <ul style="list-style-type: none"> Preliminary design Detail design Design review Laboratory test 	<p>Management Review (9)</p> <ul style="list-style-type: none"> NPI gate review Post-launch review Existing product review Management approval Product road map review 	<p>Launch Planning (12)</p> <ul style="list-style-type: none"> Developing marketing strategy Placement of products at right Channels

Figure 10.2: Palette of Routines and Associated Subroutines in Portfolio Management

10.3.4 Conclusions

Seven to nine routines underlying NPD portfolio management were identified across the case companies, where NPD portfolio management is constituted by between 27 and 35 subroutines. FoodCo and MultiproductCo account for a significant proportion of formal subroutines, much higher than that of CosmeticsCo and AutocompCo. Finally, a composite of routines is constituted by 12 routines (identical to the composite portfolio management categories) consisting of 52 subroutines.

Across the four case companies, eight to 12 connections link the routines together. FoodCo and MultiproductCo routines framework is assembled by the highest number of

connections; CosmeticsCo’s framework has the least connections. Concept Development is the most connected routine at most case companies. The most connected routines have the potential to be the most established routines across the whole portfolio management process.

10.4 LINKAGE TO ESPOUSED BUSINESS STRATEGY: RESEARCH

QUESTION 3

This section answers RQ 3: *Is the espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* The analysis checks if the case companies’ espoused business strategy is considered as part of the routines underlie their NPD portfolio management. .

10.4.1 Cross-Case Comparison of the Espoused Business Strategy Considered

The key findings regarding the linkage between espoused strategy and portfolio management is shown in Table 10.4. This table refers to the key information presented in the tables in Appendices C.3 (CosmeticsCo), D.7 (FoodCo), E.7 (MultiproductCo) and F.7 (AutocompCo). For example, in CosmeticsCo, ‘building future products’ is an element of the organisational goal considered in two different subroutines.

Table 10.4: Cross-Case Comparison of Espoused Business Strategy Considered

DETAILS OF LINKAGE	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	CONCLUSIONS
Elements of the business strategy predominantly considered (and number of subroutines which considers them)	<p>Organisational Goals:</p> <p>Building future products (2)</p> <p>Featuring local resources and culture (2)</p> <p>Market share (2)</p> <p>Margin (2)</p> <p>Competitive Strategy:</p> <p>Focus on core brands (2)</p> <p>Promotion (3)</p>	<p>Organisational Goals:</p> <p>Sales (7)</p> <p>Profitability (6)</p> <p>Growth (6)</p> <p>Competitive Strategy:</p> <p>Affordable premium product (7)</p> <p>Capabilities:</p> <p>Innovation capability (1)</p>	<p>Organisational Goals:</p> <p>Sales (6)</p> <p>Profitability (9)</p> <p>Competitive Strategy:</p> <p>Technology Innovation (5)</p> <p>Channel (10)</p>	<p>Organisational Goals:</p> <p>Cost (9)</p> <p>Profitability (12)</p> <p>Competitive Strategy:</p> <p>Engineering and design (1)</p> <p>Capabilities:</p> <p>Design capability (2)</p>	<p>Profitability (margin) is the most significant element at all case companies.</p> <p>For its competitive strategy, each case company considers different significant elements</p> <p>Capabilities aspect is present only at FoodCo and AutocompCo)</p>
Routines which consider a relatively high number of different	<p>New Product Research (4)</p> <p>Management review (5)</p>	<p>Business Planning (5)</p> <p>Management Review (6)</p>	<p>Business Planning (4)</p> <p>Market and Industry Analysis</p>	<p>Design (2)</p> <p>Build Business Case (3)</p> <p>Management</p>	<p>Each case company has specific key routines which are linked most to business strategy</p>

DETAILS OF LINKAGE	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	CONCLUSIONS
elements of business strategy ¹⁹⁹ (plus the number of elements considered)			(4) Concept Development (6) Project Prioritisation (6) Management Review (6)	Review (2) Product Development (2) Project Review (2)	Management Review in particular is a key routine at all case companies

Furthermore, the table shows that ‘profitability’ (the ‘margin’) is the organisational goal considered in a number of different subroutines across all four case companies (CosmeticsCo: 2; FoodCo: 6; MultiproductCo: 9, and AutocompCo: 12). In addition, ‘sales’ (and ‘market share’) is also considered in a significant number in CosmeticsCo, FoodCo and MultiproductCo’s subroutines.

Each case company has specific elements in its routines which consider competitive strategy. AutocompCo, in particular, has only one subroutine (‘engineering and design’) which considers the aspect of competitive strategy.

In terms of the capabilities aspect, only FoodCo and AutocompCo include this in their portfolio management. FoodCo considers ‘innovation capability’ as part of one of its subroutines; AutocompCo views ‘design capability’ in two different subroutines.

10.4.2 Routines and Key Aspects of Business Strategy

Appendix G.5 presents a comparison of the key aspects of business strategy which are considered in the case company routines. For example, CosmeticsCo does not perform a Business Planning routine, thus no business strategy appears. FoodCo, in contrast, incorporates organisational goals and competitive strategy while performing a Business Planning routine.

Appendix G.5 shows that all four case companies consider their business strategy across all their portfolio management routines. Organisational goals and competitive strategy are considered mainly in practice. As described earlier, two occurrences of the capabilities aspect are identified in FoodCo and AutocompCo’s routines.

¹⁹⁹ See Appendices C.3 (CosmeticsCo), D.7 (FoodCo), E.7 (MultiproductCo) and F.7 (AutocompCo)

As described earlier, Appendix G.5 also depicts the degree to which routines are linked to business strategy, shown in the ‘%’ column. This percentage indicates the proportion of elements (within the organisational goal, competitive strategy and capabilities) involved, compared to the total number of elements in the espoused business strategy. These figures can be associated with the extent to which the espoused business strategy is considered in the routines. For example, CosmeticsCo (Appendix C.3) has nine elements of organisational goal (pioneering, global brands, building future products, featuring local resources and culture, market share, market existence, market expansion, margin, growth). In the Market Industry Analysis routine three elements are considered, i.e., pioneering, building future products, featuring local resources and culture); the percentage of business strategy considered is thus 3/9 or 33%. Complete figures for the whole routines in each case company are displayed in Figure 10.3.

From Figure 10.3 it is clear that, overall, MultiproductCo and FoodCo have better linkages to business strategy than have CosmeticsCo and AutocompCo. The Management Review routine, excepting that at AutocompCo, has the strongest link. Instead, at AutocompCo the Build Business routine has highest level of linkage to business strategy. This is because in AutocompCo’s portfolio management process, which is dominated by customer-driven projects, the ‘RFQ and quotation preparation’ subroutine is a pivotal activity requiring an intensive link to business strategy. Further discussion on these results is presented in Chapter 11.

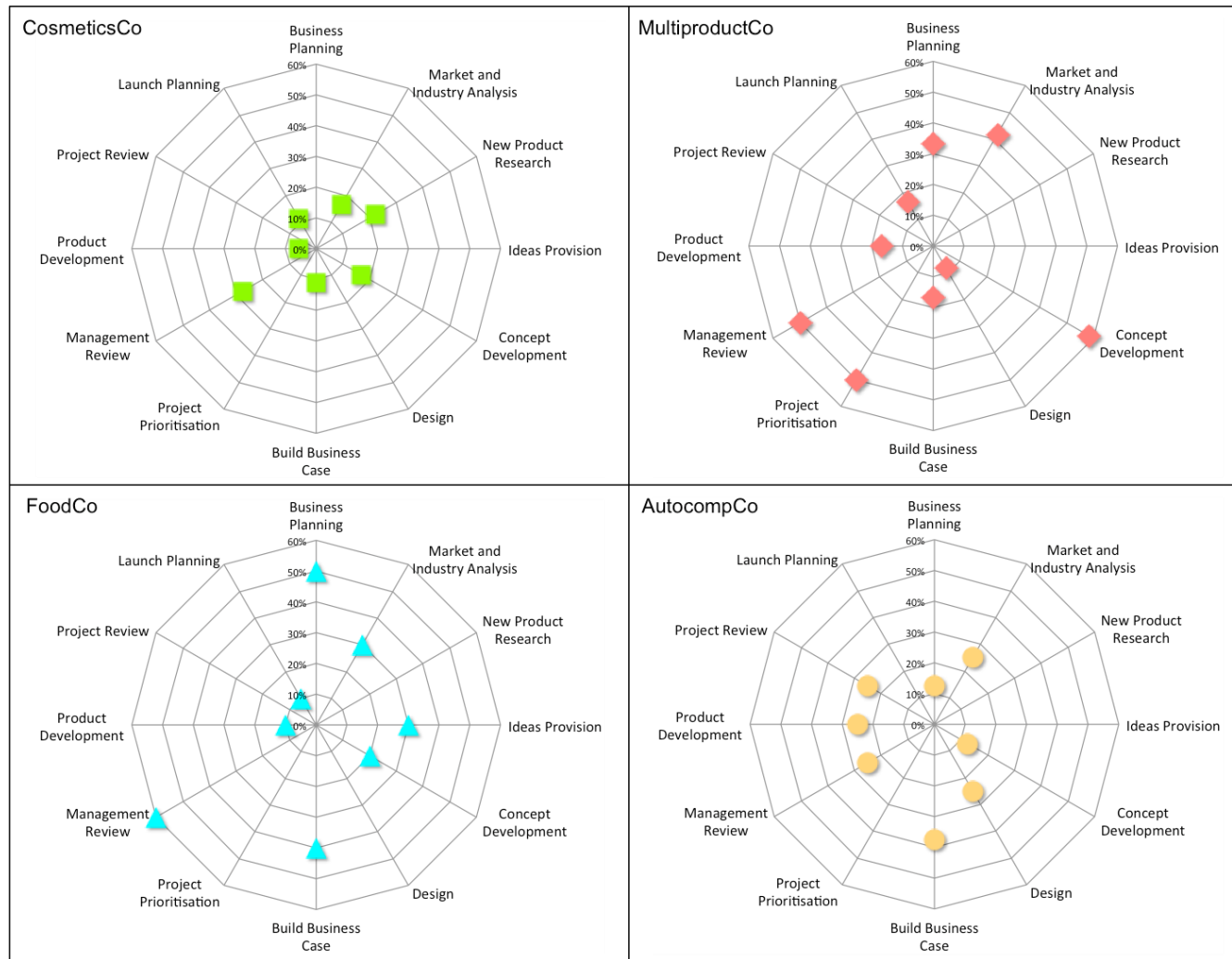


Figure 10.3: Degree of Linkage between Routines and Business Strategy

10.4.3 Conclusions

The findings show that all four case companies consider their business strategy as part of all the routines in the NPD portfolio management process. Organisational goals and competitive strategy are notably considered in the routines. In contrast, the Capabilities aspect is not considered to any significant degree. In considering business strategy, different routines emphasise its different key aspects.

Profitability (margin) is an element of organisational goals considered in a significant number of different routines at all case companies. In contrast, each case company has specific significant elements of competitive strategy which need to be considered in the routines.

Each case company has its own specific key routines which link to multiple elements of business strategy's key aspects. Management Review is a key routine for all case companies.

10.5 SUMMARY

This chapter has presented the cross-case analysis in response to RQ 1, RQ 2 and RQ 3. It has shown the following:

- A composite category of routines in NPD portfolio management is termed 'a palette of routines', consisting of 12 routines: (1) Business Planning; (2) Market and Industry Analysis; (3) New Product Research; (4) Ideas Provision; (5) Concept Development; (6) Design; (7) Build Business Case; (8) Project Prioritisation; (9) Management Review; (10) Product Development; (11) Project Review, and (12) Launch Planning.
- No case company utilises all 12 routines; in the companies, only seven to nine routines underpin NPD portfolio management, constituted by 27 to 35 subroutines.
- Five core routines are employed by all four case companies: Market and Industry Analysis; Concept Development; Build Business Case; Management Review, and Product Development.
- Across the case companies, eight to 12 connections bring the routines together. FoodCo and MultiproductCo have the highest number of connections. Concept Development is the most connected routine of the case companies (the most

connected routines are potentially those which are the most established across the whole portfolio management process).

- All four case companies consider their business strategy as part of all the routines in the NPD portfolio management process, in particularly organisational goals and competitive strategy. In contrast, the Capabilities aspect is not significantly considered.
- Profitability (margin) is the element of organisational goals considered in a significant number of different routines in all the case companies. In contrast, each company considers specific, significant elements of competitive strategy in its routines.

CHAPTER 11 DISCUSSION AND CONCLUSIONS

11.1 INTRODUCTION

This chapter starts by summarising the within-case findings (Chapters 6 to 9) and the cross-case analysis provided in Chapter 10. The discussions in Chapter 10 focused on the RQs and underpinning theories (that is, portfolio management and organisational routines), whereas this chapter goes further in developing broader findings; and in presenting theoretical and managerial contributions. This broader perspective led to a suggested generic framework for NPD portfolio management and several other insights on portfolio management practices. The main sections of this chapter are a summary of results; discussions on the broader insights; theoretical contributions; managerial contributions of this study are described subsequently; limitations and further research are identified.

11.2 SUMMARY OF THE RESULTS

This section presents the key results of the cross-case analysis (Chapter 10) and compares them with the three research questions.

11.2.1 NPD Portfolio Management: Research Question 1

The summary of the cross-case analysis towards the answers of RQ 1: *How is new product development portfolio management conducted?* is presented. It discusses the routines in NPD portfolio management employed in each case companies, the ways of each case companies conduct the project selection and the parties which play important role in the portfolio management.

Across the case companies, it was found that portfolio management practices involve 12 different categories of routines. These twelve will be termed a ‘palette’²⁰⁰ of routines, as reshown in Figure 11.1. It should be noted that no single case company utilised all 12 routines. However, all of the case companies were found to have five

²⁰⁰ A palette of routines is analogous to a palette of colours, in which, from the palette, managers can select a set of routines for composing a required portfolio management capability.

common routines: Market and Industry Analysis; Concept Development; Build Business Case; Management Review, and Product Development. The total number of routines used by the four case companies ranged from seven to nine.

Business Planning (1)	Ideas Provision (4)	Build Business Case (7)	Product Development (10)
Market and Industry Analysis (2)	Concept Development (5)	Project Prioritisation (8)	Project Review (11)
New Product Research (3)	Design (6)	Management Review (9)	Launch Planning (12)

Figure 11.1: Palette of Routines in NPD Portfolio Management

No case company was found to have ‘complete’ set of portfolio management procedures. MultiproductCo is the only case company which employs project prioritisation; whereas, other case companies conduct ideas selection informally. Moreover, all case companies were found to evaluate products on an individual basis rather looking at the portfolio as a whole. This explains why the highly important routine of portfolio review is not used by all case companies, which means that those companies might have not been able to create a balanced portfolio.

Final selection decisions in all case companies are made by senior management, based on the business proposals presented by marketing. This takes place formally in management review meeting, for example: BOD meeting in CosmeticsCo; Food Forum in FoodCo. Financial methods are used to evaluate the projects; and profitability is the most common selection criteria. This means that maximising value could be the only goal they have been pursuing.

In two case companies (CosmeticsCo and MultiproductCo) marketing and R&D have been given important roles in the portfolio management processes. This leads to strong relationships between senior management and R&D, and with marketing as well. At FoodCo and AutocompCo, on the other hand, R&D’s role is less dominant. In customer-driven project nature, in particular, marketing has a role as an interface

between customers and the company, whereas the engineering project team manages the internal processes.

11.2.2 Organisational Routines in the NPD Portfolio management: Research

Question 2

The cross-case analysis provides the answer to RQ 2: *What organisational routines can be identified in the new product development portfolio management in companies?* It describes routines, subroutines and their connections which the study identified across the case companies.

The palette of 12 routines was found to be related to a total of 52 subroutines, as shown in Figure 10.2. As Table 10.2 shows, FoodCo and MultiproductCo have the highest portion (63% and 67% respectively) of formal²⁰¹ subroutines compared to those of CosmeticsCo and AutocompCo (37% and 38% respectively).

In addition, the simulation part of the research found that a high proportion of conversations²⁰² (30%) at MultiproductCo corresponded to the subroutines. In contrast to only 10% of conversations at CosmeticsCo. In relation to this, almost all conversations which emerged at MultiproductCo corresponded to the *formal* subroutines (89%), whereas, at CosmeticsCo, those which emerged mostly did not.

As described previously, it is important to investigate connections between routines, as these connections determine the existence of routines and their degree of stability. The study found that the relationships between routines in the palette constitute 25 connections (15 sequential and 10 reciprocal) (see Appendix G.3). Except at CosmeticsCo and MultiproductCo, the proportion of sequential and reciprocal connections in all case companies is balanced. At MultiproductCo, five out of nine routines have the highest number of connections. In addition, Concept Development is the common routine with the highest number of connections in all case companies.

Finally, by comparing the connections between routines across the case companies, the networking of routines can be determined, as shown in Appendix G.3.

²⁰¹ Formal routines refer to routines stated in the company's documents

²⁰² "...actions are constructed in conversations taking place between people, which give meaning to physical movements and all kinds of events" (Czarniawska, 1997, p.42).

This figure shows that the network is assembled by 24 connections (13 sequential and 11 reciprocal) between routines.

11.2.3 Linkage to Espoused Business Strategy: Research Question 3

The cross-case analysis enabled the answer to RQ 3: *Is the espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?* It reports the key aspects of business strategy – organisational goals, competitive strategy and capabilities – which are considered in the routines.

The linkage between routines and business strategy are shown in Figure 10.3. It shows that, in terms of NPD portfolio management, all four case companies consider their business strategy as part of all routines. Organisational goals and competitive strategy are mainly considered in practice. Only two occurrences of the capabilities aspect of NPD portfolio management are identified as part of company routine (at FoodCo and AutocompCo).

At CosmeticsCo and FoodCo, organisational goals and competitive strategy are prevalent in the Business Planning and Management Review routines; in the Product Development and Launch Planning routines, competitive strategy is more central. At MultiproductCo, the role of organisational goals and competitive strategy are more balanced across all the company's routines; in AutocompCo, the organisational goals aspect dominates (see Appendix G.5)

In all the companies studied, the element of organisational goals considered to be of the most significance is profitability (margin). In contrast, in terms of competitive strategy, each case company considers different elements to be significant.

11.3 BROADER INSIGHTS FROM THE RESEARCH

It was important to answer the three research questions (as summarised above); equally however, in this last chapter it is important to 'step back' and synthesise the results to produce broader insights. Langley and Abdallah (2011) suggested that cross-case analysis not only provides an opportunity to seek differences between cases, but also allows the exploration of regularities in 'temporal patterns' across cases (p.211). This section starts therefore with a discussion of patterns found in the links between

particular aspects of routines with business strategy. Next, it presents a generic framework of portfolio management, including an analysis of the potential link between its routines and business strategy. Finally, it presents a discussion of the broader perspective offered by this framework.

11.3.1 Link to Business Strategy: Insights from the Case Companies

11.3.1.1 Completeness of Routines and the Link to Business Strategy

It is important to examine how the ‘completeness of the routines’ of each case company corresponds to the link to business strategy. The completeness of the routines was determined by taking the ratio of the number of subroutines in each routine to the number of subroutines in each routine in the composite routines²⁰³.

For example, as shown in Appendix G.1, at CosmeticsCo the completeness of the routines of Business Planning is 0/2 (0 out of 2) or 0%; Market and Industry Analysis is 3/4 or 75%; New Product Research is 3/3 or 100%; Ideas Provision is 0/4 or 0%; Concept Development is 4/10 or 40%; Design is 0/5 or 0%; Build Business Case is 3/3 or 100%; Project Prioritisation is 0/1 or 0%; Management Review is 3/5 or 60%; Product Development is 7/11 or 64%; Project Review is 0/3 or 0%, and Launch Planning is 2/3 or 67%. Thus the completeness of the entire routines (the average of the completeness of all routines) is 42%²⁰⁴. Further, along with the percentage of the link to business strategy shown in Appendix G.5, a matrix which compares the completeness of the routines with the link to business strategy can be developed as depicted in Figure 11.2.

²⁰³ See Appendix G.1.

²⁰⁴ The average of the completeness of all routines (0%, 75%, 100%, 0%, 40%, 0%, 100%, 0%, 60%, 64%, 0% and 67%).

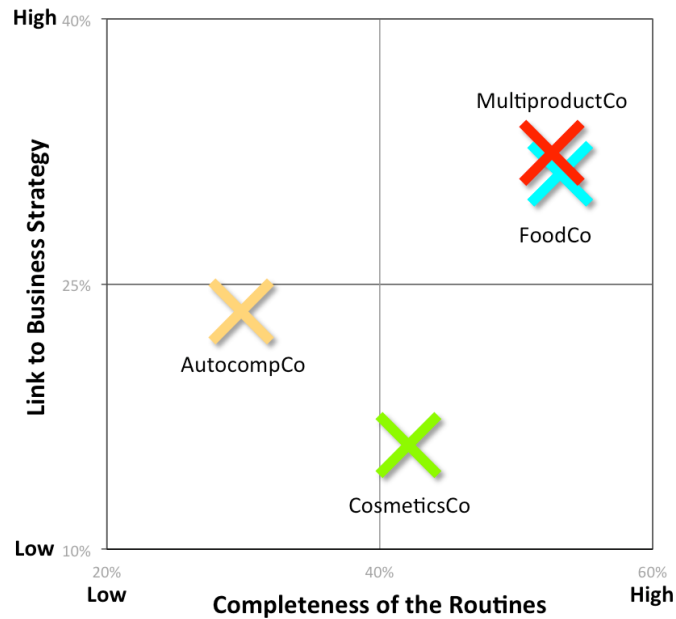


Figure 11.2: Completeness of the Routines-Link to Business Strategy Matrix

This figure positions the four case companies into three different quadrants: (1) low completeness of the routines-low link to business strategy; (2) high completeness of routines-low link to business strategy, and (3) high completeness of the routines-high link to business strategy. AutocompCo is located at low completeness of routines-low link to business strategy, whereas CosmeticsCo is situated at high completeness of routines-low link to business strategy. In contrast, MultiproductCo and FoodCo are sited at the point of high completeness of routines-high link to business strategy.

An interesting finding is shown by AutocompCo and CosmeticsCo. It can be seen that even though CosmeticsCo involves more complete routines than that of AutocompCo, its link to business strategy is weaker. This phenomenon might occur because CosmeticsCo does not have a Business Planning routine, that is, the routine where the company's espoused business strategy is formally articulated.

11.3.1.2 Connections and the Link to the Business Strategy

Connections are central in organisational routines, which are built and reinforced by connecting parts (Feldman and Pentland, 2008). These connections enable routines to 'gain or lose strength, stability and legitimacy' (Feldman and Pentland, 2008, p.306). It is thus thought-provoking to examine how, across the case companies, the number of connections (Table 10.3) corresponds to the level of the link to business strategy

(Appendix G.5). A two-by-two matrix presents the position of each case company (Figure 11.3)

This figure interestingly positions the four case companies in three different quadrants: (1) low number of connections-low link to business strategy; (2) high number of connections-low link to business strategy, and (3) high number of connections-high link to business strategy. CosmeticsCo is located in the low number of connections-low link to business strategy quadrant; AutocompCo is situated in the high number of connections-low link to business strategy quadrant. In contrast, MultiproductCo and FoodCo are sited in the high number of connections-high link to business strategy quadrant.

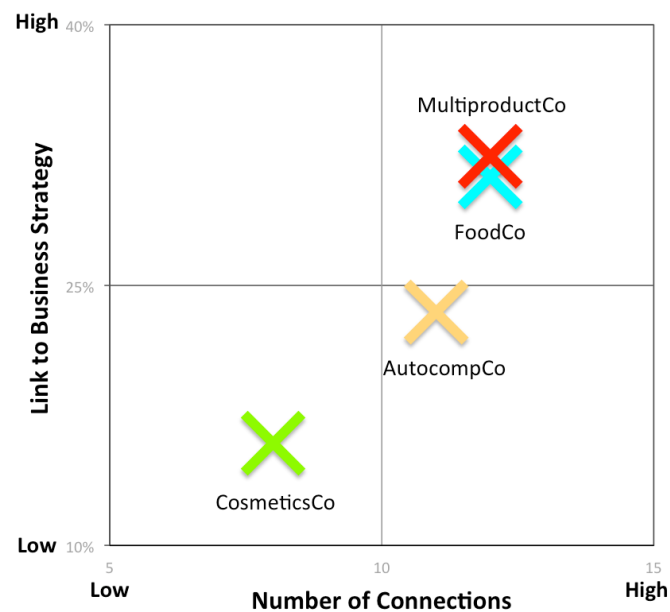


Figure 11.3: Number of Connections-Link to Business Strategy Matrix

It seems that the higher the number of connections a case company has, the more strongly they are linked to the firm's business strategy. Interestingly, although AutocompCo has 11 connections, and FoodCo and MultiproductCo each have 12 connections, AutocompCo's linkage to strategy is far weaker than that of MultiproductCo and FoodCo. It seems that simply the number of connections is inadequate to explain why one case company has a stronger link to business strategy than others. Further inspection of Figure 10.3 (which presents the linkage degree of routines to business strategy) shows that in most case companies, the routines that are

strongly linked to business strategy appear at the same time to embody a high number of connections. For example, Management Review has the strongest linked routine to business strategy at CosmeticsCo, FoodCo and MultiproductCo. In terms of connections, at FoodCo and MultiproductCo, the Management Review routine is highly connected to other routines (four and three connections respectively). Similarly, while the Market and Industry Analysis routine is linked considerably strongly to business strategy in all the case companies, it also has a high number of connections at FoodCo, MultiproductCo and AutocompCo (three connections each)

This implies that at the routines level (not at the company level), connections with other routines might lead the routines to link to business strategy. Explanations of how connections between routines create these links are presented in detail in Section 11.3.5.

11.3.1.3 Formality and the Link to Business Strategy

This subsection discusses two interesting findings related to the formality²⁰⁵ of routines. Firstly, the finding shows the impact of formality in the routines on the linkage of the routines to business strategy. Secondly, the finding from comparing the identified formal routines²⁰⁶ with the conversations emerged in the simulations²⁰⁷.

From the findings presented in Table 10.2 (formality of routines) and Appendix G.5 (the linkage to business strategy), a matrix exhibits the position of each case company is shown in Figure 11.4. This figure interestingly posts the four case companies into two different quadrants: (1) low formality-low link to business strategy, and (2) high formality-high link to business strategy. CosmeticsCo and AutocomCo are located in the low formality-low link to business strategy quadrant; MultiproductCo and FoodCo are sited in the high formality-high link to business strategy quadrant. Although this needs further investigation, it seems that the formality of routines enables these latter two companies to link their portfolio management to business strategy more effectively.

²⁰⁵ 'Formal' routines refer to the activities described in company documents.

²⁰⁶ See Table 6.7 (CosmeticsCo), Appendix D.2 (FoodCo), Appendix E.2 (MultiproductCo) and Appendix F.2 (AutocompCo).

²⁰⁷ See Table 6.8 (CosmeticsCo), Appendix D.5 (FoodCo), Appendix E.5 (MultiproductCo) and Appendix F.5 (AutocompCo).

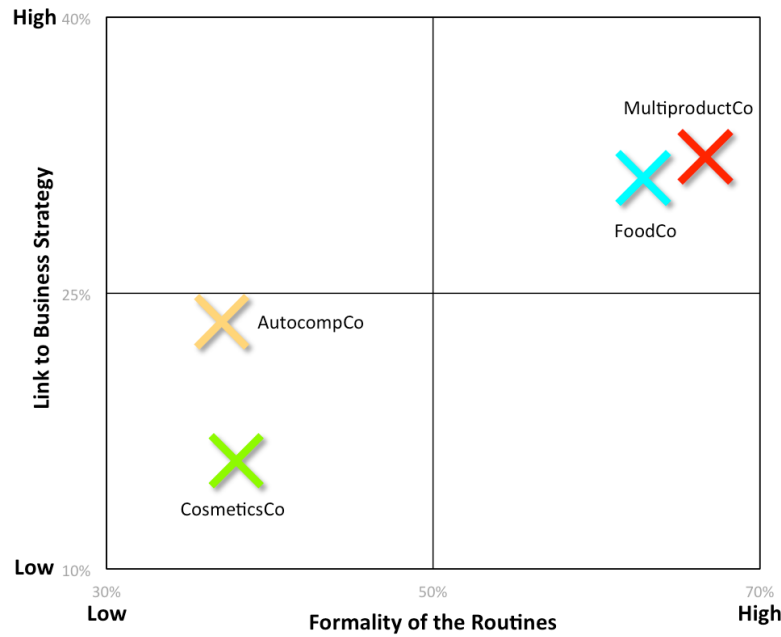


Figure 11.4: Formality of the Routines-Link to Business Strategy Matrix

11.3.1.4 Conclusions

Across three different examinations, MultiproductCo and FoodCo demonstrate the strongest link to business strategy, followed by AutocompCo. These three case companies have adopted a Business Planning routine, whereas Cosmetics has not. This seems to be the explanation for why MultiproductCo, FoodCo and AutocompCo have a better link to business strategy.

This linkage to business strategy does not seem to be influenced by the completeness of the routines followed. From the point of view of connections, the pattern appears to show that there is more relevance in investigating number of connections at the routines level, rather than at the organisation level. In terms of formality in particular, the link to business strategy to some extent (not dominantly) is affected by the formality of the routines.

11.3.2 Forming a Generic Framework of NPD Portfolio Management

11.3.2.1 Which Routines are Necessary

As described in Chapter 10, the combination of routines used by a company determines the 'picture' of how the NPD portfolio is managed. This has been shown by the findings which indicate that each of the four case companies has a different combination of

routines involved in their NPD portfolio management process. For example, New Product Research routine is only applied at CosmeticsCo, which carries out regular activities in discovering new ingredients.

Detailed inspection led to the notion that business strategy seems to affect the selection and combination of routines and subroutines from the palette. In the case of CosmeticsCo, their organisational goal ‘building future products’ requires them to establish ‘formula collection and research’ subroutines (categorised under the New Product Research routine)²⁰⁸. In contrast, MultiproductCo, established a ‘global portfolio analysis’ subroutine (categorised under Concept Development), because new product invention is provided by the global affiliated companies from different areas. In the AutocompCo case, in order to meet its goal on ‘cost’, the company set up ‘product cost review’ subroutines (categorised under the Project Review routine)²⁰⁹. Findings relating to the link between routines and business strategy are discussed further in another section.

The discussion now addresses the cluster of routines. Twelve different categories of routine were identified across the case companies (see Figure 11.5). Five were common routines (see green shading in Figure 11.5), found in all case companies. These are ‘core’ routines, meaning that they are clearly recognised as basic routines and an essential part of portfolio management.

Other findings reveal that the Ideas Provision and Design (white shading in Figure 11.5) and Concept Development routines overlap. For example, at FoodCo the Ideas Provision routine contains an ‘Ideas screening’ subroutine, which at CosmeticsCo is juxtaposed with the ‘Product selection’ subroutine within Concept Development. Furthermore, the ‘Formula preparation’ subroutine within the Concept Development category can be also considered to be part of the ‘Design’ routine. In addition, a preliminary concept selection is carried out by CosmeticsCo and MultiproductCo as part of Concept Development, as well as by FoodCo in its Ideas Provision routines. Based on these reasons, these three routines thus can be grouped into a routine named *Concept Selection and Development* (see Figure 11.6).

²⁰⁸ See Table 6.9

²⁰⁹ See Appendix F.6

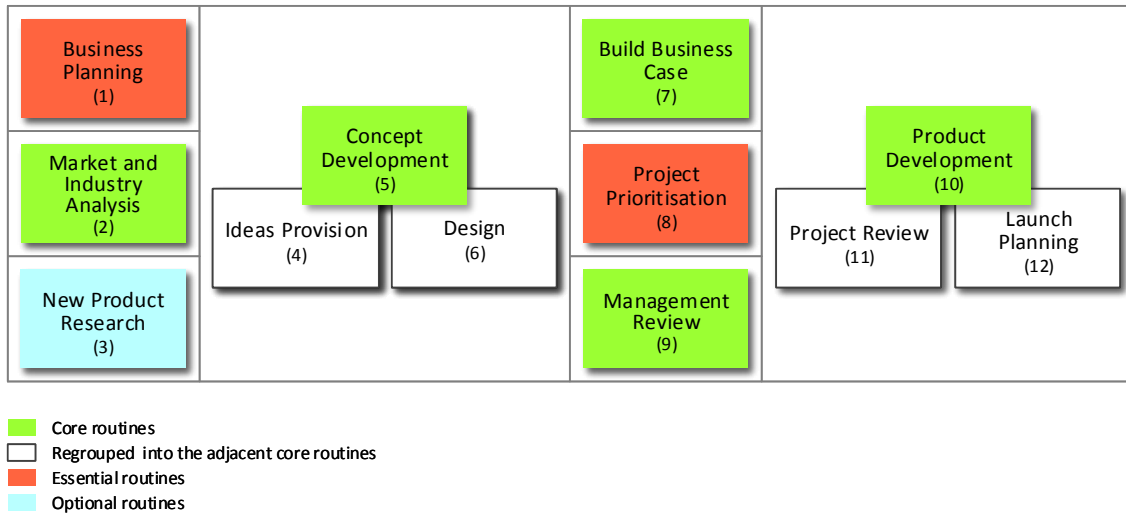


Figure 11.5: Refining the Palette of Routines

Similarly, Project Review and Launch Planning (white shading, Figure 11.5) activities are related to Product Development. For example, activities related to the Project Review routine, that is, the ‘Product development progress coordination’ subroutine at CosmeticsCo²¹⁰ and the ‘Project progress review’ subroutine at FoodCo²¹¹, are carried out within the Product Development category. Moreover, as shown in the composite routines framework (Appendix G.3), the Launch Planning routine is only engaged with the Product Development routine, and are therefore relevant for incorporation into Product Development routines.

The refinement of the palette of routines resulted in a *generic palette* of eight routines (see Figure 11.6). In addition to the ‘core’ routines, taking into consideration the pros and cons of the practices of the four case companies, it is recommended that any company needs to incorporate Business Planning and Project Prioritisation routines into their portfolio management. These routines are ‘essential’ and shaded red.

²¹⁰ See Figure 6.6.

²¹¹ See Figure 7.5.

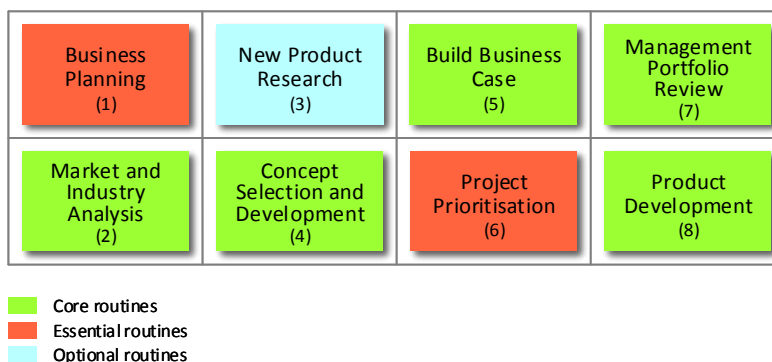


Figure 11.6: Generic Palette of Routines

The argument for this is that the Business Planning routine is actually employed by three case companies (not CosmeticsCo). In Business Planning, *product road mapping* and *strategic bucket allocation*²¹², two methods suggested by Cooper (2005) for providing strategic portfolio decisions, can be carried out. For example, FoodCo conducts product roadmap prioritisation²¹³ as part of its Business Planning routine; however, use of strategic buckets was not found in their portfolio management practices.

It is also important that the Project Prioritisation routine is conducted, according to the framework suggested by Archer and Ghasemzadeh (1999)²¹⁴. This routine uses financial and strategic evaluation instruments. In this way, portfolio decision-making processes can lead to better project selections. MultiproductCo has demonstrated the utility of this routine.

The blue shaded box is an ‘optional’ routine recommended for use by companies striving to deliver fundamental innovation to the market. For example, CosmeticsCo implements this routine as part of its continuous drive to discover new ingredients and collect new formulas.

Across all four case companies, Management Review contains subroutines which mainly deal with the review of individual projects, and would be better termed a Management Portfolio Review. In order to achieve one element of portfolio management goals, i.e., strategic alignment, managers should have a *portfolio*

²¹² See also Figure 2.1.

²¹³ See Figure 7.5.

²¹⁴ See Figure 2.2 (Chapter 2, Portfolio Management).

*mindset*²¹⁵. This can be realised if the companies establish portfolio review activities as suggested by Cooper (2005)²¹⁶. In this routine, therefore, adoption of the ‘Portfolio review’ subroutine is strongly recommended²¹⁷.

11.3.2.2 Incorporating the Connections into the Generic Palette of Routines

Based on the composite routines framework and their connections, shown in Appendix G.3, the refinement of the palette led to a framework depicted in Figure 11.7. As Ideas Provision and Design were regrouped into Concept Selection and Development routines, hence all connections attached to them pool into the Concept Selection Development routine. This was similarly applied to the connections within Project Review and Launch Planning, which are then embedded into the Product Development routine.

As Figure 11.7 shows, each routine embodies its associated connections. A routine along with its connections thus can be ‘plugged-in’ or ‘plugged-out’ depending on the organisational context, to create an effective portfolio management framework. For example, if the New Product Research routine is not incorporated into portfolio management, then its connections to the Market and Industry Analysis and Concept Development routines would also be detached. The role of these connections is discussed further in the following subsections.

²¹⁵ “A complete understanding of all of the projects in the NPD portfolio and how each is aligned to the firm’s strategy” (Kester et al., 2011, p. 647).

²¹⁶ See also Figure 2.1

²¹⁷ This is carried through in the generic framework of NPD portfolio management shown in Figure 11.9.

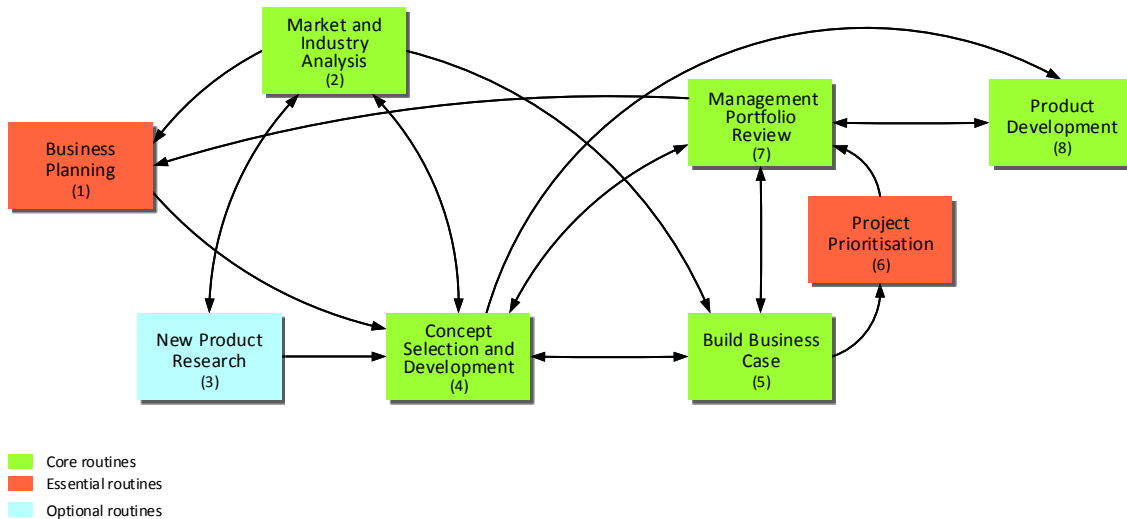


Figure 11.7: Generic Palette of Routines with Connections

11.3.3 Link to Business Strategy: Insights from the Generic Framework

Some of the extant literature indicates the link between portfolio management and business strategy to be tenuous; however, this study found something different. It looked into whether business strategy is considered in the routines of the four case companies and showed that in all of them, the majority of routines are those which relate to the business strategy (see Figure 10.3, the degree of linkage to business strategy). This subsection discusses the links between the generic routines and the generic business strategy²¹⁸, identified from an analysis of the proportion of generic business strategy considered in routines. In other words, it presents the extent to which each routine may be said to consider an organisation's business strategy, as presented in Appendix G.7. The results are displayed in Figure 11.8. It should be noted that this chart is based on the generic palette of routines.

²¹⁸ This study defines generic business strategy as constituted by elements which are common in at least two case companies. For example, generic Organisational Goals consist of 'Building future products', 'Market Leader', 'Brand position', 'Sales', 'Profitability' and 'Growth'.

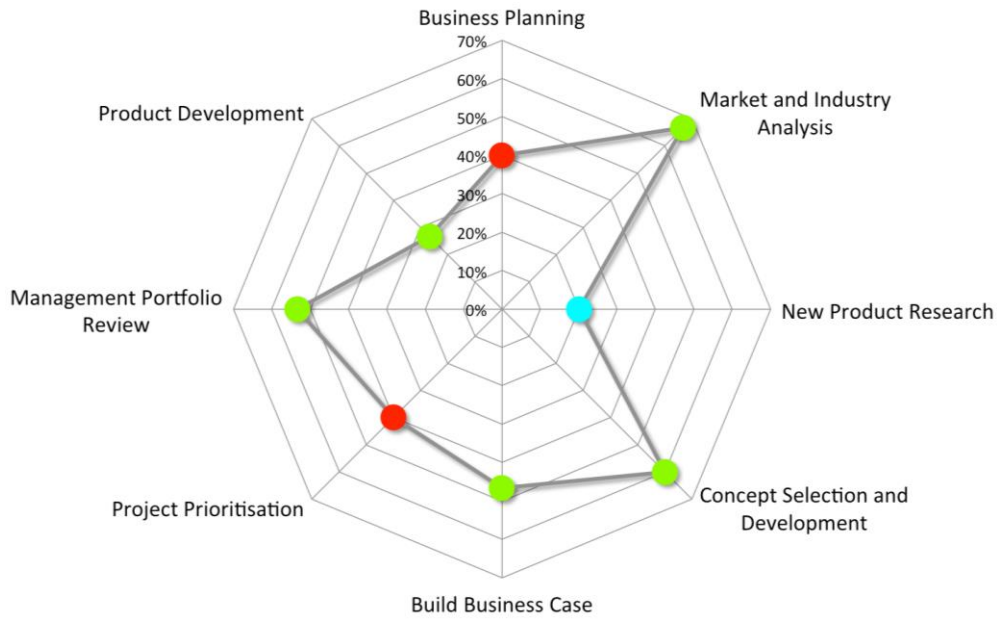


Figure 11.8: Standard Degree of Linkage between Routines and Business Strategy²¹⁹

Figure 11.8 shows that the core routines (represented by green dots) have the strongest link to business strategy. Thus, Market and Industry Analysis, Concept Selection and Development, Build Business Case and Management Portfolio Review (Product Development is an exception) have the highest percentage in terms of linkage to business strategy. This finding supports the argument for classifying these routines as ‘core’.

Business Planning and Project Prioritisation (red dots) are significantly linked to business strategy, manifesting that they have important roles in realising the companies’ business strategy. These are essential routines. Establishing ‘core’ and ‘essential’ routines thus provides complete portfolio management that can facilitate strategic alignment.

The linkage of the New Product research routine to business strategy is also weak. The argument is that the New Product Research routine considers only the ‘Building future product’ and ‘Market leader’ elements²²⁰; it is therefore a very specific routine, dedicated to building future products in order to secure the position as a market leader.

²¹⁹ The degree of the linkage represents the percentage of the elements (in OG, CS and C) involved in a routine, compared to the whole elements of the espoused business strategy.

²²⁰ See Appendix G.7.

As described earlier, at the case companies the links to business strategy are informally established, and considered only unconsciously by management when performing routines. The next subsection discusses this issue further by trying to investigate the mechanisms which might create these links.

11.3.3.1 The Role of Connections in Linking Routines to Business Strategy

Organisational routines are embodied by their connections. Understanding the connections between actions, actors and artefacts therefore enables an organisation to identify and replicate its performance (Pentland and Feldman, 2008b). By applying an organisational routines perspective, this study of portfolio management revealed the prevalence of connections (which were not reported in the companies' documents). The connections identified represent sequential and reciprocal relationships, implying that portfolio management is not a one-way and linear process; instead, it is built on iteration.

As Figure 11.7 suggests, Concept Selection and Development is the core routine with the highest (six) connections. This routine can thus be considered the 'busiest' across portfolio management. In comparison with others, in this routine, communications between managers are extensive. It constitutes important activities in portfolio management. For example, 'Product selection' at CosmeticsCo, 'Ideas screening' at FoodCo, 'Potential product identification' at MultiproductCo, and 'Product concept screening'²²¹ at AutocompCo are subroutines which perform the identification and selection of the most promising ideas to be developed (see figures 6.6, 7.5, 8.5, 9.5).

As with Concept Selection and Development, Management Portfolio Review is also a highly connected (five connections) routine. It is another vital routine, in which senior management conducts reviews of NPD projects as well as existing products. In addition, the Market and Industry Analysis and Build Business Case routines are considered highly connected, with four connections. Interestingly, these four – the most connected routines – are at the same time the core routines.

²²¹ This is considered to be a partly verified subroutine.

Figure 11.8 shows that four core routines – Market and Industry Analysis, Concept Selection and Development, Build Business Case and Management Review – are the routines most strongly linked to business strategy. The assumption here is that the most connected routines might also be most closely linked to business strategy.

Each of these four routines performs activities which require extensive information, and which thus need connections with various other routines. For example, the Concept Selection and Development routine receives information from Business Planning and New Product Research, transfers information to Product Development, and exchanges information with the Market and Industry Analysis, Build Business Case and Management Review routines. Referring to Feldman and Rafaeli's (2002) notion, the connections made by these routines manifest the interactions between the companies' managers, as they discuss the portfolio of products and coordinate their related decisions. Connections enable information exchange to take place and ultimately create shared understanding (Feldman and Rafaeli, 2002).

The shared understanding generated mainly encompasses ideas about the most promising product concepts and why these products have the potential to be launched. To arrive at a common understanding, managers appear to consider the company business strategy (organisational goals, competitive strategy and capabilities). This relates to what Perks (2007) suggested about *inter-functional integration*, whereby managers from different departments interact with each other in striving for common goals.

The current study has shown that the main link between routines and the espoused business strategy is not formal. At the same time, evaluation and measurement as to whether the processes are aligned with the company's business strategy do not formally exist. The managers seem to relate their decision-making processes unconsciously to business strategy. This aligns with Feldman's (1989) view that in the policy-making process (of which portfolio management is an example), constructive measures can be taken without being consciously coordinated. In such processes, mutual adjustment is employed by managers (Lindblom, 1965 in Feldman, 1989) so that each interaction between them can develop shared understanding about the overall company goals

(Feldman and Rafaeli, 2002). As a result, this sort of mechanism can produce coordinated outcomes (Feldman, 1989).

Routines make connections which enable the creation of shared understanding about the business strategy. In addition, Giddens (1984) suggested that *routinisation* can lead to the forming of trust, an element required in the development of shared understanding.

In conclusion, routines form connections to facilitate a shared understanding about which potential products should be developed. In the course of attaining this common understanding, managers unconsciously incorporate business strategy into their decision-making processes.

11.3.4 Portfolio Management: A Comprehensive Perspective

Comparing the generic palette of routines (Figure 11.7) with the conceptual framework derived from the literature (Figure 2.1) suggests that the palette of routines is more realistic. According to the conceptual framework, it is assumed that new product concepts are already in place; here, portfolio management is centred solely on making portfolio decisions. In contrast, the palette of routines (based on the empirical data) covers the entire range of activities related to portfolio decision-making, covering end-to-end routines, from business planning to product development.

The generic palette of routines contains connections between the routines. These form a network which stores information between actions, which according to Pentland (1999) this kind of information is unidentified in the investigation using other methods (Pentland, 1999). As the key activities in portfolio management are connected one to another, they were identified and are included in the framework. The composition of these routines and the connections within them form a portfolio management capability.

In addition, the framework shows potential linkages from each routine to business strategy (Figure 11.8), including the latter's key aspects – organisational goals, competitive strategy and capabilities (see Figure 11.9) – and its generic elements (see Appendix H). For example, in a Business Planning routine, the organisational goals commonly considered are 'market leader', sales, profitability and growth', and in regard

to competitive strategy are ‘distribution’ and ‘focus on core brands’. Having links to the business strategy will ensure its alignment with a company’s portfolio decisions.

These generic routines provide managers with a broader perspective of portfolio management, namely, that managing the product portfolio needs to go beyond the mere use of tools or methods and include the management of all the aspects of the organisational process: systems, structure and people (Feldman and Pentland, 2005; Schwenk, 1989). Managing these aspects enables a company to provide a more systematic process of portfolio management (Cooper, 2009; Cooper et al., 2004; Khurana and Rosenthal, 1997) .

11.4 THEORETICAL CONTRIBUTIONS

This study has looked into the phenomenon of portfolio management through the lens of organisational routines, and provides new perspectives on how portfolio management is conducted. It also addresses the gaps²²² identified in previous studies, and the main issues around portfolio management, which drove this study²²³.

11.4.1 Organisational Routines Perspective

As described in the systematic literature review (chapters 2, 3, 4), the strategic decision-making perspective suggests that there are three elements involved in process: procedural-rationality, socio-political processes and organisational process (Allison, 1971). An important study by Kester et al. (2011) investigated two elements of the decision-making process – cognitive and power – but under-represented the organisational process element. Moreover, Lant and Hewlin (2002) pointed out that portfolio management involves group decisions which are associated with the cognition of the decision makers rather than with issues of organisational process. In contrast, this study fills that gap by suggesting a generic palette of portfolio management routines (as shown in Figure 11.7) representing the organisational process of decision-making.

Figure 11.7 acknowledges the involvement of the above three elements. The identified routines are deemed to facilitate the emergence of and the interaction between

²²² See research gaps identified in Chapter 4, Synthesis of the Literature.

²²³ See Chapter 1, Introduction.

procedural-rationality and the socio-political process (Royer and Langley, 2008). From a process perspective, Garvin (1998) corroborated this notion, indicating that the organisational process element, *behavioural processes*, is related to the course of actions needed to perform the *cognitive* (procedural-rationality) and *interpersonal* (socio-political processes) aspects of work.

Even though this study did not go as far as to observe the progression of procedural-rationality and the socio-political process, the connections which accommodate the exchange of information (the procedural-rationality element) and the communication between managers performing the socio-political activities (Feldman and Rafaeli, 2002) were identified, as shown in the framework.

11.4.2 Understanding Entirety

As Kester et al. (2011) indicated, the focus of previous studies has been how organisations select and terminate an individual product, rather than examining the entire process. This study, in contrast, not only showed how projects are selected but also unveiled the entire activities involved with portfolio management (Figure 11.7).

The palette of routines demonstrates that portfolio management not only deals with new products but also involves the evaluation of existing ones, and those which are newly launched. It also shows that the selection process is not a single point process, but involves a series of activities. A particularly interesting finding shows that portfolio selection is not carried out only at one stage as most of the literature suggests (e.g. Archer and Ghasemzadeh (1999)); rather it is conducted in stages from the beginning of the portfolio management process onwards, that is, as part of the initial concept selection.

Cooper's important study in portfolio management (Cooper et al., 1999) mainly surveyed portfolio methods used by companies. This study, however, did not show at what point(s) those methods were applied. The palette of routines encapsulates the information concerning what potential portfolio methods are used, as part of what routines they are used, and what they are used for.

Nagji and Tuff (2012) suggested that companies should define their innovation 'golden ratio', that is, the proportions invested in *core*, *adjacent* and *transformational*

products. However, the dynamic nature of the business environment impacts on portfolio decisions, and can cause the acceleration, postponement or termination decisions of NPD projects (Steffens et al., 2007). This is reflected in the findings, which show that the case companies need to adjust their priorities along the way as the environment evolves. As Figure 11.7 shows, a feedback arrow exists from Management Portfolio Review heading to Business Planning. This phenomenon was observed at FoodCo, where product priority listed in the company road map is regularly evaluated as part of the 'Product road map review' subroutine (within the Management Portfolio Review routine category)²²⁴. The result of this review is taken into account in the next Business Planning period.

11.4.3 Discovering Links to Strategy

In contrast to the indication that the linkage between portfolio management and business strategy is often missing (Cooper et al., 1997a; Kandybin, 2009), the findings show that business strategy is considered in all routines to a different degree (see Figure 10.3). It also identified what (key aspects and elements)²²⁵ and when (in which routines) managers normally consider the business strategy²²⁶. These findings at the same time also respond to, as indicated by Camillus (1981), understanding the linkage between business strategy and action planning is one of the weakest points in the strategy studies.

Interestingly, these linkages appeared to be unconscious and informal. This phenomenon seems to reflect the notion that complex problems take advantage of an *unconscious unstructured* decision-making process (Dijksterhuis, 2004; Dijksterhuis and van Olden, 2006). Nevertheless, for the portfolio management process employing both *normative (analytical) approaches* and *judgemental approaches* together is suggested to gain a more transparent phenomenon (Lindstedt et al., 2008; Moenaert et al., 2010).

²²⁴ See Figure 11.9.

²²⁵ Key aspects of business strategy: organisational goal, competitive strategy and capabilities. Each of these key aspects consists of various elements, for example, in FoodCo: organisational goals consists of sales, profitability, growth and market leader.

²²⁶ See Figures 6.7, 7.6, 8.6, 9.6.

This study accordingly attempted to indicate potential links which occur in each routine. Figure 11.8 shows that most core routines in portfolio management are strongly linked to business strategy. In addition, in relation to Section 11.3.1.3 (Figure 11.4), addressing the evidence that formality in routines moderately influences the linkage to business strategy, this study suggests that in each routine, companies should define clearly what elements of business strategy should be considered (see Figure 11.9) and Appendix H.

Kester et al. (2011); Kester et al. (2014) suggested that the decisions made harnessed a portfolio mindset, that is, an overall understanding about the whole portfolio and individual NPD projects, leading to a strategically aligned portfolio. Managers thus should develop this capability, particularly in terms of the routines which require strong linkage to business strategy, such as Market and Industry Analysis, Concept Selection and Development and Management Portfolio Review (Figure 11.8). The current study shows that the management of a large number of projects involve complexity (see Table 8.5). As suggested earlier, the complexity of the decision-making process together with a large number of projects evaluated leads to the necessity of employing information and decision-making support systems (Archer and Ghasemzadeh, 1999; Closs et al., 2008; Kester et al., 2011; Killen and Kjaer, 2012; Lindstedt et al., 2008).

11.4.4 Contribution to Research Methodology

In addition to employing three common data collection methods, i.e., interviews, meeting observation, document reviews, this study used simulation as part of its research. From an organisational theoretical perspective, the first three methods were applied to investigate routines from the point of view that routines are recurrent interaction patterns. On the other hand, a simulation was used to observe routines using a point of view that routines are *dispositions*. This latter view considers routines to be ‘behavioural capacities or capabilities’ (Hodgson and Knudsen, 2004, p.250), stored as procedural memory (Cohen and Bacdayan, 1994).

The simulation was used to identify those parts of routines enacted as a response to the decision-making situation provided (that is, the simulation case). This is aligned with the suggestion of Hodgson (2004) and Narduzzo and Warglien (2008) that routines

are repositories of potential behaviour which can be triggered and emerge to solve a problem. The data obtained was compared with these three sources and also compared across all case companies. This method was useful to compare what the managers said in the interviews and their actual actions recalled from their procedural memory. It thus was able to simulate a small episode of the portfolio management process, i.e., business proposal evaluation and making portfolio decisions.

11.5 MANAGERIAL CONTRIBUTIONS

The current study investigated a number of problems emerging from the literature, including those that had long been identified (Cooper et al., 1997a). These were that poor portfolio management means that projects do not reflect strategy; poor quality portfolios; ineffective gate reviews; inadequate go/kill criteria, scarcity of resources and a lack of focus, and insignificant project. These problems can be addressed by the generic framework, helping managers to undertake more comprehensive NPD portfolio management. In addition, the current study suggested ways for the case companies to respond to their specific portfolio management problems.

11.5.1 Portfolio Management Generic Framework

Figure 11.9 shows the seven routines ('core' and essential') required for portfolio management, and one optional routine, required by companies facing competition which demands the delivery of highly innovative products. The diagram can be used by companies to design their portfolio management based around these seven routines.

Figure 11.9 presents a generic framework of NPD portfolio management, constructed by incorporating the generic palette of routines, the associated subroutines and business strategy. The framework identifies three attributes of the routine: *aim*, *linking to strategy*, and *key activities*. Using this framework, a company can design an appropriate NPD portfolio management process, relevant to the company's context. For example, at a practical level Figure 11.9 provides a checklist which can guide which can guide determining the necessary portfolio management routines. Utilising this generic framework may provide a response to the issue concerning lack of formal process raised by Cooper (2009) and Khurana and Rosenthal (1997).

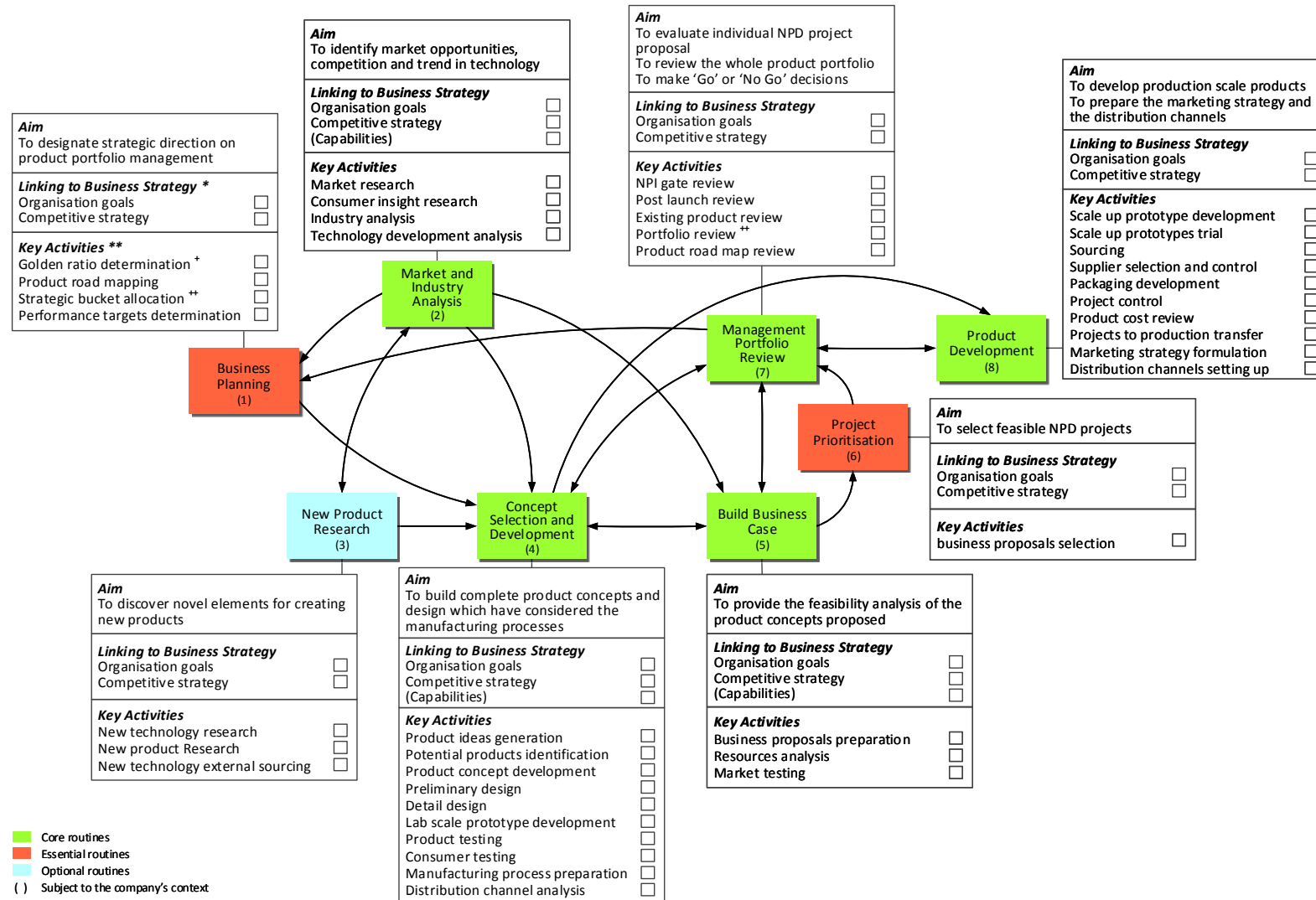


Figure 11.9: Generic Framework of NPD Portfolio Management and Associated Attributes

* Details of the business strategy elements are presented in Appendix H.

** These are strictly subroutines; the term 'activities' is used as it is more familiar to case company managers. These names are modified to generalise the context.

+ Not seen in case company subroutines; this is added from literature by Nagji and Tuff (2012); ** is added from literature by Cooper (2005).

Smith and Sonnenblick (2013) suggested the need to shift from selecting the best project to selecting the best set of projects to fulfil a company's strategy. This leads the management to shift its focus from budget-based to strategy-based portfolio management (Smith and Sonnenblick, 2013). The generic framework formally defines the elements of business strategy present in each routine, and can ensure managers keep aligned with the company business strategy while generating different portfolio options according to the business scenario.

11.5.2 Relating Emerged Insights to Case Companies' Portfolio Management Practices

Based upon the insights which have emerged from this study, this section creates a set of recommendations for each of the case companies (see Table 11.1).

It can be seen from Table 11.1, for example, that although MultiproductCo was found to have the most comprehensive and formal approach to NPD portfolio management, recommendations for improvement can still be made. The six recommendations made by this study are²²⁷:

- 1) MultiproductCo could further enhance its NPD portfolio management by adding the New Product Research routine. This will support the company if it envisions seeking to discover new materials in-house
- 2) MultiproductCo could establish a formal portfolio review subroutine. This would enable the company to evaluate the entire portfolio, which can help the company achieve portfolio balance.
- 3) MultiproductCo needs to determine its strategic buckets. This will lead the company to allocate an appropriate budget which reflects a balanced portfolio.
- 4) MultiproductCo could define its business strategy, and this should be considered as part of each routine and used to formulate instruments for measuring strategy achievement. This will keep the processes aligned with the company's business

²²⁷ Note: an important part of gaining access was the promise that each company would be given feedback by the researcher visiting again to provide specific recommendations (Table 11.1). At the time of completing this thesis, this was planned but had not yet taken place.

strategy, which, in turn, will enable portfolio decisions to be aligned with its business strategy.

- 5) MultiproductCo could consider incorporating portfolio balance and strategic alignment as part of its selection criteria.
- 6) MultiproductCo could tighten the review gates, focusing on prioritised products. This would enable the company to generate an appropriate number of projects. In addition, the managers should pay attention more on new projects rather daily operations²²⁸.

²²⁸ Bentzen et al. (2011) suggested that paying high attention to new projects enables them to be reviewed by managers early in the process; this can lower the risk of having to discontinue the projects later on

Table 11.1: Recommendations on the Case Companies' Portfolio Management Practices

Portfolio Management Key Aspects	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo
1 Routines categories	Include Business Planning and Project Prioritisation routines	Include Project Prioritisation routine To enhance innovation capability, plug in New Product Research routine	New Product Research Routine could be plugged in if the company envisions seeking new materials discoveries	Project Prioritisation could be included if the company develops large number of 'own products' New Product Research routine could be established to continuously provide leading design
2 Formality of the routines	Formal procedures are also required in Build Business Case and Management Portfolio Review routines	Establish formal Project Prioritisation routine	Establish formal Portfolio Review subroutine	Establish formal Business Planning, Management Portfolio Review routines
3 Portfolio management goals				
<i>Value maximisation</i>	Evaluation is based on the portfolio Allocate NPD budgets; start from strategic bucket	Evaluation is based on the portfolio	Evaluation is based on the portfolio	Evaluation is based on the portfolio
<i>Balanced portfolio</i>	Clearly determine the strategic bucket	Clearly determine the strategic bucket	Clearly determine the strategic bucket	Clearly determine the strategic bucket
<i>Strategic alignment</i>	Define clear business strategy referred to in each routine and formulate instruments for measuring strategy achievement	Define clear business strategy referred to in each routine and formulate instruments for measuring strategy achievement	Define clear business strategy referred to in each routine and formulate instruments for measuring strategy achievement	Define clear business strategy referred to in each routine and formulate instruments for measuring strategy achievement
4 Strategic portfolio decisions	Define product road map Allocate strategic bucket	Allocate strategic bucket	Define product road map Allocate strategic bucket	Define product road map Allocate strategic bucket
5 Tactical portfolio decisions	Establish formal stage-gate review and portfolio review	Formalise stage-gate review Establish portfolio review	Incorporate portfolio review in NPI gate review	Apply stage-gate review for own-product initiative projects.
6 Effective portfolio management	Apply various selection methods besides the financial-based ones	Apply various selection methods besides the financial-based ones Establish formal alignment between marketing and R&D	Establish formal alignment between marketing and R&D	Establish formal management review forum, attended by senior management
7 Selection criteria	Include non financial criteria Consider portfolio balance and strategic alignment	Include non-financial criteria Consider portfolio balance and strategic alignment	Consider portfolio balance and strategic alignment	Include non-financial criteria Consider portfolio balance and strategic alignment
8 Problems in portfolio	Build agility in the process by swiftly	Implement product development	Tighten review gates, guided by	Establish formal alignment between

Portfolio Management Key Aspects	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo
management	phasing out those projects no longer appropriate with the market dynamics; this can free up resources.	<p>stages consistently</p> <p>Build a portfolio mindset, by having good understanding of both an entire portfolio and in-depth knowledge of individual projects.</p> <p>Establish stage-gate process</p>	<p>clearer decision criteria</p> <p>Focus more on new projects rather on daily operational tasks</p> <p>Focus on clearer priorities</p> <p>Utilise a portfolio display: e.g. bubble diagram, prioritised projects list</p>	marketing, engineering project and R&D teams

11.6 LIMITATIONS AND FURTHER RESEARCH

This section presents the aspects not considered in this study and the potential development for future research.

11.6.1 Limitations

This study had, of course, a number of important limitations:

- 1) The sample size was only four, which is, according to Yin (2009), the minimum number required for investigating two different patterns of theoretical replications. All of the sample companies are located in one area, i.e., Indonesia. It is an emerging market; however, the nature of its industry leads the product development process to be more market driven rather than technology driven. Among the case companies, CosmeticsCo is an exception, as the company pursues leading innovation in ingredients and formulas.
- 2) This study used organisational routines as the perspective for investigating the phenomenon occurring in the portfolio management processes. Feldman and Pentland (2005) suggested that routines consist of actions, actors and artefacts. This study has looked into these three elements; however, the investigation of *actors* and *artefacts* could have been deeper if these aspects had been more fully incorporated in the interview questionnaire. For example, specific enquiries about who conducts specific activities (actors) could have been made.
- 3) The routines were identified based on an *etic* approach, which solely uses researcher interpretation. An *emic* approach, which involves the perspective of participants, was not simultaneously applied.
- 4) The study used multiple data sources (interviews, meeting observation, company documents and simulation). However, access to the crucial senior management meeting was only obtained at MultiproductCo. The other three case companies granted access to the product development review meeting.
- 5) A *retrospective* approach dominated the research. Evidence was obtained mostly from interviews and documents, much less from observation. The investigation of

routines thus focused only on the activities already carried out (the ostensive aspect), without considering activities being performed (the performative aspect).

- 6) The data analysis (coding) was conducted by one person only.
- 7) The trail of evidence was hard to demonstrate, particularly at the data analysis stage. This is because the ways of analysing the data evolved as part of the analysis process, so that evidence emerging at every step of the analysis was not recorded or documented.

11.6.2 Further Research

Based on the above limitations, a number of areas for further research can be identified:

- 1) A study with a larger sample size needs to be conducted. Potentially, this will be able to improve external validity. In addition, the case companies selected could be ones working to develop a wide range of product types (including those involving both incremental and radical innovation).
- 2) Research applying both etic and emic approaches simultaneously could potentially strengthen the internal validity. When the researcher identifies a company's routines, managers would be asked to identify the routines that they perform regularly.
- 3) Future research should involve more than one researcher, enabling the consistency of the coding could be assessed (inter-rater reliability) to increase reliability.
- 4) New research should include the preparation of procedures to enable a clear demonstration of the trail of evidence, including identifying ways to display the evidence trail at every step of the research.
- 5) A longitudinal ethnographic study, following the portfolio of a particular industry (for example, a fast-moving industry over 1-2 years) would be valuable. It would enable the study of both ostensive and performative aspects. In addition, a longitudinal study could support the implementation of point 6.
- 6) Finally, future research should further the understanding of the strategic decision-making process. It should take the perspective such decisions involve procedural rationality, socio-political processes and routines, therefore investigating how routines shape the interactions between these factors.

11.7 SUMMARY

Product portfolio management is crucial to a company's success and the projects chosen have a direct impact on the achievement of an organisation's chosen strategy. Despite its immense significance in terms of management practice, portfolio management is still not well understood. For example, much of what has been written focuses mainly on individual project selection rather than managing the entire process; still unclear is how to manage the link between the process and business strategy, and the lack of formal process

The systematic literature review showed that there has been no study of portfolio management using an organisational routines theoretical perspective. This is an important perspective, able to uncover not only the formal but also the informal ways in which portfolio decisions are made. The literature review led to three research questions: 1) *How is new product development portfolio management conducted?*; 2) *What organisational routines can be identified in the new product development portfolio management in companies?*; 3) *Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?*

To address the research questions, case study research was conducted in four manufacturing firms based in Indonesia, from the cosmetics, food, consumer and automotive sectors. The study focused on how the firms conducted portfolio management. It used multiple sources of data: semi-structured interviews with directors and managers; inspection of portfolio management process documentation; attendance at a product development meeting; and a simulation exercise which involved observing the approach managers took in selecting a product portfolio.

The findings show that there are a 'palette' of routines connected to portfolio management. From these, seven routines are categorised as 'core' (Market and Industry Analysis, Concept Selection and Development, Build Business Case, Portfolio Management Review and Product Development); two are 'essential' (Business Planning and Project Prioritisation); and one is 'optional' (New Product Research). While in the literature portfolio management is centred solely in making portfolio decisions, the

generic palette of routines covers the entire activities related to portfolio decision-making, covering end-to-end routines, from business planning to product development

The study contributed to theory including employing organisational routines as a theoretical perspective in investigating portfolio management; showing the entire process of portfolio management; discovering the linkage between the process and business strategy and introducing simulation as useful data collection method

The generic framework from the study shows the recognition on the involvement of the elements in strategic decision-making. It not only shows how projects are selected but also unveils the entire activities involved in portfolio management. In contrast to previous studies, this study showed that business strategy is considered in all routines to a different degree. Furthermore, in terms of methodology, the simulation proved effective in identifying which routines emerged in discussions. The simulation generated data that were useful to compare with what the managers said in interviews (and indicated actions based on procedural memory).

The study also contributed to practice by providing a generic framework of portfolio management. The framework is constructed by incorporating the generic palette of routines, the associated subroutines and business strategy. This framework can help managers to design an appropriate NPD portfolio management process, which is relevant to the company's context.

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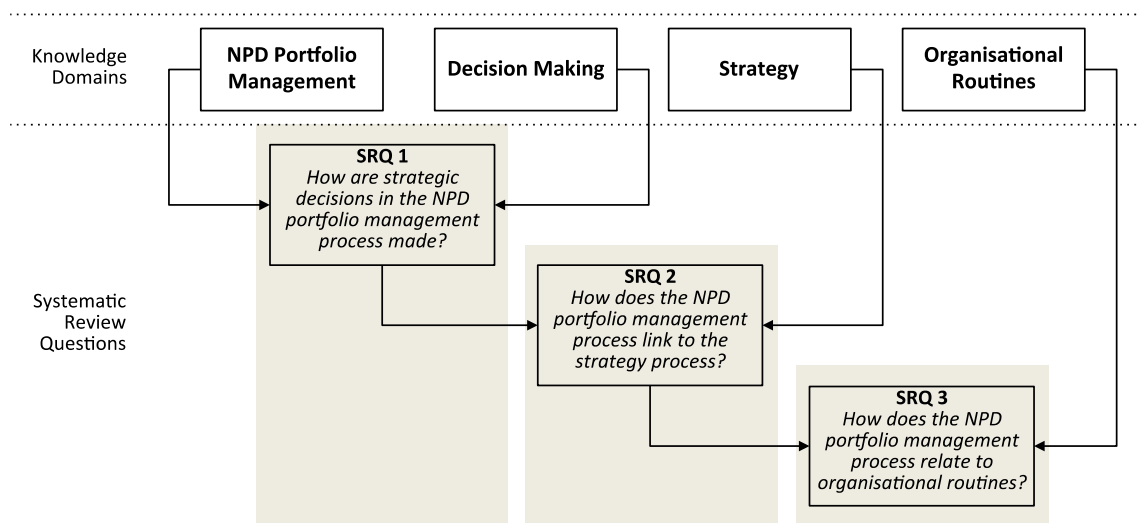
APPENDICES

APPENDIX A SYTEMATIC LITERATURE REVIEW

A.1 INTRODUCTION

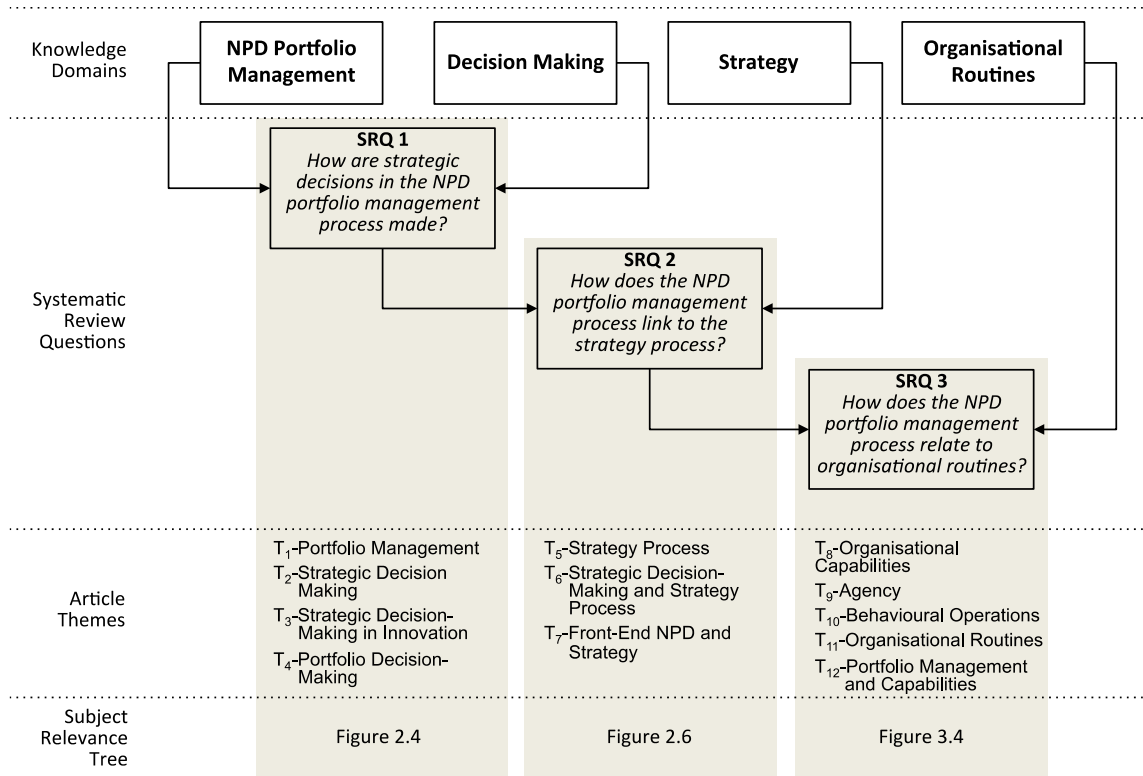
This systematic literature review (SLR) was conducted by Tjaturpriono (2013) aimed to explore the extant literature in *NPD portfolio management* that relates to *decision-making*, *strategy* and *organisational routines*. It was an attempt to provide an integrative framework of NPD portfolio management, which ultimately showed the potential research gaps in NPD portfolio management studies. The review was conducted with specific steps that were evidence-based in nature aiming to answer the *systematic review questions* (SRQs), exhibited in Section A.1.1. 2,058 journal articles were screened through a systematic search and evaluation to obtain 40 qualified articles for the review. The summary of the results of this review is presented in this appendix, including: (1) methodology; (2) descriptive analysis (3) conceptual analysis, and (4) synthesis of conceptual findings.

A.1.1 Framework of the Synthesis of Four Knowledge Domains

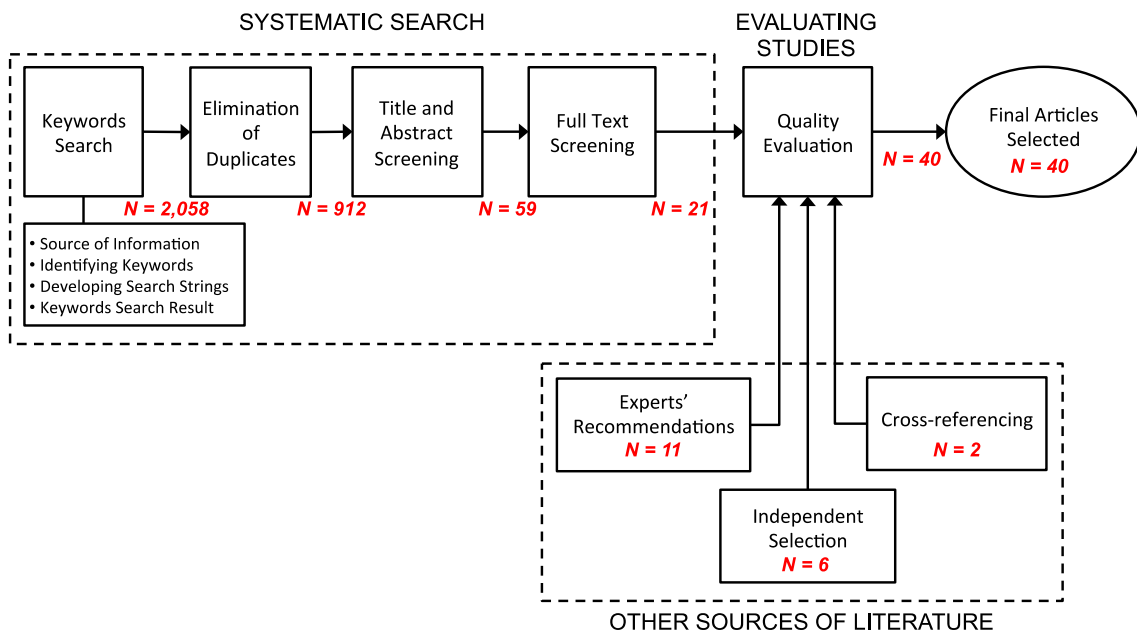


A.2 METHODOLOGY

A.2.1 Conceptual Analysis Framework



A.2.2 Framework of Systematic Search and Evaluating Studies



A.3 DESCRIPTIVE ANALYSIS

A.3.1 Thematic Findings of the Literature Reviewed

	Theme	Description	No. of Art	%	Type of Literature			Research Design		
					PR	TH	ER	Qual	Quant	Mixed
Systematic Review Question 1 <i>How are strategic decisions in the NPD portfolio management process made?</i>	Portfolio Decision-Making	Studies on how decisions are made simultaneously across the full set of NPD projects in development.	9	22.5%	1		8	5	2	1
	Portfolio Management	Focuses on decisions in selecting, reviewing, revising or terminating projects.	7	17.5%	2	4	1			1
	Strategic Decision Making	Focuses on how strategic decisions and actions occur in organisations.	3	7.5%		1	2		2	
	Strategic Decision Making in Innovation	Studies on the key factors in evaluating the strategic innovation projects.	1	2.5%			1			1
Systematic Review Question 2 <i>How does the NPD portfolio management process link to strategy process?</i>	Front-End NPD and Strategy	Focuses on the front-end phases of NPD that are moderated by the corporate's strategy.	4	10.0%			4	2	2	
	Strategy Process	Studies on the overall process of organisational decision-making and organisational change.	2	5.0%		2				
	Strategic Decision-Making and Strategy Process	Studies on the process of strategy making.	1	2.5%			1	1		
Systematic Review Question 3 <i>How does the NPD portfolio management process relate to organisational routines?</i>	Organisational Routines	Studies Routines as the genetic foundation of organisation capabilities.	7	17.5%		3	4	4		
	Organisational Capabilities	Studies organisational capabilities, their evolution and their influences on firm performance.	3	7.5%		2	1	1		
	Behavioural Operations	Studies that use a behavioural approach to view the underlying drivers of operating system performance.	1	2.5%		1				
	Agency	Studies on the components of human <i>agency</i> and the interplay among them within different structural contexts of action.	1	2.5%		1				
	Portfolio Management and Capabilities	Studies on the application of dynamic capabilities to portfolio management.	1	2.5%		1				
Total			40		3	15	22	13	6	3
					(7.5%)	(37.5%)	(55%)	(59.1%)	(27.3%)	(13.6%)

Note: PR = Practice; TH = Theoretical; ER = Empirical Research
Qual = Qualitative; Quant = Quantitative

A.3.2 Empirical Research Information

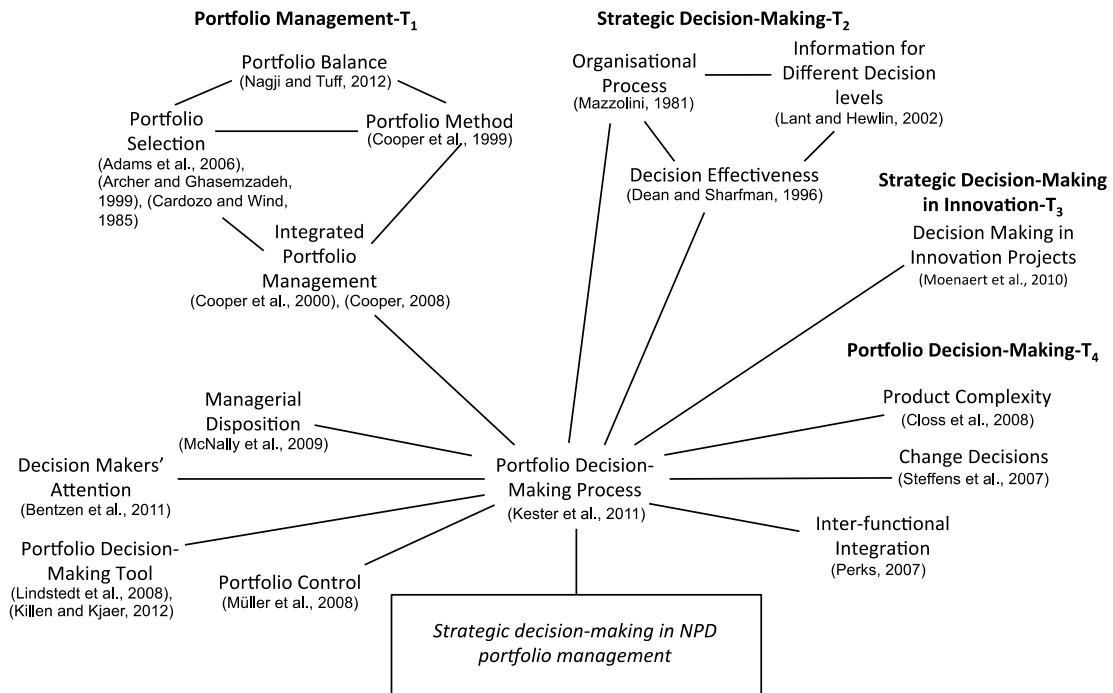
Method	Research Design ²²⁹		#	Sector	#	%	Geography	#	%
	#	Methodology							
Qualitative	13	Single Case	3	Multi industry	6	27.3%	US	5	22.7%
			Multiple Case	10	Telecommunication	2	9.1%	Finland	2
		1		Building materials	1	4.5%	Europe & US	1	4.5%
		1		Home products manufacturing	1	4.5%	US & Japan	1	4.5%
		1		Industrial product	1	4.5%	Europe	1	4.5%
		1		Semiconductor	1	4.5%	Italy	1	4.5%
		Waste collection		1	4.5%	UK	1	4.5%	
			1	4.5%	Global	1	4.5%		
Quantitative	6	Survey	4	Multi industry	3	13.6%	US	2	9.1%
			Experimental	2	Industrial	1	4.5%	Finland	2
		1		Petrochemical	1	4.5%	Denmark	1	4.5%
		1		NA	1	4.5%	Global	1	4.5%
Mixed	3	Sequential	3	Multi industry	2	9.1%	US	1	4.5%
				Telecommunication	1	4.5%	Australia	1	4.5%
							Belgium and Netherland	1	4.5%
Total	22								

Note: #–Number of studies

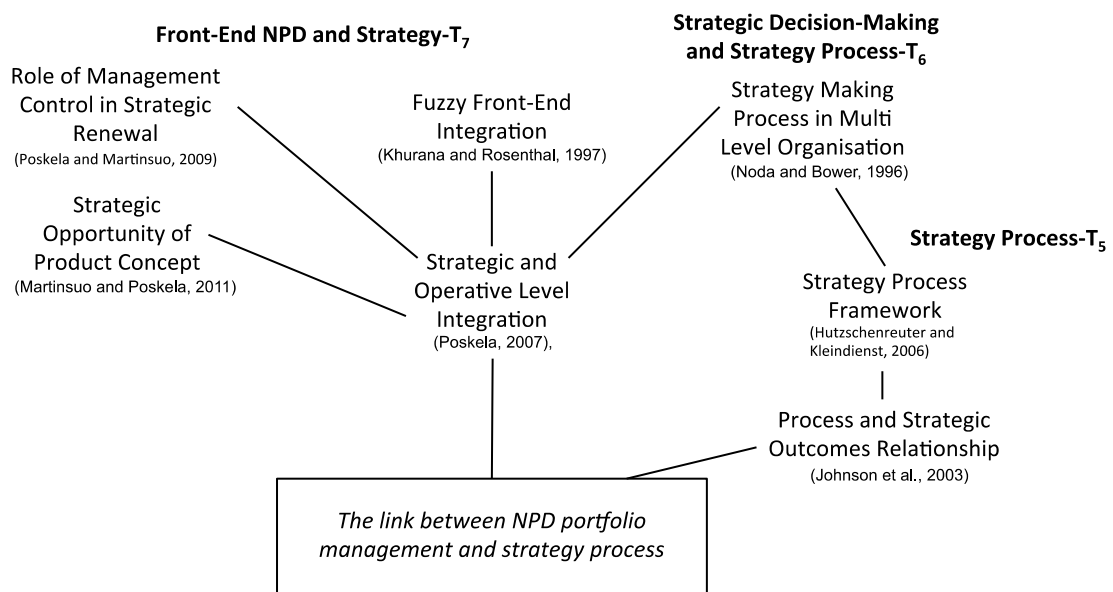
²²⁹Refers to Creswell (2009)

A.4 CONCEPTUAL ANALYSIS

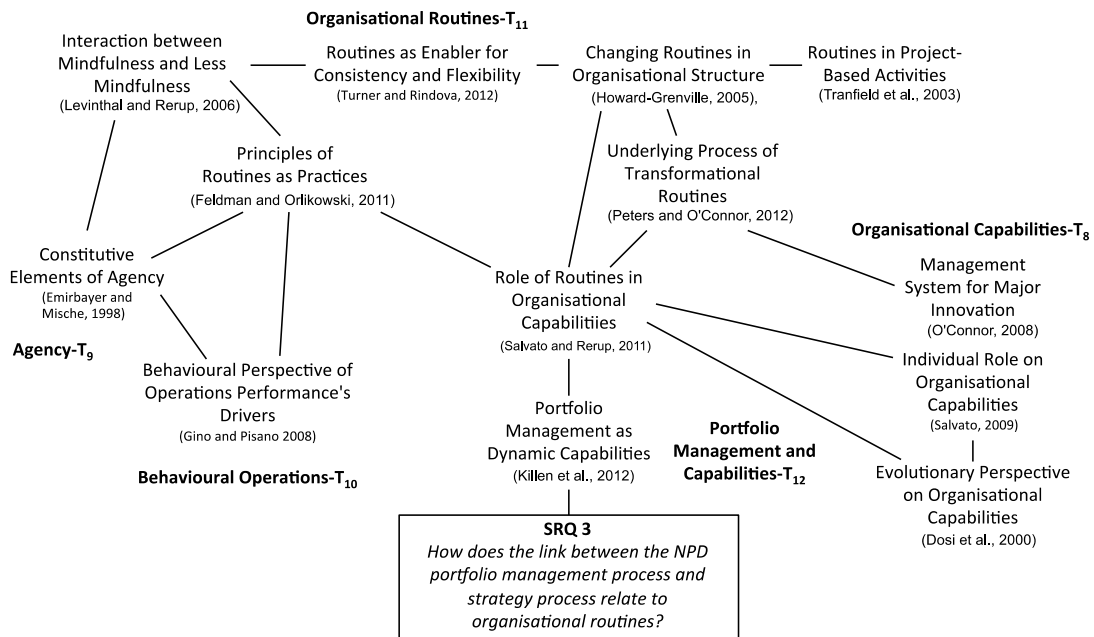
A.4.1 Subject Relevance Tree for the Literature of Strategic Decision-Making and NPD Portfolio Management



A.4.2 Subject Relevance Tree for the Literature of Portfolio Management and Strategy Process



A.4.3 Subject Relevance Tree for the Literature of Portfolio Management and Organisational Routines



A.5 SYNTHESIS OF CONCEPTUAL FINDINGS

A.5.1 Summary of the Synthesis of the Findings

Systematic Review Question	Research Gaps	"Size" of Gap	Research Question
SRQ 1. How are strategic decisions in the portfolio management process made?	<ul style="list-style-type: none"> • Previous studies overlooked the <i>organisational factors (organisational routines)</i> in the portfolio decision-making process • The influence of environmental factors was not clearly considered in the portfolio decision-making process • Decision changes were not incorporated in the portfolio decision-making process 	<i>Partial</i>	RQ 1. How is new product development portfolio management conducted?
SRQ 2. How does the portfolio management process relate to organisational routines?	<ul style="list-style-type: none"> • No previous studies used the concept of organisational routines for investigating portfolio management 	<i>Very significant</i>	RQ 2. What organisational routines can be identified in the new product development portfolio management in companies?
SRQ 3. How does the portfolio management process link to the strategy process?	<ul style="list-style-type: none"> • Previous studies only investigated the link between strategic and operative level processes • No formal mechanisms to form and maintain the links between strategic and operative level processes • The alignment with the business strategy is enabled by the managers' <i>portfolio mindset</i>²³⁰ rather than formal processes 	<i>Significant</i>	RQ 3. Is the company's espoused business strategy considered in the new product development portfolio management (as evidenced in routines)?

²³⁰ "A complete understanding of all of the projects in the NPD portfolio and how each is aligned to the firm's strategy" (Kester et al., 2011, p. 647).

APPENDIX B PILOT CASE STUDY: FOOTWEAR

B.1 INTRODUCTION

This section presents the results of the pilot case study conducted in a London-based company which produces branded footwear. This study, which took place from September to October 2014, consisted of seven interviews, one meeting observation, one experiment and a documents review.

The purpose of conducting a pilot case study is to provide the researcher with an opportunity to evaluate and improve the data collection plans; the lesson learnt about research design and field procedures thus is the essence of this research stage (Yin, 2009). In this study, the results examined included both the main issues being studied and the methodological issues (Yin, 2009). These notions were the basis for conducting and evaluating this pilot study, and are discussed in detail in the following parts of this section: (1) background to pilot case study, (2) data collection, (3) data analysis, and (4) reflections on the research design. This section closes with a summary.

B.2 BACKGROUND TO PILOT CASE STUDY

This pilot case study was conducted at Footwear²³¹, a subsidiary business of Business Group, which owns a number of global brands of footwear and apparel products and is located in North London. The rationale behind the selection of this case company, gaining access to it, and general information about the company are presented below.

B.3 SELECTION OF CASE COMPANY

The selection criteria for a pilot case study are not necessarily the same as those for main cases (Yin, 2009). For this pilot case study, three main selection criteria were considered: (1) the company develops a range of products, (2) the new product development cycle is fairly short, and (3) the researcher had key contact persons in the company. These criteria led to Footwear, which was one out of two companies approached to be the pilot case.

²³¹ Names have been changed to preserve anonymity.

B.4 ACCESS TO THE CASE COMPANY

Access to Footwear Co. was gained through a DBA alumnus of Cranfield School of Management who works for Business Group. A written research summary was presented to the company, followed by the first site visit for an introductory meeting with the managing director and the key contact person. The meeting established the company's commitment to provide access for data collection and assigned the managers who would be the sources of information.

B.5 GENERAL INFORMATION ABOUT FOOTWEAR

Footwear develops three main footwear product groups under the X brand, categorised according to three seasons: (1) Spring/Summer, (2) Back to School, and (3) Autumn/Winter. The company deals with the design and selling of the products in the UK and Ireland; the manufacture of the products is outsourced to manufacturing companies overseas, in China, India and Vietnam.

In term of organisation, the functions directly under Footwear's structure are product development, design, sales and customer support. Some other functions, i.e. finance, supply chain, and marketing, are shared with other subsidiary businesses within Global Group.

The product portfolio (which in the fashion industry is termed 'range planning') is developed following the key milestones presented in the *Seasonal Meeting Framework* shown in Figure B.1 These milestones take place 33 weeks before launch.



Figure B.1: Seasonal Meeting Framework at Footwear

Source: Footwear document (Doc. #10, collected 09-10-2014)

In this document, the milestones are accompanied by the tasks and responsibilities assigned to each managerial function. Developed by the Head of Product, this was not a formal company document.

B.6 DATA COLLECTION

Five visits were carried out to conduct the data collection. Three visits were used for interviews, one visit for meeting observation and one visit for the experiment. Documents and artefacts were gathered during these visits. The data collected from the interviews, meeting observation, experiment, and documents and artefacts are presented in the following parts of this section.

B.6.1 Interviews

The interviews took place on the third, fourth and fifth site visits. Semi-structured interviews were conducted with seven participants, comprising five participants responsible for brand X and two participants who work for brand X, Y and Z. The Managing Director and Head of Product were considered to have strategic roles in the portfolio management team; thus, they were interviewed with a set of questions which enquired not only into the portfolio management process but also into issues relating to company strategy.

Table B.1 outlines the details of each interview, specifically the role and responsibility of each participant, the duration of each interview, the date it took place and the number of pages of the transcripts. Together, the interviews took 522 minutes 51 seconds. All were recorded and were then transcribed, resulting in 165 pages of transcript.

Table B.1: Interview Details at FootwearCo

No	Role	Responsibility	Interview details		Transcript (number of pages)
			Duration (minutes)	Date	
1	Managing Director	Brand X	102:43	03-10-2014	34
2	Head of Product	Brand X	106:34	03-10-2014	33
3	Designer	Brand X	63:07	03-10-2014	18
4	Sales Manager	Brand X	57:46	15-09-2014	18
5	Business-to-Business Executive (customer support)	Brand X	69:17	15-09-2014	21
6	Head of Supply Chain	Brand X, Y, Z	58:26	15-09-2014	21
7	Business Analyst (Finance Manager)	Brand X, Y, Z	64:58	09-10-2014	20
Total			522:51 (8 hrs 42 mins 51 secs)		165

B.6.2 Meeting Observation

The observation took place on the second site visit. It was conducted during the *100% CAD Review* meeting (see Figure B.1) for the Autumn/Winter 2015 portfolio, held in X design room. Nine members of the portfolio management team attended the meeting, namely, the head of product, product development staff, three designers, sales manager, two supply chain staff and one finance staff member. The team reviewed an array of new product concepts developed by the three designers (of the Kids, Mens and Women's range) and made suggestions about the products, including whether and how they were to be developed further.

This meeting took 251 minutes 34 seconds, composed of three sessions (the duration of each is shown in Table B.2). The Kids range designer went through the CAD drawings of the portfolio in the first session, followed by the Mens range designer in the second session and the Womens range designer in the third session. The discussion reviewed a range of issues, namely, colour, shoes material and price. The meeting was recorded, and its recording was transcribed resulting in 106 pages of transcript. In addition, the researcher took notes during the discussion, paying attention mainly to the *nonverbal behaviour* of the participants which cannot be captured by the recorder.

Table B.2: Meeting Observation Details at Footwear

Session	Duration (minutes)	Transcript (number of pages)
1	140:37	62
2	69:20	26
3	41:37	18
Total	251:34 (4 hrs 11 mins 34 secs)	106

B.6.3 Simulation

The experiment took place on the sixth site visit and was conducted in the Business Group's meeting room. In this experiment, participants were not randomly assigned; instead, seven team members had been selected to take part and six actually participated, comprising the managing director, head of product, sales manager, designer, customer support executive and finance staff. A representative from the supply chain department were absent.

The team was assigned to solve a mini case which addressed a problem in how to select an NPD portfolio out of seven potential NPD projects, with a certain budget. This case was adapted from an innovation portfolio case developed for Cranfield School of Management²³². Alongside an outline of the case was provided the risk-reward diagram (bubble diagram) of these potential projects, to support the participants in analysing the portfolio.

Forty-five minutes were provided for the experiment; the team came up with a portfolio decision in 42 minutes 40 seconds. This experiment was filmed and its video recording was transcribed (providing a transcript of 21 pages).

B.6.4 Documents

Eleven documents were collected. Documents 4-8 were provided during the site visits, the remaining three documents were delivered by email. Table B.3 gives details of the collected documents: document number, name, number of pages and description. In addition, a number of artefacts were gathered, including two pages of design drawings, and photographs of the design room (a meeting room), a sample of products and working spaces.

Table B.3: Documents Collected

Doc no.	Document name	No. of pages	Description
1	Men Casuals project Overview	8	High level development plan for men casuals products
2	Strategic overview/Initial Range Planning	32	Overview of previous season products' performance and new season plan
3	Style colour plan	1	List of all types of products to develop
4-8	Product catalogue	234	Promotion materials displaying different types of products
9	Critical path dates	2	Tasks and the delivery dates
10	Seasonal meeting framework	3	Portfolio meeting stages, including the key inputs and outputs
11	Design specification sheet	1	A blank form in MS Excel spreadsheet, consisting field of data as to the product specifications

²³² This case is a modified version of an innovation portfolio case developed for Cranfield School of Management by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

B.7 DATA ANALYSIS

B.7.1 Displaying the Data

Three data displays are presented, encapsulating evidence of coding, coding pattern and variables identification in the experiment.

B.7.2 First-Order Coding

Figure B.2 shows an example of coding from part of the transcript of interview with Head of Product. The first column contains the transcript; the codes and remarks appear in the second column. For example, CUST FEEDBACK code denotes customer feedback, while CUST FEEDBACK→NEW PROD CONCPT indicates that customer feedback relates to (affects) new product concepts.

As the coding proceeded, a model (coding frame) was also formed. This is described in the following part of this section ('second cycle coding')

Transcript	Codes
Head of Product, page 18, 19 of 33	
<p><u>OK. Well once we get the feedback from the current season and we've got the sell-through from the previous season, that gives us a good indication to see, "OK, what works well? What didn't work well? Did we offer too many products? Did we not offer enough?" We can look at different retailers – "Who took what? Who bought into this, was it successful for them, did it sell out well for them or did they have to put it on to discount?" ... we can make a lot of judgements based on having all of that information. I think without having that sort of information it's very difficult to plan around because you need some sort of history to look back on.</u></p>	<p>CUST FEEDBACK CUST FEEDBACK → INITIAL PLAN</p>
<p><u>And then the next part is- I would say is the nicest part, is looking at the future, And looking at, OK, so what happened on the catwalk for Spring/Summer, '15, you know – London-Paris Fashion Week has just been and gone, so there's tons of images now from what's happening with them, and trying pick out, "OK, what's right for "X", and what should we be doing for the new season?" So trying to marry that part together with the numbers part.</u></p>	<p>TREND TREND → NEW PROD CONCEPT</p>
<p><u>And then the other bit, which Martin gets involved in (who just came in then), he looks at it from a very financial point of view, and says, "OK, well if you want- if our target is 20 per cent growth for next year, and you've only added in two new shoes into Men's- that means that you need to sell, I don't know, 10,000 each style to get to that Price?. So have we got enough in the range to ensure that we've got- we can target where we need to be?</u></p>	<p>PRODUCT QTY PREVIOUS RESULTS</p>
<p><u>So it's kind of, bit of- three things. The historical data, the nice design element we want to put in to keep it fresh and nice, and then looking at the budget and saying, "OK, realistically what we might have 17 pink fluffy shoes, but if no one's going to buy them we're not going to get to our 20 per cent growth. So we need a nice black leather shoe and maybe one pink." It's kind of a mixture of all those things together.</u></p>	<p>UNIQUE DESIGN GROWTH PRODUCT MIX</p>
<p><u>So we all sit down in meetings similar to the one you were sat in, but before we get to the CADs [Computer Aided Design] and the designs. We sit in meetings all together, with sales, Duncan, finance, me, supply chain, marketing, and we all discuss all of this and then decide roughly what the plan is going to be.</u></p>	<p>STRATEGY REVIEW PAST DECISIONS</p>
<p><u>So what I normally do is break it down into gender-- so I break it down Men's, Women's, Kids. And then I look at what we offered the previous season and how much of that was bought into. And did we offer too much? Could we have offered more? Like two seasons ago on Women's, I think we only offered eight styles on Women's Spring/Summer '13 but they all got bought into. So then that indicates that actually we could have offered more, because we could have probably seen more getting into the market. So we expanded our Women's range based on what happened the previous season. And that worked, because then Women's has continued to grow.</u></p>	<p>EXPLANATION PREDICTION</p>
<p><u>I make a decision based on that and have a rough plan of where I think we should be, and then discuss it with everybody else. And then we kind of- we pin down a rough plan, and then I hand that over to the design team, and say, "OK, this is what we're looking at – we're looking at 10 new styles on Women's, six new styles on Men's, and it can be based on some new colours of this, five new colours of this for the season." And brief them, very loosely, on what they need to do. And then they go away and do their designing and inspiration, whatever. And then we come back together and they've put together their ideas, so like mood boards and colour, and they've got some samples of what they like. And then we sit and talk through what we like. And we kind of say, "OK, maybe that's not right, but focus more on that." And then they go off again, and that's when they start actually drawing up the shoes. And then we sit together - like the meeting you sat in - that's when we go through all the designs and say that's what we're going to run with.</u></p>	<p>INITIAL PLAN COORDINATION COMMUNICATION NEW PROD CONCEPT PRIORITISATION</p>

Figure B.2: First-Order Coding an Interview at Footwear

B.7.3 Second Cycle Coding

The second cycle coding resulted in a coding frame shown in Figure B.4. The coding incorporated the data emerged from interviews (discussed in the foregoing subsection), the meeting observation and documents, and was guided by the hypothetical coding frame (Figure B.3) conceived prior to the data collected.

This coding frame consists of elliptical and square symbols. The former indicates *codes*, whereas the latter represents *categories of codes*. However, the identified relationships among them are not presented because of layout constraints. Six main categories are presented, i.e. cognitive process, socio-political process, organisational process, business strategy, innovation strategy and environment. Compared to the hypothetical coding frame, there are fewer categories, as some are now part of the cognitive, socio-political and organisational processes.

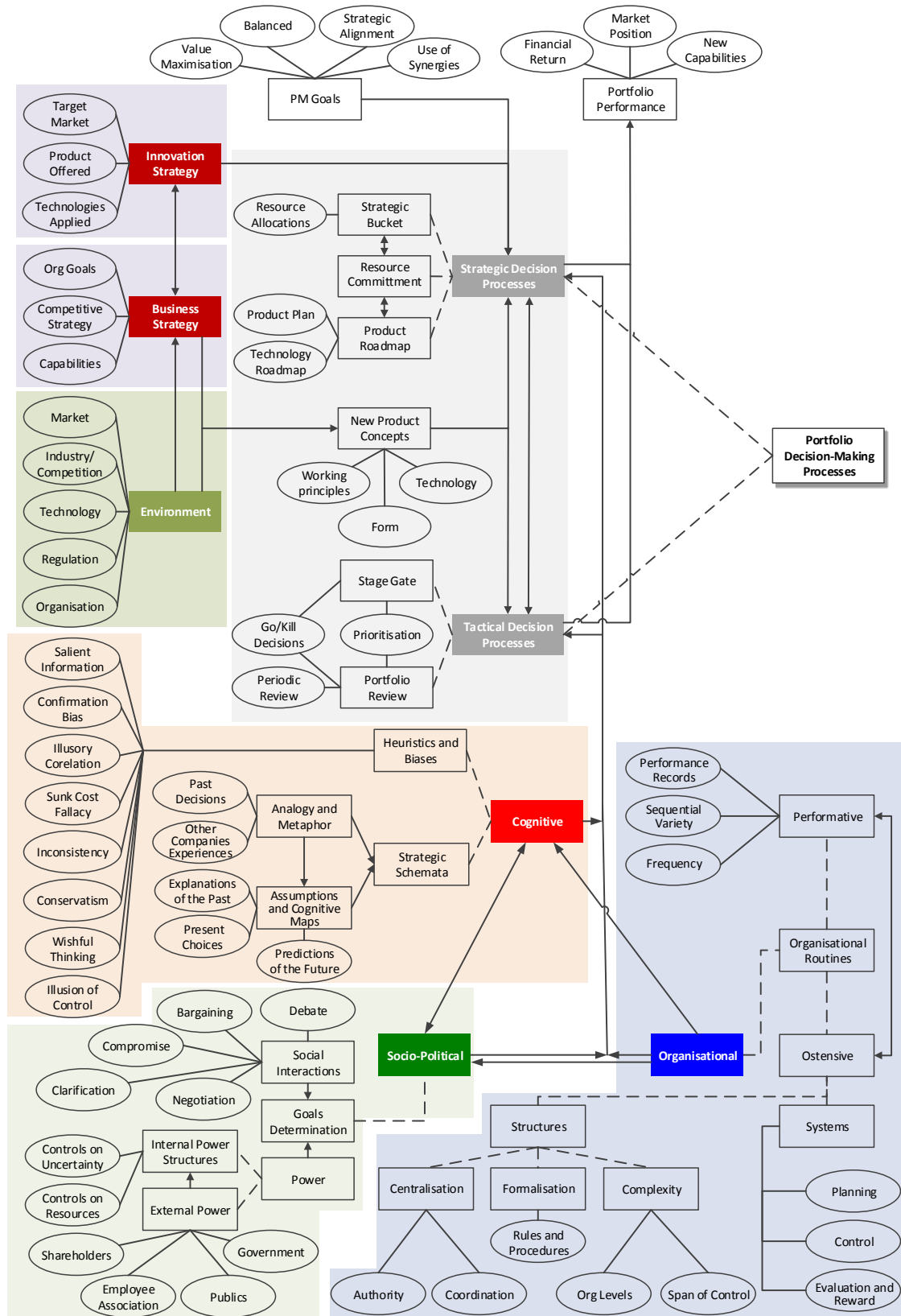


Figure B.3: Hypothetical Coding Frame

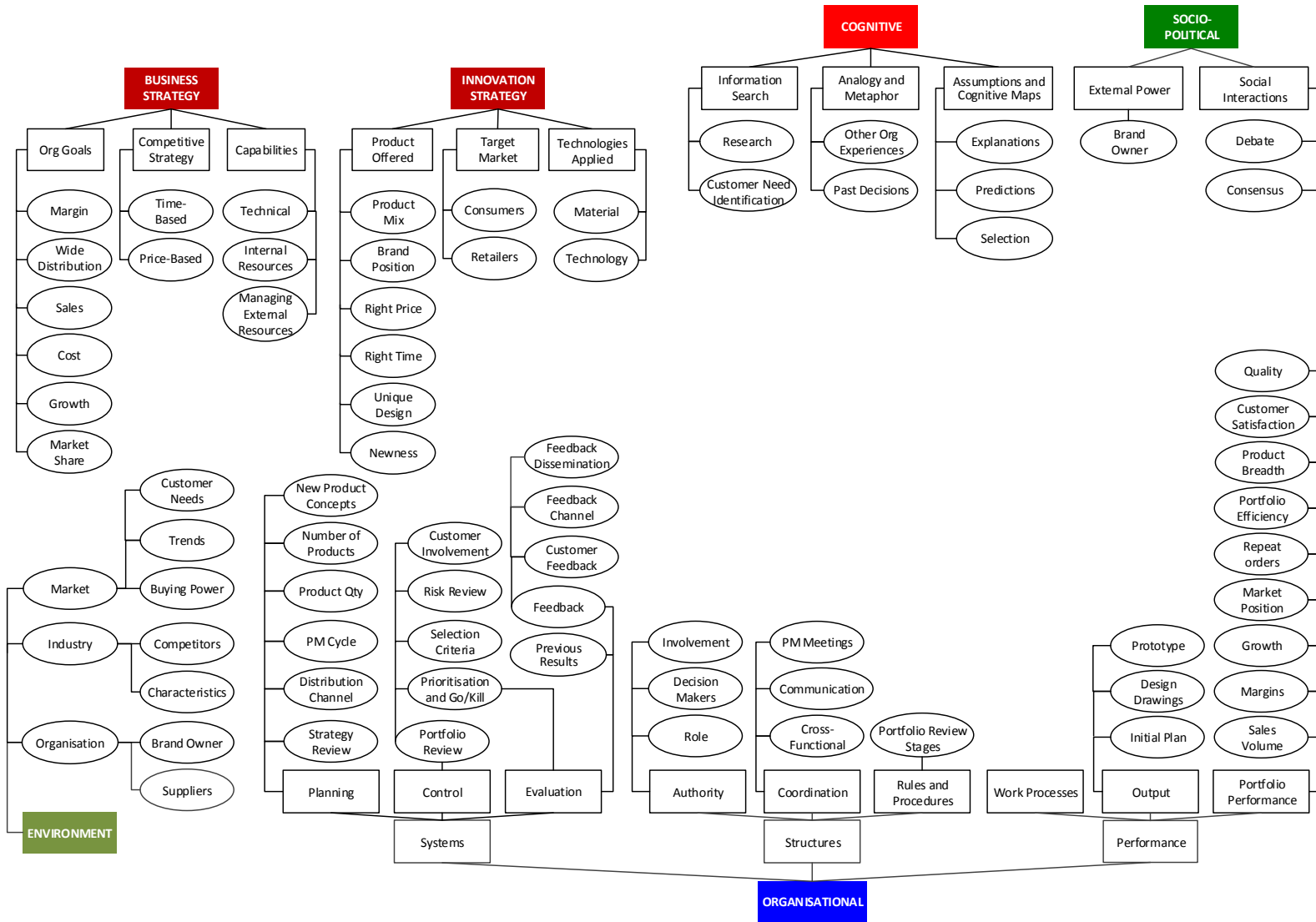


Figure B.4: Coding Frame

B.8 DRAWING MEANING: ANSWERING THE RESEARCH QUESTIONS

The data displays presented in the foregoing subsection are analysed in order to answer the Main RQ: “*How is new product development portfolio management conducted?*” Furthermore, the data analysis is honed to address Sub RQ 1: “*What organisational routines can be identified that underlie the portfolio decision-making processes in companies?*” and Sub RQ 2: “*To what extent is the company’s espoused business strategy considered in the portfolio decision-making processes?*” Evidence from data is presented, including the initial of the participants as the source of the evidence, as follows: CS-Customer Support, DS-Designer, MD-Managing Director, FM-Finance Manager, HP-Head of Product, SC-Supply Chain and SM-Sales Manager.

B.8.1 How the Company Conducts the NPD Portfolio Management

Based on the categories presented the coding frame (B.4), plausible patterns of the portfolio decision-making processes are drawn. Prior to that, the formal procedure of conducting portfolio management (in the company’s term called range building or range planning) is discussed.

- *No formal procedures*

Discussion starts with the issue of whether the company has a formal documented procedure in managing portfolio management:

No [it’s] not really [that it has a procedure], ...there’s not a structure, there’s not a clear process that’s used by every brand. And some brands are better than others. (HP, p.26)

I wouldn’t say there was a formal procedure but there’s a lot of kind of sharing of best practice... I say ‘range building’ - there’s a lot of science behind it and structure, but then there’s a bit of you know, art to it as well. (SC, p.13)

There’s no [documents]- the documents are all different... Everybody uses something different. So there’s no standardised documents. (HP, p.26)

This indicates that the company seems not to have a formal documented procedure for undertaking the portfolio management process. Nevertheless, the Head of Product (HP) employs some conceptual guidance for coordinating the process:

... and it’s my responsibility in a way. I kind of set the process myself, really. (HP, p.26)

It seems that HP's statement refers to *Document #10: Seasonal Meeting Framework* (see Figure B.1). It shows how HP manages the portfolio decision-making process through the six stages of meetings. In the document, *key inputs*, *key outputs* and the *key responsibilities* of each function—design and product, finance, supply chain, marketing and sales—are described briefly (bullet points). This document is more a high level guideline for HP; it is not an official company document or set of working guidelines.

In contrast, a designer (DS) indicated that there is a procedure in place:

The procedures are- well, it would be from getting an analysis from how products have performed in the market place ... So... that is the procedure. (DS, p.12)

It seems that what DS recalled is the company's regular activities in developing new products, which follows a particular schedule, called a *critical path*:

Yes. It's not a document that everybody sees, but... yeh – that is the documented process. But... well, we have a critical path. (DS, p.13)

... there's the published critical path, about what- about all the steps that would need to happen. (FM, p.13)

- *Systems: planning, control and evaluation*

Before new season planning is conducted, the product development team collect feedback from the previous season's performance.

At the end of every season we would then sit down and get the feedback – what's sold well, what's not sold well, why, how do we move it forward. So that's what we do. (SM, p.15) [Feedback Channel]

After that, new season planning is initiated with *Seasonal Kick Off* (Document #10), meeting, which includes responding to the feedback,

OK. Well, once we get the feedback from the current season and we've got the sell-through from the previous season,... we can make a lot of judgements based on having all of that information. I think without having that sort of information it's very difficult to plan around because you need some sort of history to look back on.... (HP, p.18) [Customer Feedback]—>[Initial Plan]

looking at trends,

And then the next part is- I would say is the nicest part, is looking at the future, And looking at, OK, so what happened on the catwalk for Spring/Summer '15... [Trends]

and determining the quantity of the products to be produced:

And then the other bit, which the FM gets involved in (who just came in then), he looks at it from a very financial point of view... So have we got enough in the range to ensure that... we can target where we need to be [Product Qty]

Simultaneously, designers start doing their own research to look at the trends:

...and at the same time myself and the other designers will be doing their research into the current trends going forward that we feel are relevant to the brand. (DS, p.12) [Research]

Seasonal Kick Off is then followed by *Range Strategy Review (Document #10)*:

... before we get to the CADs and the designs... we sit in meetings all together, with sales, [MD], finance, me [HP], supply chain, marketing, and we all discuss all of this and then decide roughly what the plan is going to be. (HP, p.19) [Strategy Review]

which produces an initial plan.

I make a decision based on that and have a rough plan of where I think we should be, ... (HP, p.19) [Initial plan]

Subsequently, several coordination meetings, which are not shown in *Seasonal Meeting Framework (Doc #10)*, take place, led by HP.

... and then discuss [a rough plan] with everybody else. And then... we pin down a rough plan, and then I hand that over to the design team, and say, "OK, this is what we're looking at ... And brief them, very loosely, on what they need to do. And then they go away and do their designing and inspiration... (HP, p.19) [Coordination]

During this period, the designers consider the initial plan together with their research results, which together inform their development of new product concepts.

And then we come back together and they've put together their ideas, ..., and they've got some samples of what they like. And then we sit and talk through what we like. And we kind of say, "OK, maybe that's not right, but focus more on that." And then they go off again, ... (HP, p.19) [Coordination] [New Product Concept]

And then we will amalgamate our information and any other market research... And then we come together and work out exactly what we want to do. And then with the information from [MD]... the limit on how many new offerings we're going to produce

for that season, then we have a good idea what we can do going forward then, for the new season (DS, p.12) [New Product Concept] [Number of Products]

These new product concepts, finally, are presented in the *CAD Review* meeting, attended by all functions—head of product, product development, designer, sales, finance and supply chain. This is a portfolio review meeting, in which the team decide the portfolio to develop.

... and that's when they start actually drawing up the shoes. And then we sit together - ... - that's when we go through all the designs and say that's what we're going to run with. (HP, p.19) [Portfolio Review]

In the portfolio review, the team evaluate and cut off some products if they consider the portfolio range to be too broad.

And it would go to the CAD review and they would put all their ideas down on paper and there would be lots. Now at that stage there might be too much and we would take things out. So we would say, "We don't need that – we actually need this." And then you would go away, and they would take the ideas away from there, and they would have a more defined range. (SM, p.6) [Portfolio Review]

The second biggest thing was around the collections that we had... too much product... I didn't know what the numbers should be, but when we plotted out the graph with the tail, anything that didn't hit minimum for the factory requirements, we just cut the tail off. (MD, p.2) [Portfolio Review]

The main criteria used in taking out a product was solely on the benefits which would thereby be generated:

I think you take each product on the merits of the job it does. (SM, p.10) [Selection Criteria]

There's only two reasons why we would- the main reason why we would kill something is if we don't think it can perform and deliver against expectation and make us some money. (MD, p.25) [Selection Criteria]

B.9 REFLECTIONS ON RESEARCH DESIGN

Conducting this pilot study has provided the researcher with insights concerning to what extent the research design can be applied to the research investigating the portfolio decision-making processes. These insights, which are mainly concerned with data collection and data analysis, are important to ensure the improvement of the next stage of research design.

B.9.1 Reflection on Data Collection

Employing five data sources in this research—interviews, meeting observation, experiment, documents and artefacts—provided the researcher with a rich data set. In terms of practicality, even though different ways of data collection should have been carried out, it was still workable. Nevertheless, a number of points were encountered during the process which need to be considered for the next stage of research design:

- *Interview questions.* Some parts of the interview questions drew information which related only slightly to the research questions. Hence, the next research questions should emphasis more on probing how the *process* of portfolio management and the decision-making are taken place.
- *Meeting observation.* Notes taken during the observation were not rewritten into well-structured descriptions, so that many points were difficult to recall.
- *Experiment.* In the middle of the process, the participants encountered a situation in which they perceived some information differently, e.g. *remaining development cost*. This is because the researcher assumed that the participants had understood that information and so it was excluded in the briefing. For the next research, two points should be considered:
 1. The briefing session should take longer (20 minutes) and include an opportunity for the participants to pose questions. This is to ensure that all participants understand the whole case.
 2. The debriefing session needs to probe the reason for the decisions made by participants on the products chosen. This information will enrich the data related to whether they consider business strategy when evaluating and selecting each product.
- *Data collection instruments.* *Field notes*, *contact summary sheets* and *document summary forms* were part in the research design; in practice, they were not utilised. The unavailability of these instruments impeded the researcher from efficiently seeking particular key points that had been spotted during the data collection process. During the next research they should be fully utilised.

B.9.2 Reflection on Data Analysis

Data analysis appeared to be most challenging part. The following are some important issues encountered during the process which should be considered for the next period of research:

- *Dealing with data.* This pilot study investigated only one company; however the researcher was overwhelmed with the data processing. The time was spent mainly on coding, so that the time left for drawing and writing the “meaning” of the findings was very limited.
- *Coding.* The coding was initially undertaken directly within NVIVO. However, this gave the researcher a sense of loss of attachment to the phenomenon, adding to the prolonging of the process. Then, as it was found that writing codes and remarks in the left and right margins of the printed transcripts was more effective, the process was reversed. Codes were identified and written directly on to the printed transcripts first, and then they were recorded in NVIVO.
- *Experiment.* Two concerns emerged regarding this method:
 1. Applying the QCA method for this pilot study is not appropriate, as the study involved one company. In addition, even though results did emerge from the analysis, it seemed too risky to draw conclusions from these.
 2. The data which emerged from the experiment is too rich if used only for testing a hypothesis. It contained information about events, processes and people which can be analysed to reveal an evolution in the decision-making process. Furthermore, according to Royer and Langley (2008), studying the relationships between cognition, socio-politics and routines in organisational decision-making suggests longitudinal and multilevel research design. Treating an experiment as a simulation of a longitudinal process would therefore provide more impact on both theoretical and practical knowledge.
- *Project management.* The analysis has not been able to incorporate all the data collected because of the limitation of time. For the next stage of research, which will involve a larger quantity of data, the focus should be on simultaneous data collection and analysis, in order to complete the project on schedule.

B.10 CONCLUSIONS

This appendix presents the research design and the results of a pilot study conducted at a London-based company which produces branded footwear. The key results of this study address the research design applied and the practice of portfolio management at the company studied. In addition, the contributions of this study to theoretical knowledge and to practice are discussed.

Case study with multiple data sources—interviews, observation, experiment, documents and artefacts—is appropriate to the investigation of decision-making processes in portfolio management. It provides a rich data set appropriate for analysing the elements which constitute the process. Some key points for the improvement of data collection and data analysis are:

- Data collection:
 - Interview questions need to give greater emphasis to the exploration of how the processes are conducted.
 - Detailed explanation of the case is required during the briefing session before the experiment starts.
 - In the experiment, enquiries into the reasons for the managers' selections should be made in the debriefing session.
 - Utilising field notes, contact summary sheets and document summary forms
- Data analysis:
 - Data from the experiment is more appropriate for use in analysing the evolution of the decision-making process.

Even though the case analysis has not been fully completed, preliminary results present some key findings:

- Although documented procedures for organising portfolio management did not exist, the company has built specific routines in performing the portfolio management process.
- From a planning perspective, the company has established formal and informal meetings to define the portfolio objectives for the next season, covering design concept, range of products, quantity of products, prices and distribution channels.

- From a control perspective, portfolio review meetings play an important role in ensuring the portfolio meets the objectives. More importantly, the portfolio reviews, which are attended by different functions, are routines which appear to maintain the link between the portfolio decision-making process and the company goal. The finance team in particular continuously linked the discussions to company goals. This is understandable, as the company goals are dominated by financial measures (among others, profit, growth and wide distributions).
- From an evaluation perspective, routines to obtain feedback from consumers and retailers are in place. However, these routines appear to be not as well-established as those dealing with planning and control.

Even though these are preliminary results, they provide an indication of the potential of this study to provide significant contributions. From a theoretical perspective, this study steps beyond portfolio techniques by explaining the portfolio management process through the underlying process of decision-making—the cognitive process, the socio-political process and routines (the organisational process). In addition, it provides managers with an understanding concerning the routines currently in places at their companies. This provides them with an opportunity to recognise how to improve the portfolio decision-making process.

**APPENDIX C DATA SUPPORTING CASE STUDY 1-
COSMETICSCO**

C.1 UNVERIFIED FIRST-ORDER CODES AS ROUTINES: CASE STUDY 1-COSMETICSCO

First-Order Codes	Data Sources		
	Int	Obs	Doc
Clinical Trial	●		
Contingency Plan	●		
Creating product concept following the BOD acceptance	●		
Creating Trends	●		
Customer Problem Identification	●		
Discontinue-Stop Purchase-Phase Out	●		
Educating Market	●		
Establishing Counters at Modern Stores	●		
Formula and packaging evaluation	●		
Go-Kill Evaluation	●		
Investment on New Own Shops	●		
Issuing Work Instruction	●		
Linking Decisions with Org Goals	●		
Market attractiveness evaluation	●		
Material Availability	●		
Measuring Brand Awareness	●		
Plan research	●		
Plants Sourcing	●		
Portfolio prioritisation	●		
Price setting	●		
Product development Budget Allocation	●		
Product registration	●		
Production	●		
R&D and marketing meeting	●		
Receiving Complaints	●		
Re-Development	●		
Reporting to BOD	●		
Responding Complaints	●		
Responding Market Dynamics	●		
Safety, Efficacy and Stability Testing	●		
Sample development	●		
Seeking for requests from the channels	●		
Sorting & Distributing Complaints	●		
Sourcing ideas	●		
Technology Evaluation	●		
Utilising Existing Channels (Spa)	●		

C.2 RELATIONSHIPS BETWEEN ROUTINES: CASE STUDY 1-COSMETICSCO

ROUTINES	Market and Industry Analysis	Market research	New Product Research	New product research	Formula collection and research	Concept Development	Creating product concept	Production capabilities evaluation	Build Business Case	Business feasibility proposal	Market test-FGD #1	Management Review	Business proposal evaluation	Existing product review	Product Development	Product development kick-off	Formula development	Packaging development	Product appraisal	Production scale up	Market test-FGD #2	Launch Planning	Placement products using the right channels	Developing marketing strategy	SUPPORTING EVIDENCE FROM DIFFERENT DATA SOURCES
Market and Industry Research																									
Attending exhibitions, seminars							→																		<i>Creation and Development of a New Product (DOC4, p.16)</i>
Market research			↔																						<i>...so the first stage certainly comes from the [market] research, meaning whether the product [ideas] are actually needed or not by consumers. (INT-MM, p.3)</i>
				↔																					<i>...For example, [in the past] R&D was just concerned with conducting research and producing patents—10 to 20 [of them]; however, they didn't get sold. [On the other hand], marketing thought only about selling; they weren't aware that R&D had excellent products. So... [the role of the innovation centre] is to align [the activities of both teams] (INT-DIC, p.7).</i>
Consumer research				↔																					<i>We combine the result of [consumer] research and local potential [that is, ingredients] into a product concept...So we combine consumer research and local potential with global trends. (INT-DSM1, p.14)</i>
							→																		<i>Creation and Development of a New Product (DOC4, p.16)</i>
Colour forecasting							→																		<i>Well, they [the colour consultants] refer to the textile industry, so I know the colour which I'm gonna sell in the next two years. That prepares me for creating all the product concepts. (INT-DSM1, p.13-14)</i>
New Product Research																									

ROUTINES	Market and Industry Analysis	Market research	New Product Research	New product research	Formula collection and research	Concept Development	Creating product concept	Production capabilities evaluation	Build Business Case	Business feasibility proposal	Market test-FGD #1	Management Review	Business proposal evaluation	Existing product review	Product Development	Product development kick-off	Formula development	Packaging development	Product appraisal	Production scale up	Market test-FGD #2	Launch Planning	Placement products using the right channels	Developing marketing strategy	SUPPORTING EVIDENCE FROM DIFFERENT DATA SOURCES	
New product research							→																		<i>Whitening – OK. What does the formula look like – what sort of white aspects should it have? Oh, they are like this – OK, we translate them into a [product] concept. (INT-DSM1, p.19)</i>	
Formula collection and research							→																		<i>...we form into one result the [consumer] research and the local potential [ingredients]; we combine [them] to get a product concept. (INT-DSM1, p.14)</i>	
Concept Development																										
Product selection											→														<i>...products are selected at the beginning of a feasibility [study], ...[they] are determined already [before BOD meetings]... (INT-MM, p.9)</i>	
Creating product concept											→														<i>Well, usually, after all [the product concept creation processes] are finished, then a complete business proposal is made – the one presented to board of directors. (INT-DSM2, p.16)</i>	
																	→								<i>If this [presentation to BOD] gets through, then [marketing] give [the product concept] to us to launch. However, if [the process] hasn't reached that stage, development is still carried out, otherwise we waste time... If we wait [until] the final BOD meeting decides that [product concept] should continue, and only then we start developing the packaging, design, it'll be too late. (INT-MPD, p.3)</i>	
													→												<i>...they [marketing] create a product concept... Normally after that, we conduct an FGDs; we carry out research and FGDs with a number of people.(INT-DSM2, p.16)</i>	
							→																		<i>...the R&D manager has to consider this [product concept], whether it's possible to be developed or not, because it contains high tech concepts or whatever; meanwhile we don't have resources internally... They'll evaluate the production facility aspects as well. (INT-MPD, p.2)</i>	

ROUTINES	Market and Industry Analysis	Market research	New Product Research	New product research	Formula collection and research	Concept Development	Creating product concept	Production capabilities evaluation	Build Business Case	Business feasibility proposal	Market test-FGD #1	Management Review	Business proposal evaluation	Existing product review	Product Development	Product development kick-off	Formula development	Packaging development	Product appraisal	Production scale up	Market test-FGD #2	Launch Planning	Placement products using the right channels	Developing marketing strategy	SUPPORTING EVIDENCE FROM DIFFERENT DATA SOURCES	
Build Business Case																										
Business feasibility proposal														→												<i>Then... based on the business proposal, we discuss, I bring this [business proposal], along with the marketing [team], to the board [of directors]... (INT-DSM1, p.19)</i>
Market test-FGD #1										→																<i>If the panel test gets through, then what's called... the focus group discussion can be carried out... After the brand is disclosed, whether people still want to buy the product or not – that's the marketing task. Then [marketing] develops the business proposal... (INT-MPD, p.2)</i>
Management Review																										
Business proposal evaluation															→											<i>When the BOD has approved [the business proposal], we can provide R&D with a [product] concept... it's kind of the kick-off. "OK, the project can be started." (INT-MM, p.19-20)</i>
Product Development																										
Extract development																→										<i>Creation and Development of a New Product (DOC4, p.16)</i>
																	→									<i>Creation and Development of a New Product (DOC4, p.16)</i>
Formula development														→												<i>Yeah, because sometimes, [the evaluation is based on] the concept ...[and] the evaluation is actually performed by the directors, who don't have any idea what the formula looks like, what the design looks like. [So they need a kind of] mock-up... (INT-MPD, p.3)</i>
																				↔						<i>Creation and Development of a New Product (DOC4, p.16)</i>
Packaging development														→												<i>Creation and Development of a New Product (DOC4, p.16)</i>
															→											<i>Creation and Development of a New Product (DOC4, p.16)</i>

ROUTINES	Market and Industry Analysis	Market research	New Product Research	New product research	Formula collection and research	Concept Development	Creating product concept	Production capabilities evaluation	Build Business Case	Business feasibility proposal	Market test-FGD #1	Management Review	Business proposal evaluation	Existing product review	Product Development	Product development kick-off	Formula development	Packaging development	Product appraisal	Production scale up	Market test-FGD #2	Launch Planning	Placement products using the right channels	Developing marketing strategy	SUPPORTING EVIDENCE FROM DIFFERENT DATA SOURCES
																									...we translate them into a concept; the formulation is ready, and then we [design] the graphics, the packaging. From that we do a market test again. (INT-DSM1, p.19)
Product appraisal																									Creation and Development of a New Product (DOC4, p.16)
Production scale-up																									...the factory has been set up, as well as the raw materials... finally we determine where we're gonna distribute [the products] to... (INT-DDSM, p.10-11)
																									→ Well, after... [the production scale-up] then marketing will carry out the development of the marketing strategy... (INT-MAR, p.2)
Product development progress coordination														↔											Is 'frosty' gonna be continued? (SpF) No. (MPG) That means 'Frosty' will be discontinued? There's still two left. (SpF) It's certainly going to be discontinued. (MPG) Have we informed PPIC it'll be discontinued? (SpF) (OBS-MPG, SpF, p.35) In terms of a meeting, we call a product development progress coordination [meeting], conducted before a BOD meeting held every month. (Email-SupervisorRD, 15-10-2015)
																									↔ The content is OK? According to Ms. 'E' [the formulation specialist], everything's OK, right? Just the container issue remains – just the packaging. (MPG) We wait for the concept from marketing, don't we? (SpF) Yes, we'll redo the [product] concept. (MPG)

ROUTINES	Market and Industry Analysis	SUPPORTING EVIDENCE FROM DIFFERENT DATA SOURCES
	Market research	
	New Product Research	
	New product research	
	Formula collection and research	
	Concept Development	
	Creating product concept	
	Production capabilities evaluation	
	Build Business Case	
	Business feasibility proposal	
	Market test-FGD #1	
	Management Review	
	Business proposal evaluation	
	Existing product review	
	Product Development	
	Product development kick-off	
	Formula development	
	Packaging development	
	Product appraisal	
	Production scale up	
Market test-FGD #2		
Launch Planning		
Placement products using the right channels		
Developing marketing strategy		
	(OBS-MPG, SpF, p.30)	
Launch Planning		

Note: → – One routine affects another routine; ↔ – Interplay between routines

C.3 ROUTINES AND ELEMENTS OF BUSINESS STRATEGY: CASE STUDY 1-COSMETICSCO

BUSINESS STRATEGY	Business Planning	Market and Industry Analysis	New Product Research	Ideas Provision	Concept Development	Design	Build Business Case	Project Prioritisation	Management Review	Product Development	Project Review	Launch Planning	Whole Portfolio Management
Organisational Goals-OG													
Pioneering		●											
Global brands													
Building future products		●	●										
Featuring local resources and culture		●	●										
Market share							●		●				
Market existence			●										
Market expansion													
Margin					●				●				
Growth									●				
Proportions-OG		3/9 (33%)	3/9 (33%)		1/9 (11%)		1/9 (11%)		3/9 (33%)				
Competitive Strategy-CS													
Portfolio					●								
Focus on core brands					●				●				
Promotion							●		●			●	
Distribution												●	
Responsive to market			●										
Availability										●			
Proportions-CS			1/6 (17%)		2/6 (33%)		1/6 (17%)		2/6 (33%)	1/6 (17%)		2/6 (33%)	
Capabilities-C													
R&D human capital													
Lean marketing organisation													

BUSINESS STRATEGY	<i>Business Planning</i>	<i>Market and Industry Analysis</i>	<i>New Product Research</i>	<i>Ideas Provision</i>	<i>Concept Development</i>	<i>Design</i>	<i>Build Business Case</i>	<i>Project Prioritisation</i>	<i>Management Review</i>	<i>Product Development</i>	<i>Project Review</i>	<i>Launch Planning</i>	<i>Whole Portfolio Management</i>
Sophisticated and efficient production facilities													
<i>Proportions-C</i>													
<i>Overall Proportions</i>		3/18 (17%)	4/18 (22%)		3/18 (17%)		2/18 (11%)		5/18 (28%)	1/18 (6%)		2/18 (11%)	16%

APPENDIX D DATA SUPPORTING CASE STUDY 2-FOODCO

D.1 FIRST-ORDER CODING AN INTERVIEW: CASE STUDY 2-FOODCO

Transcript	First-Order Codes
R&D Manager, p.2-3	
<p>Well, ideas from R&D's initiatives get into the phase which is kind of the zero-phase in the seven-stage [framework]. <u>In R&D, for the R&D-driven ideas, we have an avenue called 'creativity days'.</u> In the seven-stage [framework], <u>idea pooling is in stage 1.</u> Idea pooling up until product determination does indeed relate to the business aspect, [while the role of] R&D is as a supporting [party]. We support those [processes]; for example, <u>when Ms. 'K' [the marketing insight general manager] is gonna conduct consumer research through FGD, [investigating] whether a particular product fits [consumers' needs], then we prepare the prototype [of that product].</u> That's a business-driven [process], which can be initiated by management as a top-down project. <u>It can be also initiated by marketing which finds ideas from market, from everywhere. They collect them into a pool of ideas</u> which is then processed. Well, if a technological aspect is driving the emergence of a new product, [then the ideas] can be from R&D.</p>	<p>Creativity days</p> <p>Idea pooling</p> <p>Consumer insight research</p> <p>Consumer insight research ↔ Developing lab scale prototype</p> <p>Developing lab scale prototype</p> <p>Idea pooling</p>
<p>In existing product improvement, they [manufacturing] keep the production of existing products steady. They also give input [on how to make the process] more productive, [to get higher] productivity. So it's concerned with the efficiency aspect, which helps production to be more efficient, [to reduce] costs. [The inputs also include] material substitution because of the material shortage; the production obstructions which cause high number of personnel which could lead to a high cost [process]. So [we consider] how to simplify the process. <u>During this existing process, if they come across new ideas after carrying out observations, then they can channel those ideas through NPRD [that is, new product research and development]</u></p>	<p>Existing product review</p>
<p>Every FoodCo employee has the opportunity to present their ideas. Even though the ideas we get are not that many, <u>every year, we normally ask everyone to submit ideas, which we then screen by looking at their alignment with the company's vision and mission.</u> We also prioritise ideas which will utilise existing machineries; so ideas which require new investments get lower priority. Nevertheless, <u>we give a portion [of the score] for the strength of the ideas; so we combine those factors. After that, we present the prototypes to Marketing; they select them and give the approval. We place those ideas into the idea pool. Well, that's the R&D-driven [new product development projects].</u></p>	<p>Idea pooling</p> <p>Idea screening</p> <p>Idea screening → Developing lab scale prototype</p>

D.2 ROUTINES IN PORTFOLIO MANAGEMENT: CASE STUDY 2-FOODCO

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Product road map prioritisation	●	●	<p><i>STAGE II-Alignment Analysis: Develop a matrix of product categories</i></p> <p><i>Develop a road map for 5 years (DOC2, p.1)</i></p>	<p><i>...we always [try to] foresee where we're going to be in five years ahead... OK, total [the sales target] [for example] is 10 billion [rupiahs]²³³ within certain years... we allocate it to different [product] categories..., what [is the sales target] we can derive for 'B' category... for 'S'²³⁴; whether we need to enter new categories... we call this a road map. (INT-CFO, p.4)</i></p>	<p><i>There's a road map [for product development] for 5 years ahead... and marketing prepares the outline of it... [actually], everybody prepares it. I [supply chain department] also make [the road map of the facilities] for supporting [the development]. (INT-MSD, p.12)</i></p>	<p><i>From those four categories... [in the prioritisation], we actually look at their potentials, market size, and then we make a road map... So, what sort of products should be [developed]? (INT-CEO, p.7)</i></p>	
Business planning	●		<p><i>We have legendary products... nevertheless, we still have to launch their variances every year... If it's decided to increase [the revenue], that means that the business needs to grow. Meaning that [we should determine] how much we target our business to grow every year... (INT-DF, p.3-4)</i></p>	<p><i>...[management] direction is already there. For example... this year there are new products; how many products and what the categories are is already set out. A sort of plan is already in place every year... (INT-MF, p.10)</i></p>	<p><i>...when we compose, what's it called? a business plan, the marketing people certainly join [in its preparation]. Once they join, then we know what projects they have... (INT-GMM2, p.9)</i></p>	<p><i>...actually, from the road map we turn it into a yearly business plan... (INT-CEO, p.3)</i></p>	
Market research	●	●	<p><i>Certainly, that one, [which is the step in determining new products], is identifying market potentials. (INT-CEO, p.5)</i></p>	<p><i>We always do market surveys, market insight... anyhow, [we utilise] various kinds of data; it could be secondary, could be primary [data]. (INT-CEO, p.5)</i></p>		<p><i>Innovation Funnel–Marketing Responsibilities: STAGE IV Market Insights–Consumer & Market Insight Studies (DOC2, p.1)</i></p>	
Consumer insight research	●	●	<p><i>...This study aims to understand the emotional aspects of a [product]</i></p>	<p><i>Innovation Funnel–Marketing Responsibilities: STAGE IV Market</i></p>	<p><i>...the idea pooling [stage] up until product determination is [related to]</i></p>	<p><i>...from the research aspect, like consumer insight, finding latent</i></p>	

²³³ The Rupiah is the currency of Indonesia.

²³⁴ 'B' and 'S' are the name of product categories.

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>category in terms of consumer perception... (INT-MCNI, p.11)</i>	<i>Insights-Consumer & Market Insight Studies (DOC2, p.1)</i>	<i>business aspects, while, we [in R&D] are a support [function]. We support, for example, when Ms. 'K' [the marketing insight general manager] is gonna conduct consumer research [investigating] whether a product fits [consumers' needs]...]. (INT-MRD, p.2)</i>	<i>[needs] is actually difficult, because at that point in time, ... [the consumers] don't know [their needs]... So we need to probe [them], [and then] we anticipate them. (INT-GMM2, p.6)</i>
Industry analysis	●	●		<i>... in stage 1, [we] just want to see the industry, [so as to consider] whether we want to enter it or not – [Whether] we have already got into, it or we haven't got into it but will get into it. Well the 'Porter analysis' will step in to that [discussion]. (INT-GMM1, p.6)</i>	<i>Innovation Funnel–Marketing Responsibilities: STAGE III Intermediary Screening-Determine Industry and Company Key Success Indicator (DOC2, p.1)</i>	<i>... when Ms. 'K' [the marketing insight general manager] is gonna conduct consumer research through FGD, [investigating] whether a particular product fits [consumers' needs], then we prepare the prototype [of that product] (INT-MRD, p.2)</i>	<i>Actually, in the funnelling process, the first thing is concerned with what kind of industry we're gonna enter... [once] the industry is clearly [defined], then we seek which [market] segment we're gonna aim for... (INT-GMM2, p.1-2)</i>
Technology development analysis	●			<i>...[we need to identify] what kind of technology has been trending recently... so we have ITD [innovation technology development]. They are ones responsible for determining the most appropriate technology. (INT-DM, p.9)</i>			<i>...sometimes we can start by visiting machinery exhibitions, from which we also gather ideas. "Oh apparently, this kind of machinery does really exist"... in addition, besides developing from market size, we can take the opportunity from the machinery offered [to the company]... (INT-MF, p.10)</i>
Creativity days	●			<i>Well, the ideas come from R&D, as the initiative of R&D, can also be counted; however, these emerge in the '0' phase within the seven stages [of new product development]. So in R&D, for R&D-driven [purposes], we have a medium we call 'creativity [days]'. (INT-MRD, p.2)</i>	<i>So... [R&D] also provide ideas. We have what we call a 'creativity day' which we organise two to three times a year. (INT-GMM1, p.6)</i>	<i>We have a 'creativity day'; R&D and manufacturing people propose [ideas] for [new] products. (INT-DM, p.11)</i>	<i>...The samples [of new products] are already there; then they're scored [according to] whether these products are OK or not. Ones with the highest score will be placed in the seven stages [of the product development process]. (INT-DM, p.11)</i>
Idea pooling	●	●		<i>...either top management's [ideas], marketing-driven ideas, or the ideas they get from the consumer, all of them are combined with the R&D-driven and manufacturing-driven</i>	<i>Innovation Funnel–Marketing Responsibilities: STAGE V Pool Idea (DOC2, p.2)</i>	<i>Well, for new categories, normally a special project leader is assigned; he or she is normally from the business development [division]. For existing categories, [the project leader] is</i>	<i>Every year, we ask everyone to raise ideas; we then screen these ideas according to the vision and mission of the company... (INT-MRD, p.3)</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>ideas, forming a pool of ideas...</i> (INT-MRD, p.4)		<i>normally a brand manager or marketing manager. Well, that's who manage that process until coming out with the products we're aiming for. They put forward these products [ideas] as a new product request.</i> (INT-MRD, p.2)	
Open innovation	●			<i>...in open innovation we don't need... to develop [product ideas] on our own; instead, we can buy them from outside [such as] from universities or [by] taking over companies...</i> (INT-DSP, p.1)	<i>...we intensively conduct ...what we call open innovation. Open innovation establishes cooperation with universities or consultants...</i> (INT-CEO, p.10)		
Idea screening	●				<i>Every year we ask everybody to generate ideas; then these ideas are screened according to company's vision and mission. [they] are prioritised based on machinery availability.</i> (INT-MRD, p.3)	<i>...After [the ideas] come in to R&D, we form a team [and] screen them, first based on whether the machinery is capable of [handling the idea], whether they have potential, so that they're appropriate ... [in terms of] the 22 [prioritised] categories.</i> (INT-MRD, p.16)	
Developing product concept	●		●	<i>Stage V: Execution for Internal Growth Determine Product Concept: Determining the product concept from product ideas which potentially become NID [or New Idea Development] based on the results of Consumer Insight Studies. [The product concept] describes the specifications of the product, its packaging, market potential and benchmarking.</i> (DOC2, p.6)		<i>...the [product] improvement idea is brought in to a meeting forum. Marketing determines whether the LOA [or Level of Acceptance] improvement should be worked out or not. In upgrading the level of acceptance, we occasionally need to change the flavour and that kind of thing, related to the product concept. This is R&D's responsibility.</i> (INT-MRD, p.11)	<i>When the [product] concept developed by R&D enters real production, it might not match 100% with [the production requirements]. It sometimes need reformulation...</i> (INT-DM, p.21)
Formulation preparation	●		●	<i>We create a formulation, a technical formulation...</i> (INT-MRD, p.14) <i>The technical works include searching for the formulation</i>	<i>STAGE V: Pool Idea-Formulation Readiness</i> (DOC2, p.2)		<i>[Marketing insight] has its own market audit. So we can ask 'Please check this, check that'... From that we contact R&D colleagues, to ask 'Would you do research [to develop]</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>references.</i> (INT-MRD, p.13)			<i>these [products]?'</i> (INT-CEO, p.5)
Developing laboratory scale prototype	●	●	●	<p><i>...we create the prototype [of the product] in R&D, a lab scale one. [After] R&D delivers the lab scale prototype, we organise a workshop, [performing a test on it] (INT-DSP, p.3)</i></p> <p><i>Stage V-Pool Idea: Lab Scale Prototype Development RANK A – R&Q (DOC2, p.2)</i></p>	<p><i>...and then from [formulation development], we normally come up with a prototype. (INT-GMM2, p.2)</i></p>		<p><i>...when we're about to conduct consumer research, doing an FGD to examine if a product fits [consumer needs], we [R&D] will prepare the prototype. (INT-MRD, p.2)</i></p>
Panel test	●	●	●	<p><i>There are different steps [in product development]. For example, a consumer test, a product acceptance test. For these, we have a particular standard; for example, [the score of the] product acceptance test should be 3.5; below 3.5, [the product] shouldn't be launched. (INT-CEO, p.6)</i></p> <p><i>Stage V-Pool Idea: Lab Scale & Internal Panel test (DOC3, p.5)</i></p>	<p><i>Normally, before we launch a product, the [product] concept [undergoes] an acceptance test. The acceptance test is conducted by a panel, using either qualitative or quantitative [methods] (INT-MCTI, MD, p.17).</i></p>	<p><i>So in our SOP²³⁵, the requirement a product to be launched is that it should be approved [by a panel] with a minimum score of 3.5. The assessment is carried out by a panel... [in which the members] are from these two buildings [of FoodCo's office]; the number of population is around 300. (INT-MRD, p.7-8)</i></p>	<p><i>From there, when [the product] is already approved, we stock the formulation. Then when it goes to the next phase, we start to communicate with manufacturing. (INT-MRD, p.15)</i></p>
Brand positioning	●	●	●	<p><i>The product portfolio is managed based on how the brand would be positioned... Marketing does the positioning, and it needs to be approved by the CEO. (INT-GMMI, p.2)</i></p> <p><i>Innovation Funnel–Marketing Responsibilities</i></p> <p><i>Stage V-Pool Idea: Brand Communication Plan. (DOC2, p.2)</i></p>	<p><i>After [market] segmentation, we normally provide the positioning of each segment to marketing... (INT-MCNI, p.2)</i></p>	<p><i>Marketing and business development are the ones who determine [the brand position]; however, marketing is the project leader. (INT-GMMI, p.3)</i></p>	<p><i>After [market] segmentation, we normally provide the positioning of each segment to marketing. Then, [based on this information], marketing will determine how they position each brand (INT-MCNI, p.2)</i></p>
Distribution channel	●	●	●	<p><i>...our strategy [should show] what</i></p>	<p><i>With every new project initiative, the</i></p>	<p><i>...companies should think about how</i></p>	<p><i>Initially, when marketing develops a</i></p>

²³⁵ Standard Operating Procedure.

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
determination				<i>we want to do – whether our target is to put our products through every channel or selected channels (INT-MCT1, p.15) Innovation Funnel: Stage V-Pool Idea: Distribution Plan. (DOC3, p.5)</i>	<i>things needing to be analysed include manufacturing capability and distribution – whether the channel management is the same... (INT-GMM2, p.1)</i>	<i>to determine which channels suit the products we’re gonna launch. This is one of my [customer insight manager’s] tasks; besides this, afterwards, measuring how these products perform in the market. (INT-MCT1, p.2)</i>	<i>new product, they have certainly determined what product they wanna develop, what segments they’re gonna enter, which the target [markets] are; they’ve also[defined] which channels they’re gonna use. From there, only then [the responsibility] goes to the distributor team... (INT-MD, p.1)</i>
Packaging design	●	●	●	<i>The other day, we actually chose [to have] just the wrapping because of the cost [consideration]. To be honest, this one is, indeed, more attractive in terms of exclusivity; however, it’s costly, just for tertiary packaging. (OBS-MB, p.28) Innovation Funnel–Marketing Responsibilities: STAGE V-Pool Idea Existing facilities: Start packaging design New facilities: Start packaging design (DOC2, p.2)</i>	<i>[After] R&D delivers the lab scale prototype, we organise a workshop... In the meantime, we work together with Packaging Development to figure out how the packaging should be. (INT-DSP, p.3)</i>	<i>...for packaging, normally, marketing work together with the designer. We, [the distribution team],... provide no major inputs; no major... (INT-MD, p.5)</i>	<i>When I surveyed kids, apparently [I found that] they didn’t look at the content, they [instead] considered the packaging. So, if there’s some that’s new and attractive, they must try it. Well, because of that we design the packaging as cute as possible... (INT-GMM1, p.26)</i>
Technology and process preparation	●		●	<i>Innovation Funnel–Marketing Responsibilities: STAGE V-Pool Idea Existing facilities: Technology and Process Readiness New facilities: Technology, Process & Facility Readiness (OEM/Invest) (DOC2, p.2)</i>	<i>From there, when [the product] is already approved, we stock the formulation. Then when it goes to the next phase, we start to communicate with manufacturing and our partner, especially the R&D BU, [the business unit], to prepare this line’s equipment. (INT-MRD, p.15)</i>	<i>Then we also consider... whether the production facility is available or not; [for that] we involve Manufacturing. There’ll be no problem for existing products for which the machineries are already in place. But for the products we haven’t produced before, completely new, we work together with Manufacturing to buy new machineries; [determining] where we put them and what the production process should be. (INT-DSP, p.3-4)</i>	<i>Sometimes an investment is required – “Oh, we lack equipment”. Then we organise meetings with Manufacturing, or our colleagues sited there arrange meetings with them. [This coordination] may result in the decision that there should be an investment. (INT-MRD, p.15)</i>
Feasibility study	●		●	<i>Financial Feasibility Study: Analysing feasibility using various financial</i>	<i>At the beginning of a feasibility study, we state that we aim to gain</i>	<i>When we’re gonna launch a new product, we form a [project] team,</i>	<i>This FS is concerned with various aspects, from end to end, [including]</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>measurements such as NPV, IRR, payback period, ROI. (DOC2, p.6)</i>	<i>so much [turnover]. [At this stage], profitability is not yet considered as a success factor in NPL. We look more at delivery time, distribution and turnover. (INT-GMM2, p.15)</i>	<i>where its leader is from business development... We prepare the FS, the feasibility study. The leader is the one who prepares the FS... (INT-DSP, p.5)</i>	<i>the manufacturing process, marketing, finance, the costing is like this, the selling would be like this, the legality of the brand is OK, the [registration with] [the Food and Drug Administration] is being processed. They're all involved in there (INT-DSP, p.5)</i>
Food forum	●			<i>The food forum is for discussing new product launch projects; [from] end to end, from consumer insight [research], technology [analysis], R&D up until marketing [planning]. (WAM-GMMI, 26-04-16)</i>	<i>The food forum is actually a regular meeting at which we discuss projects, mainly new product launch [projects], not existing products. So it's for NPL... held once a month. (INT-MRD, p.27)</i>	<i>The ones involved [in food forum] are the Manufacturing, Research and Development group, including Engineering, QS, then, Business Development and sometimes it's attended by directors. (INT-MRD, p.27)</i>	<i>R&D and Marketing gather in the food forum. New ideas and other things are sometimes discussed there, including monitoring some processes which are running. (INT-DF, p.13)</i>
Post launch review	●	●		<i>[Marketing] must be also looking into the amount of sales achieved... whether those from NPL are saleable or not. We can observe it; we can push [their sales]. Certainly, we discuss it in the forum; but the discussion is led by marketing. (INT-DF, p.10-11)</i>	<i>Ideally, within three months, then after six months, and one year, we monitor new products launched. [What] we normally monitor are, firstly, awareness; [which measures] to what extent people know about the newly launched product. Then, the second one is the trial rate; [this shows] what percentage of people who know about [the product] are interested to try [it]. (INT-MCNI, p.7)</i>	<i>...every week we review [the launched products]. In [week 1] [we review] how much the sales are, then what the advertising is like. [The review continues] until [evaluating] how much the sales out are, how much the [gross profit] is. Every Monday we review them with CEO. (INT-GMMI, p.12)</i>	<i>Stage VII NPL: Commercialisation-Business Monitoring (New Project Management); Marketing Activity Monitoring; Sales Monitoring; GP Monitoring; Quality Monitoring; Utilization Monitoring. (DOC2, p.3)</i>
Existing product review	●			<i>...looking at the development of the product itself in the market. Looking at its development means that [analysing] whether, after some years, their growth is good, or going down, or whether we're gonna phase out or what? (INT-MCTI, p.12)</i>	<i>Yes, that's how the product cycle should be. While we can rejuvenate some, others disappear... For example, the [coated peanuts]: it's an old product – we rebrand it [so that] [its sales] rise again. (INT-DF, p.10)</i>	<i>[Marketing checks] each NPL so those which haven't contributed that much are considered failed; for example, product 'L'... [its contribution] hasn't achieved that much...; later on, management will just make a decision whether it's able to grow that much, otherwise I'll kill it. (INT-GMMI, p.9-10)</i>	
Brand tracking	●			<i>We also have [a process] called weighted distribution. How strong does a brand sell in the outlets? The</i>	<i>In the brand tracking study, we trace the health of our brands and compare them to our competitors'.</i>		

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>stronger a brand... the more it sells. We can only observe a numeric distribution. It happens... for example, a product sells very well in one store but the numeric [distribution] is very low, that is, the penetration is low. This means we have the potential to increase our sales using additional stores...</i> (INT-MD, p.21)	<i>Usually, we also check how the new launched [products perform].</i> (INT-MCNI, p.7)		
Product road map review	●			<i>Much earlier we made a road map. That road map however wasn't very detailed, so things might change [along the way].</i> (INT-GMM2, p.3)	<i>[There's] a lot of meetings [conducted] every week; for example, every Monday we and the CEO review the 22 [prioritised] items.</i> (INT-GMM1, p.10)		
FDA Registration	●	●	●	<i>So, MD is a critical [element]. We can't launch [the product] without MD.</i> (INT-DSP, p.6)	<i>STAGE VII Production Legal doc. & Preparation Registration – RANK A MKT MD, Halal (DOC2, p.3)</i>	<i>Then one legal aspect R&D need to fulfil is registration with the Indonesian FDA; it's a sort of approval [for a new product].</i> (INT-MRD, p.16)	<i>If MD hasn't been released, we can't issue PR and PO.</i> (OBS-StR, p.13)
Developing scale up prototype	●		●	<i>Main Process of Product Development Pipeline: Scale-up or Pilot Plan-scale Prototype Development (DOC3, p.2) Innovation Funnel-Marketing Responsibilities Stage VI- Up scaling: Scale Up Prototype Development (DOC2, p.2)</i>	<i>If the laboratory scale [prototype] is fixed already and everything is OK – the market [evaluation results] are accepted, the cost [analysis results] are appropriate – then [then the project] is supposed to go through. [Afterwards] we move to the next level, developing a production scale prototype.</i> (INT-DSP, p.4)	<i>Sometimes ... we don't have the facilities for processing a product... [so] once we get into the scale-up stage, we get confused So there should be a proposal for providing new facilities; whom is it proposed to? as Marketing is the project leader, then we should go to Marketing.</i> (INT-GMM2, p.7)	<i>Scale Up & Internal Panel test: Conducting product development for production scale and continued with an internal panel test.</i> (DOC2, p.6)
Scale up prototype trial	●		●	<i>Main Process of Product Development Pipeline: Prototype Stability test (DOC3, p.2) Innovation Funnel-Marketing Responsibilities Stage VI- Up scaling: Scale Up & Internal Panel test (DOC3,</i>	<i>We make a production scale prototype... it goes back and forth until getting through the test, internally. R&D has its own methodology to determine whether the prototype is approved.</i> (INT-DSP, p.4)		<i>The trial of [the production scale prototype] might not conform with the laboratory test. The laboratory [test] is straightforward, whereas once the machinery's involved, while at the same time we don't know its parameters, [then] we'll be finished... So the most difficult thing is finding the parameters of the process (INT-</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Market testing	●	●	p.5)	<p><i>When a product's ready to be launched, we wonder what the market response is; if consumers buy [this product], what [other products] would would stop to buy, meaning a reduction in another brand's share. [Previously], we carried out this test in cafes... (INT- MCNI, p.26)</i></p>	<p><i>Innovation Funnel–Marketing Responsibilities: STAGE VI-Up scaling</i> <i>External consumer testing (DOC2, p.2)</i></p>		<p>GMM1, p.8)</p> <p><i>When a laboratory scale prototype is ready and it's passed the assessment, that means [the prototype] meets the standards... We usually test this prototype, on a [larger] scale. The marketing insight team helps us perform the test; we do FGDs, market surveys, and test the product with the consumers [invited]. (INT-DSP, p.4)</i></p>
Packaging development		●	●	<p><i>STAGE VII-NPL: Packaging Design & Design Industry Registration</i> <i>Developing product packaging design and applying for registration with the Ministry of Law [to secure intellectual property rights] (DOC2, p.7)</i></p>	<p><i>STAGE VII Production</i> <i>Packaging Development& Design Industry</i> <i>Order Raw Material and Packaging Material,</i> <i>Printing Packaging (RANK A – Procurement)</i> (DOC2, p.3)</p>	<p><i>I might agree with Mr. 'E' [the plant manager]'s concerns from a manufacturing [point of view]; to be efficient, we don't need further investment. However, from a packaging [point of view], I have a different concern; [the packaging] needs to be shrunk twice, which will cause deformation [of the material]. (OBS - StPD, p.26)</i></p>	
Distribution planning	●	●	●	<p><i>Marketing programmes normally should be interconnected [with the distribution channels]. The timing – when we do the advertisement and when we display [the product] – should be aligned... we should prepare our product availability in the stores. (INT-MD, p.15)</i></p>	<p><i>Innovation Funnel–Marketing Responsibilities</i> <i>STAGE VI-Up scaling: Distribution plan. (DOC2, p.2)</i></p>		<p><i>I haven't been able to make the allocation list. Because the MS should be OK first, only then we can confirm the making of [the list] in May or June. (OBS-MB2, 18)</i></p>
Project progress review	●			<p><i>... We [review the progress] based on our first timeline. The timeline should cover the progress up until [the product] is finally launched. So, the focus is on the timeline. The timeline's focus is on who does what, [and] what the obstacles are. When we face problems, whether we need changes or not. (INT-GMM2, p.12)</i></p>		<p><i>...so in every project, project reviews are led [by the project leader, marketing] ... [We discuss] what's missing, what the issues are; these specific points are discussed. We can [also] discuss any kind of issue, like why a delay occurs, FDA issues, formulation, etc... for sure, [these reviews are attended by] R&D, manufacturing and marketing. (INT-</i></p>	

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Commercialisation	●	●	●	<i>So? Can we do it? [Executing] the commercialisation and launch, at the beginning of May? (OBS-MB2, p.17)</i>	<i>Innovation Funnel–Marketing Responsibilities: STAGE VII- Commercialisation (DOC2, p.3)</i>		<i>DM, p.16-17)</i>
Market communication	●		●	<i>Innovation Funnel-Marketing Responsibilities Stage VI-Up scaling: Marketing Plan. (DOC2, p.2)</i>	<i>After the final product prototype is ready, marketing normally develops the communications materials... This is a strategy for communicating [the product] (INT-MCNI, p.11)</i>		<i>Marketing programmes normally should be interconnected [with the distribution channels]. The timing – when we do the advertisement and when we display [the product] – should be aligned... (INT-MD, p.15)</i>
Trade promotion	●	●		<i>All products need promotion [to support] their growth. To get a promotion [budget] the product needs to achieve a certain turnover first... (INT-MSC, p.23)</i>	<i>So, it's for the August promotion. This means that [we] should supply [the products] in July. (OBS-MB2, p.30)</i>	<i>How do [we] achieve the target sets by the brand [manager]? [trade marketing team] implement the trade promotion strategy... (INT-MTM, p.2)</i>	

D.3 UNVERIFIED FIRST-ORDER CODES AS ROUTINES: CASE STUDY 2-FOODCO

First-Order Codes	Data Sources		
	Int	Obs	Doc
Aligning decisions to goals	●		
Brand budget allocation	●		
Business call	●		
Business development process	●		
Call meeting	●		
Cooperation marketing and business development	●		
Counting complain	●		
Funneling	●		
Go or No Go	●		
Investment decision	●		
Killing product	●		
Listing	●		
Management call	●		
Managing entire process (portfolio mindset)	●		
Marketing driven	●		
Marketing monthly review	●		
New idea development (NID) readiness	●		
New product launch (NPL)	●		
New product request	●		
New product research and development	●		
NPL criteria	●		
Operational review meeting	●		
Pipeline assessment	●		
Portfolio changes	●		
Portfolio composition	●		
Postponing project	●		
Price formulation	●		
Production facilities evaluation	●		
Project composition	●		
Project launching	●		
Projects prioritisation	●		
Scanning of market potential	●		
Strategic review meeting	●		

D.4 RELATIONSHIPS BETWEEN ROUTINES: CASE STUDY 2-FOODCO

ROUTINES	1 Business Planning Product road map prioritisation Business planning	2 Market and Industry Analysis Market research Consumer insight research	4 Ideas Provision Idea pooling Ideas screening	5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design	7 Build Business Case Feasibility study	9 Management Review Food forum Post launch review Product road map review	10 Product Development FDA registration Developing scale up prototype Distribution planning	12 Launch Planning Commercialisation Market communication	SUPPORTING EVIDENCE FROM DATA SOURCES
1 Business Planning									
Product road map prioritisation	→		→						<p>...actually, from the road map we derive a yearly business plan... (INT-CEO, p.3)</p> <p>Principally, we decide numbers for [the target of each product group]: "Oh I want to grow by so much. I want to grow a certain percentage in biscuit; I want to grow by a further [percentage] in dairy". So, what sort of products should be [developed]? Then, the ideation begins. What's required by the market? What's the trend like? (INT-CEO, p.7)</p>
Business planning									
2 Market and Industry Analysis									
Market research	→	→	→						<p>We based [our prioritisation] on market potential. Based on the secondary data of market potential, we [set] goals, and [develop] a roadmap and yearly targets. We plan them five years ahead... (INT-CEO, p.7)</p> <p>... so we call it a business plan. Every year we can adjust it. Why should we adjust it? Because it depends on the market and current [business] conditions. (INT-GMMI, p.7)</p> <p>We keep finding [new ideas]; seeking them out from the market insight [research]... [they] might be not new; however, we actually want some of them to be new. (INT-CEO, p.20)</p>
Consumer insight research			→						<p>Ideally, understanding about the consumer should be obtained in the early stages [of new product development] ... However, as there is no a formal rule [for obtaining that information], each brand [manager] could</p>

ROUTINES	<p>1 Business Planning Product road map prioritisation Business planning</p> <p>2 Market and Industry Analysis Market research Consumer insight research</p> <p>4 Ideas Provision Idea pooling Idea screening</p> <p>5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design</p> <p>7 Build Business Case Feasibility study</p> <p>9 Management Review Food forum Post launch review Product road map review</p> <p>10 Product Development FDA registration Developing scale up prototype Distribution planning</p> <p>12 Launch Planning Commercialisation Market communication</p>	SUPPORTING EVIDENCE FROM DATA SOURCES
		<p>ask for that information from [the consumer insight team] at the beginning or in the middle of [the product development process]. (INT-MCNI, p.2)</p> <p>Determining product concepts from product ideas which potentially become NID based on the results of Consumer Insight Studies. (DOC2, p.6)</p> <p>... when Ms. 'K' [the marketing insight general manager] is gonna conduct consumer research, [investigating] whether a particular product fits [consumers' needs] through FGD, then we prepare the prototype [of that product] (INT-MRD, p.2)</p> <p>When I surveyed kids, apparently [I found that] they didn't look at the content, they [instead] considered the packaging. So, if there's some that new and attractive, they must be trying it. Well, because of that we design the packaging to be as cute as possible... (INT-GMMI, p.26)</p>
Industry analysis	→	<p>Sometimes ideas come from [analysing] our competitors... [including] the overseas ones; [the ideas may stem from] products developed by overseas [companies]. (INT-MF, p.10)</p>
Technology development analysis	→	<p>Sometimes [the ideas] come up [when we attend] machinery exhibitions ... "There's a new machine; that new machine is capable of doing new things. That's interesting, really. Let's explore it... (INT-MF, p. 10)</p> <p>Those related to technology are tackled first by ITD [or innovation technology development]. Only then [is the concept development] handled by marketing managers, such as what the layout and packaging looks like, the [packaging] orders, up until commissioning and production. (INT-DM, p.10)</p>
4 Ideas Provision		
Idea pooling	→	<p>Every year we ask everyone to raise ideas; we then screen these ideas</p>

ROUTINES	<p>1 Business Planning Product road map prioritisation Business planning</p> <p>2 Market and Industry Analysis Market research Consumer insight research</p> <p>4 Ideas Provision Idea pooling Ideas screening</p> <p>5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design</p> <p>7 Build Business Case Feasibility study</p> <p>9 Management Review Food forum Post launch review Product road map review</p> <p>10 Product Development FDA registration Developing scale up prototype Distribution planning</p> <p>12 Launch Planning Commercialisation Market communication</p>	SUPPORTING EVIDENCE FROM DATA SOURCES
		<p>according to the vision and mission of the company... (INT-MRD, p.3)</p> <p>All the big 15 items may come from BU²³⁶. We [in R&D] monitor them, then [for example, we might find] some of them are good but the taste isn't very good. However, these products have good concepts; [so] we redevelop and improve the taste in order to improve the LOA²³⁷. Only then do we present them to marketing and management... (INT-MRD, p.17)</p> <p>...we collect [ideas], and then those ideas are evaluated informally in the food forum, held every month. (INT-MRD, P.4)</p>
Idea screening	→	<p>...once [the ideas] get to R&D, we form a team to screen them based on whether the machinery is available, and whether they are aligned with the 22 [priority] categories. After that, we collect all of them and develop the prototypes. When the prototypes are ready, we screen them again in terms of taste and [product] concept. (INT-MRD, p.16)</p>
5 Concept Development		
Developing product concept	→	<p>...then marketing develops the product; at that stage the brand is fixed already... After that we do an in-depth interview... we try to understand how in the positioning area we targeted, this brand can communicate [the product to the consumers]. (INT-MCNI, p.10)</p> <p>...well, then we prepare a real FS... how much capacity we want, what kind of product marketing would sell, what the arrangement is like. Well, from there we determine [everything]... including the energy cost, depreciation – they're all calculated. Finally, we calculate the ROI. Well,</p>
	↔	

²³⁶ Business unit.

²³⁷ Letter of acceptance.

ROUTINES	<p>1 Business Planning Product road map prioritisation Business planning</p> <p>2 Market and Industry Analysis Market research Consumer insight research</p> <p>4 Ideas Provision Idea pooling Ideas screening</p> <p>5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design</p> <p>7 Build Business Case Feasibility study</p> <p>9 Management Review Food forum Post launch review Product road map review</p> <p>10 Product Development FDA registration Developing scale up prototype Distribution planning</p> <p>12 Launch Planning Commercialisation Market communication</p>	SUPPORTING EVIDENCE FROM DATA SOURCES
Panel test	<p>→</p>	<p><i>those are the important decisions in the FS. (INT-DF, p.2)</i></p> <p><i>At the end, the solutions we take [determine] what kind of costs I should squeeze, [and] the formula is adjusted to ensure the cost is feasible. (INT-GMMI, p.5)</i></p> <p><i>If the laboratory scale [prototype] is fixed already and everything is OK – the market [evaluation results] are accepted, the cost [analysis results] are appropriate – then [then the project] is supposed to get through. [afterward] we move to the next level, developing a production scale prototype. (INT-DSP, p.4)</i></p>
7 Build Business Case	Feasibility study	<p>→</p> <p><i>...we prepare the FS, the feasibility study... [then] we regularly present the FS to top management. It normally takes 4 to 5 times of meeting to get approval and the green light for launching. (INT-DSP, p.5)</i></p>
9 Management Review	Food Forum	<p>→</p> <p><i>...From that we contact R&D colleagues, asking: ‘Would you do research [to develop] these [products]’. There is a forum [for that], called the food forum. One that’s used for [discussing and] getting agreement on ideas (INT-CEO, p.5)</i></p> <p>→</p> <p><i>...normally when we’re gonna launch products.. the owner of directors needs to look at the reasons for launching [them]. Then, [we look into] what the market’s like, our capability up to the distribution level – whether our distribution [capability] is able to sell those products (INT-MD, p.24)</i></p>

ROUTINES	<p>1 Business Planning Product road map prioritisation Business planning</p> <p>2 Market and Industry Analysis Market research Consumer insight research</p> <p>4 Ideas Provision Idea pooling Idea screening</p> <p>5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design</p> <p>7 Build Business Case Feasibility study</p> <p>9 Management Review Food forum Post launch review Product road map review</p> <p>10 Product Development FDA registration Developing scale up prototype Distribution planning</p> <p>12 Launch Planning Commercialisation Market communication</p>	SUPPORTING EVIDENCE FROM DATA SOURCES
Existing product review	→	...once the turnover [growth] starts to be sluggish, [it's] stable like this... then at that point we'll inform the brand [manager], "Your product isn't going up anymore... So if next year you want growth, the options are either we push [sales] with [promotional] programmes... or you create a new product to increase the total turnover". Based on this, normally the brand [manager] considers launching new SKUs. (INT-MTM, p.19)
Product road map review	→	...Up until 2018, the road map is in place; however, new things could happen... we just need to evaluate it, whether it works or not. It could eventually be, 'Oh, it's not feasible buy machinery'; when it's analysed, the investment's too high. We could drop it or postpone it [until subsequent years]... (INT-GMM1, p.18)
10 Product Development		
Packaging development	↔	The important posts on labels on which we should pay attention... will be redesigned by Mr. 'R' [senior brand development] and submitted to BPOM tomorrow to get approval... (OBS-MB2, p.56)
Scale up prototype trial	→	The product sales scale examines any new formulation that has been scaled up; it proceeds just like [real] production, identifying problems which emerge. After that, commercialisation [activities] start. Related departments (for example, marketing) prepares a price structure... and production prepares personnel. (INT-MRD, p.19-20)
Distribution planning	↔	Marketing programmes normally should be interconnected [with distribution channels]. The timing when we launch advertisement and when we exhibit displays should be aligned. (INT-MD, p.15)
12 Launch Planning		

ROUTINES		SUPPORTING EVIDENCE FROM DATA SOURCES
Commercialisation	<p>1 Business Planning Product road map prioritisation Business planning</p> <p>2 Market and Industry Analysis Market research Consumer insight research</p> <p>4 Ideas Provision Idea pooling Ideas screening</p> <p>5 Concept Development Developing product concept Formulation preparation Developing lab scale prototype Packaging design</p> <p>7 Build Business Case Feasibility study</p> <p>9 Management Review Food forum Post launch review Product road map review</p> <p>10 Product Development FDA registration Developing scale up prototype Distribution planning</p> <p>12 Launch Planning Commercialisation Market communication</p>	<p>→</p> <p>↓</p> <p>...for example, we're going to do an NPL of 'X'. When we're about to start the commercialisation, apparently we don't have enough budget for that much investment; so then, [in the meeting we decide to] postpone it... (INT-GMMI, p.18)</p> <p>After the commercialisation [stage], we proceed with the post-launch monitoring process. (INT-MRD, p.20)</p>

D.5 ROUTINES IN PORTFOLIO MANAGEMENT-SIMULATION ANALYSIS: CASE STUDY 2-FOODCO

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
Business Planning				
Product road map prioritisation	<i>We have legend products, [dating] from previous years until now. We still have to launch their variants. This must definitely be done every year... (INT-DF, p.3)</i>	Defining the source of revenue	2	<i>It can't be like that. Because the pareto [that is, the product] is still [needed]..., though [we're moving from] APs [or affordable products] to APPs [or affordable premium products], in terms of amount, APs are still the ones which cover the company's operation costs. Nevertheless, strategically, [in terms of] strategic development, [these products] will be worked out (SIM-DF)</i> <i>In here, it isn't stated that we should consider past [product performance] (SIM-GMM1)</i> <i>But in fact, our money really comes from this 'pareto' product (SIM-DF)</i> (SIM-DF, GMM1, 00:31:55-00:32:22)
	<i>Currently, we aiming at future products, which... don't have such a big market segment; even they tend to be distinct with hybrid products. Well, that's is one of the ways to create high profitability. (INT-GMM2, p.4)</i>	Future products	3	<i>The 'Castor' [group of products] is [something] for the future; so product group C is aimed for the future. 'Capella' might be like an 'SO'²³⁸ [brand]. (SIM-GMMI, 00:10:59-00:11:16)</i>
Market Research and Industry Analysis				
Market research	<i>Where's the trend in Indonesia going? Is it going towards healthy [products] or still towards indulgence? ... As we're shifting to a middle class [market]... (INT-CEO, p.7)</i>	Market research focus	1	<i>Normally, if we're looking into the market, we use a qualitative [method] first, looking at what the culture is like... (SIM-GMMI, 00:11:45-00:12:08)</i>
Industry analysis	<i>Actually, in the funnelling process, the first thing concerns what kind of industry we're gonna enter... [once] the industry is clearly [defined], then we seek which [market] segment we're gonna aim for... (INT-GMM2, p.1-2)</i>	Identifying market characteristics		<i>... if we take 'Bellatrix' [as an example], we need a big effort, as the market is mature already. (SIM-GMM1)</i> <i>Yes, the market is mature. It's harder [to compete] in a mature market, because we're a challenger. (SIM-GMMI)</i> (SIM-GMM1, GMMI, 00:10:12-00:10:28)
Build Business Case				
Feasibility study	<i>This FS is concerned with various aspects, from end to end, [including] the manufacturing</i>	Resource requirement	5	<i>...in the resource requirement, 'Castor' requires a third party for doing the reformulation; this is</i>

²³⁸ One of FoodCo's product brands.

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
	<i>process, marketing, finance, the costing is like this, the selling would be like this, the legality of the brand is OK, the [registration with the] [Food and Drug Administration] is being processed. They're all involved in there (INT-DSP, p.5)</i>	Legal support	1	<i>included in the takt time, isn't it? Meanwhile, 'Capella' requires manpower from 'Bellatrix' [project] (SIM-MTM, 00:20:02-00:20:14)</i> <i>'Atlas' is vulnerable; it has to have legal support. (SIM-MTM)</i> <i>Yes, because its main content... (GMMI)</i> <i>No, [look at] the resource requirement; [the project] needs legal support (SIM-MTM)</i> <i>Meaning that it's vulnerable in terms of legal issues; so that's why the TSP²³⁹ is only 40% (SIM-MTM)</i> <i>(SIM-GMMI, MTM, 00:12:38-00:13:02)</i>
Management Review				
Food forum	<i>The food forum is for discussing new product launch projects; [from] end to end, from consumer insight [research], technology [analysis], from R&D up until marketing [planning]. (WAM-GMMI, 26-04-16)</i>	Balanced product group allocation	2	<i>It's like dividing a cake, spreading it between different baskets: future and existing [products]. So which ones: 'Antares' or 'Castor'? (SIM-GMMI, 00:36:11-00:36:23)</i>
		Sharing the risk	1	<i>So at least [if] one fails we can cover it with others; because besides mature markets, we're also entering developing and future [markets]... (SIM-GMMI, 00:14:40-00:14:52)</i>
	<i>So currently our portfolio... is based on brand. Ones selected are those that really contribute enormously [in terms of sales]... (INT-GMMI, p.9)</i>	Prioritisation evaluation	4	<i>From the three left... finally we prioritise choosing 'Castor' and 'Capella', with the rationale... that the return on investment is highest (SIM-DF, 00:16:48-00:17:16)</i>
	<i>... we select ones that truly contribute the most... we have criteria 'gold' and 'platinum'... we want all products in the portfolio to be categorised as platinum, which have a high margin and a high volume [of sales]. (INT-GMMI, p.9)</i>	Product strategy	4	<i>Hold on, we forgot one thing; this order is just based on the projects... Product group A, from the company side, is the pareto one. The sales contribute 65% of the total. (SIM-DF)</i> <i>Yes, the existing (SIM-GMMI)</i> <i>...and 50% of gross profit; so it's the pareto. Then product group B is in a mature market; the product group is certainly... (DF)</i> <i>[market] development (SIM-GMMI)</i> <i>(SIM-DF, GMMI, 00:24:12-00:24:49)</i>

²³⁹ Technical success probability

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
	<i>In NPL, the success factors [considered] are more in terms of delivery time, distribution and turnover. (INT-GMM2, p.15)</i>	Time to launch	5	<i>Why doesn't the approach start from time to launch? The order remains, ones which come out faster (SIM-DF)</i> <i>Betria's [time to launch] is one year, Bellatrix's is 1.7 years (SIM-GMMI)</i> <i>While... [Bellatrix] hasn't finished yet, 'Betria' has generated money (SIM-DF)</i> <i>(SIM-DF, GMMI, 00:22:30-00:22:58)</i>
	<i>Normally, when we're gonna launch new products... the owners or directors must be looking at the reasons for launching them. Then [they look at] what the potential of those products in the market is; [evaluating] our capability, including our distribution capability... (INT-MCTI, MD, p.24)</i>	Mastering the whole business chain	1	<i>The second [consideration] is that in product group B, we see that although [we deal with] new markets, we just do reformulation. And in terms of time to launch, we can [launch the product] quickly. The technical probability is also great – 85% – meaning that we master the business from end to end... (SIM-GMMI, 00:38:57-00:39:23)</i>
		Project allocation schedule	3	<i>The first year is for earning money (SIM-DM)</i> <i>The first year is for earning money by having 'Bellatrix', 'Betria' and what else?... 'Asterion'. If they've generated money, [then] 'Capella', 'Castor' and 'Antares' can get in (SIM-GMMI)</i> <i>Later on, 'Antares' is proceeded, as it's strategic for the company, and 'Antares' is a part of 'pareto' business we have. (SIM-DF)</i> <i>(SIM-DF, DM, GMMI, 00:29:49-00:30:13)</i>
Existing product review	<i>We have what we call a retail audit; this determines what we're gonna do with [an existing] product... For example, 'Oh, this category is growing; the growth is excellent' (INT-MCTI, MD, p.19)</i>	Existing product review	2	<i>...the complicated [situation] from the company's side is that product group A is having... (SIM-DF)</i> <i>a difficult situation; it hasn't been growing recently. (SIM-GMMI)</i> <i>The margin is decreasing. So from the company's perspective, there's a threat from it. (SIM-DF)</i> <i>And the market isn't growing [either]. (SIM-GMMI)</i> <i>(SIM-DF, GMMI, 00:25:00-00:25:27)</i>
	<i>Our new management will look first at those with a good profit; which ones are the market leader, and how to expand them. (INT-GMM1, p.4)</i>	Considering past experience	1	<i>If [we look at] the facts, in our [experience], the failed products are difficult to be revived. (SIM-MTM)</i> <i>Yes, though some actions have been taken, it doesn't necessarily succeed. (SIM-GMM1)</i> <i>In our experience, a failed product is hard to be revived.</i>

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
				(SIM-MTM) (SIM-GMM1, MTM, 00:07:31- 00:07:48)

D.6 THE ESPOUSED BUSINESS STRATEGY CONSIDERED IN THE ROUTINES: CASE STUDY 2-FOODCO

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Elements	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
Organisational goals				
Sales	●	<i>In the next five years we have a goal, that is, we want to achieve a turnover more than twice the existing one. To achieve it, we certainly do have a strategy – the direction is determined by top management. (INT-DM, p.1)</i>	<p>Business Planning:</p> <p>Product roadmap prioritisation</p> <p>Business planning</p> <p>Ideas Provision:</p> <p>Idea pooling</p> <p>Concept Development:</p> <p>Distribution channel determination</p> <p>Management Review:</p> <p>Food forum</p> <p>Post launch review</p> <p>Launch Planning:</p>	<p><i>If we review strategically, we always look at what we’re after five years ahead, which is firstly driven by sales... we call it a roadmap. Every year in the planning cycle we allocate a roadmap for each particular year. (INT-DF, p.4)</i></p> <p><i>[Marketing] can calculate, for example, that the [sales] gap for one SKU is 500 billion or 200 billion. [They should know] from where they need to resolve it; how much from NPL ... and whether [the rest] can be absorbed by existing [products]. Normally in the budgeting process, tension [in allocating sales between NPL and existing products] occurs. (INT-DF, p.4)</i></p> <p><i>“Well, we need to make a differentiation again, what else! Well, we have one, but it’s still about coating... What kind of coating isn’t yet available yet in the market...?” The expectation was that this could increase the sales of the biscuit group. (INT-CEO, p.20)</i></p> <p><i>...more towards penetration. So turnover can be raised by increasing [the number of] outlets or increasing the drop size at the outlets... Supporting this [decision] is one of customer marketing’s strategies. (INT-MTM, p.28)</i></p> <p><i>So currently our portfolio... is based on brand. Ones selected are those that really contribute enormously [in terms of sales]... (INT-GMMI, p.9)</i></p> <p><i>They [marketing] must be also looking into the sales achieved... whether those from NPL are saleable or not. We can observe it; we can push [their sales]. Certainly, we discuss it in the forum; but the discussion is led by marketing. (INT-DF, p.10-11)</i></p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Elements	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
Profitability	●	Well, [with] those parameters, management guides us to [strive for] a big business, the big margin; it leads to a sustainable [business]. The management perceives that if the business has not reached that point, it can't be sustainable... (INT-GMMI, p.10)	Trade promotion	<i>For all products, if we want them to grow, certainly they need promotion. In order to get promotion [budget], the product's turnover should be that much first... if the turnover is already as much as that, only then we dare to spend for the promotion expenses (INT-MSc, p.23)</i>
			Business Planning:	
			Road map prioritisation	<i>A roadmap for five years ahead is in place. In 2019, if I am not mistaken, we want to [have] 20T [revenue], with the road map, every year we should have, for example, profitability that much ...Marketing has made the outline of how the road map should be like... (INT-MSc, p.12)</i>
			Build Business Case:	
			Feasibility study	<i>...The FS actually considers the gross profit as the [approval] requirement. If it's an existing project, we can just use a P&L format to show the gross profit. (INT-DSP, p.7)</i>
			Management Review:	
			Food forum	<i>...firstly [the review is approached] from a demand aspect – what the trend is like, will the product be accepted by the market. Then in terms of technology, do we have the technology? ...Then whether the budget for supporting [the project] is available ...With these three [considerations], we evaluate to which categories we going to allocate the resources – which ones will generate margin and turnover quickly (INT-DM, p.9)</i>
Post launch review	<i>The beginning of [the product launch] is a profit trial period; [we evaluate] whether it matches the book. At the beginning, normally, it's messy; it's up and down. However, within six months, [the condition] is already settled in terms of profitability. (INT-GMM1, p.17)</i>			
Existing product review	<i>...the management directs us towards [having] a big business, one which has a high margin. This means that [the business] is sustainable. If [an existing] business hasn't reached that target, it's not able to be sustainable; it means that the fixed costs we spend are much higher than the profit or volume we get. (INT-GMMI, p.10)</i>			
Product road map review	<i>For example, we have a profit target of so much this year. If the realisation matches [the plan], then next year we go to plan A, whereas if there is deviation [to plan], for example, "Oh</i>			

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Growth	●	●	<p>Principally, we decide numbers for [the target of each product group]: “Oh, I want to grow by so much. I want to grow a certain percentage in biscuit; I want to grow by a further [percentage] in dairy”. So, what sort of products should be [developed]? (INT-INT-CEO, p.7)</p> <p>Corporate Profile: Being a company with strong character leads FoodCo Group to achieve success and spectacular business growth (DOC1, p.25)</p>	<p>Market and Industry Analysis:</p> <p>Market research</p> <p>Business Planning:</p> <p>Business planning</p> <p>Road map prioritisation</p> <p>Build Business Case:</p> <p>Feasibility study</p> <p>Management Review:</p> <p>Post-launch review</p> <p>Existing product review</p>	<p>we can’t achieve it”, it certainly has to be corrected. The road map might not go according to the initial plan; there needs to be some adjustments. (INT-GMM2, p.3)</p> <p>...it actually stems from market insight [research] ...for example, if I, as a marketing [manager] of biscuits, am asked to create growth, I’ll enquire where the growth comes from. We need to look into the biscuit market, who the big players are, which [market areas] they’re strong in – can we seize them? (INT-DF, p.12)</p> <p>We have legend products... nevertheless, some variants should emerge every year. Further, from a business point of view, when it’s been decided the business should grow, then every year we have to decide on a target of how much growth [we want to achieve]. (INT-DF, p.3-4)</p> <p>Developing a road map is part of the strategic management area, involving SWOT and Porter analyses. From there, [we analyse]: “By how many percent can this [product] still grow” (INT-CEO, p.7)</p> <p>[It’s] based on the study of who the competitors are, how big their market share is, how big the market size is, how much the market growth will be. These will determine to whether we enter the market or not. (INT-MF, p.4-5)</p> <p>For a new product, its growth is sometimes inferior compared to existing ones. Well, we define the target and monitor it. If [growth] goes down, then we review why it happens, so that the next year we [can determine] according to what aspects we have to improve this product. (INT-DF, p.5-6)</p> <p>We have what we call a retail audit; this will determine what we’re gonna do with [an existing] product... For example, ‘Oh this category is growing; the growth is excellent’ (INT-MCtI, MD, p.19)</p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Elements	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
Market leader	●	<i>For example, we talk about the big strategy: [that] we want to remain the market leader in the snack category. (INT-CEO, p.2)</i>	<p>Management Review:</p> <p>Existing product review</p>	<p><i>Our new management will look at first, which ones are those with a good profit, which ones are the market leader, and how to expand them. (INT-GMM1, p.4)</i></p>
Competitive Strategy				
Affordable premium product	●	<p><i>That's part of our strategy; OK, we get in to premium [markets]. We can maintain the margin freely, rather than being trapped in that 'magic' price [bracket]. Well, this is the main strategy for achieving that goal, which is translated into the NPL which pursues premium products. (INT-DF, p.5)</i></p> <p><i>...affordable premium products; [they're] premium but still buyable. (INT-GMM2, p.14)</i></p>	<p>Business Planning:</p> <p>Road map prioritisation</p> <p>Business planning</p> <p>Market and Industry Analysis:</p> <p>Consumer insight research</p> <p>Industry analysis</p> <p>Concept Development</p> <p>Channel determination</p> <p>Management Review</p>	<p><i>[For example] the road map I mentioned indicates how to move from APs to APPs. [We have] a plan for each product. (INT-MS, p.23)</i></p> <p><i>Why I should allocate my budget to ones with a small profit; you grow, but I get nothing... [so] our strategy is indeed to move from mass products to affordable premium products. (INT-GMMI, p.17)</i></p> <p><i>In food, our study found that "Oh, [apparently] people just see food, it's as simple as that". They don't see that our positioning is better, that our product is of a higher premium, that the packaging is nicer; no... none of that. That's a new insight isn't it? (INT-GMMI, p.26)</i></p> <p><i>We also do benchmarking. A company with premium products might have a small turnover; however I'm pretty sure that the margin is high. (INT-DF, p.6)</i></p> <p><i>If they launch products, for example, the 'M2' biscuit is categorised as an affordable premium product for the upper middle class and 'M4' for the lower middle class. 'M4' [products], they're placed in mass-type channels; as for 'M2', they're placed with [type]-1 retailers: those we call big retailers. (INT-MD, p.1)</i></p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Differentiation	●		One thing still [the focus] of our marketing team is that actually, we always try to define the differentiation of [these products] when we're gonna launch [them]. (INT-CEO, p.4)	Post launch review	<i>The measures of [NPD success],... thirdly, is the level of success in shifting our portfolio towards one that [serves] profitable segments, called APPs . (INT-GMM2, p.14)</i>
				Existing product review	<i>So what's the growth of APP's contribution like? ...[and then we look at] how much the growth of our gross margin is, as it's one of our indicators showing our ability in developing high margin products. (INT-GMM2, p.14)</i>
				Idea pooling	<i>...[in finding new product ideas] we try this, try this... that's about a marketing ability to choose the appropriate angle for seeking differentiation, finding better positioning. (INT-DF, p.9)</i>
				Feasibility study	<i>Those strategies are translated when developing new products. We have to consider whether there's differentiation; we examine what sort of target market we want to have (INT-DF, p.9)</i>
Distribution	● ● ●		...at the end, when we're already superior [in the differentiation aspect], the second thing [to be considered] is the distribution issue. The availability should be there. (INT-DF, p.9) Corporate Profile: Distribution Network (DOC1, p.18)	Feasibility study	<i>...when we develop new products, one concern [we need to study] is whether we're able to distribute them... INT-MCTI, MD, p.24)</i>
				Food forum	<i>Normally, when we're gonna launch new products... the owners or directors must be looking at the reasons for launching them. Then [they look at] the potential of those products in the market – [evaluating] our capability, including our distribution capability... (INT-MCTI, MD, p.24)</i>
				Existing product review	<i>After discussing the sales, we discuss the distribution... by presenting the numeric distribution, which shows the penetration level [of the product] in one area. (INT-MCTI, p.15)</i>
					Product Development:

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered			
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes	
	Int	Obs		Doc		
Brand positioning	●		<i>The product portfolio is managed based on how the brand is to be positioned... Marketing does the positioning, and it should be approved by CEO. (INT-GMMI, p.2)</i>	Project progress review	<i>Actually, from the point of view of the store availability target, we're slightly late; we expected that in early June the product would have reached '1'²⁴⁰ stores... (OBS-MB2, p.16)</i>	
				Market and Industry Analysis:		
				Consumer insight research	<i>After that we do an in-depth interview... we try to understand how, in the positioning area we targeted, this brand can communicate [the product to the consumers]. (INT-MCNI, p.10)</i>	
				Business Planning:		
				Road map prioritisation	<i>...concerning the road map, the challenge is how to build up this brand by launching products which are able to strengthen the [brand] positioning. (INT-MCNI, p.23)</i>	
Capabilities						
Innovation capability	●		<i>Technical and innovation capabilities are a handicap in the internal group; we're improving this continuously. (INT-CEO, p.7)</i>	Ideas Provision:		
				Creativity day	<i>R&D organises a sort of innovation day; they have their own ideas and then they develop the prototypes. There's one day where they exhibit the prototypes; the management look round [this event]. (INT-MCNI, p.18)</i>	
				Open innovation	<i>...we actually do a lot of what we call 'open innovation'. Open innovation is that we collaborate with universities, asking for help or a consultancy [in relation to new product creation] (INT-CEO, p.10)</i>	
R&D capability	●		<i>R&D needs to be woken up. Maybe starting from the end of the value chain, which is research and development. (INT-CEO, p.10)</i>	–	–	

²⁴⁰ One of a large local chain store

D.7 ROUTINES AND ELEMENTS OF BUSINESS STRATEGY: CASE STUDY 2-FOODCO

BUSINESS STRATEGY	<i>Business Planning</i>	<i>Market and Industry Analysis</i>	<i>New Product Research</i>	<i>Ideas Provision</i>	<i>Concept Development</i>	<i>Design</i>	<i>Build Business Case</i>	<i>Project Prioritisation</i>	<i>Management Review</i>	<i>Product Development</i>	<i>Project Review</i>	<i>Launch Planning</i>	<i>Whole Portfolio Management</i>
Organisational Goals (OG)													
Sales	•			•	•				•			•	
Profitability	•						•		•				
Growth	•	•					•		•				
Market leader									•				
Proportions-OG	3/4 (75%)	1/4 (25%)		1/4 (25%)	1/4 (25%)		2/4 (50%)		4/4 (100%)			1/4 (25%)	
Competitive Strategy (CS)													
Affordable premium product	•	•			•				•				
Differentiation				•			•						
Distribution							•		•	•			
Brand positioning	•	•											
Proportions-CS	2/4 (50%)	2/4 (50%)		1/4 (25%)	1/4 (25%)		2/4 (50%)		2/4 (50%)	1/4 (25%)			
Capabilities (C)													
Innovation capability				•									
R&D capability													
Proportions-C				1/2 (50%)									
Overall Proportions	5/10 (50%)	3/10 (30%)		3/10 (30%)	2/10 (20%)		4/10 (40%)		6/10 (60%)	1/10 (10%)		1/10 (10%)	31%

**APPENDIX E DATA SUPPORTING CASE STUDY 3-
MULTIPRODUCTCO**

E.1 FIRST-ORDER CODING AN INTERVIEW: CASE STUDY 3-MULTIPRODUCTCO

Transcript	First-Order Codes
Technical and R&D Director, p.11-12	
<p><u>The [marketer] looks at how the trend looks. They classify the customers, then determine their target market – OK, certainly, for example, those in [socioeconomic groups] A, B. As MultiproductCo mainly [produces] premium products, we target SES A, B; it’s unlikely we’re involved in C and D. Then, within A and B [markets], [they determine] which particular markets they would focus on.</u></p>	Market research
<p>After they analyse what the current trend is like and what the market is like, then <u>they’ll definitely come up with, “This is the product portfolio that we have to have this year”. They can look for it from the SOS [source of supply], subsidiaries which are present worldwide. As far as I know, recently we’ve rarely sourced products from US, except for some products which have technology content. For example, in office equipment, they have a sort of tape, a double-sided type, which can be washed. So if it gets less sticky because of dust particles on the surface, then, as it can be washed, it can get the stickiness back.</u></p>	Potential product identification Global portfolio analysis
<p>So that kind of technology isn’t available here and it might be a class 5 [product]. If that’s the case, we don’t have competitors and indeed local capability is not capable of it yet; so we have to import it. However, for simple products, where other countries in Asia Pacific have launched, we may source those products from them.</p>	Potential product identification Market research
<p><u>They will come up with ideas based on... They really have [their own] research too, market research. Let say we need a brush with excellent cleaning ability, which is also able to reach the edges; usually, the edges of [floor tiles] are difficult to reach. [One that’s] easy to handle, right? One with a handgrip does exist; for example, one from the US uses a handgrip, [so it’s] easy to handle. OK, that’s the concept [we aim for]; then Mr. ‘G’ [the designer] will develop something.</u></p>	Market research → Potential product identification Developing product concept
<p>So we want to establish a floor care portfolio, right? [For that] Mr. ‘G’ [the designer] has the capability to do the design.</p>	Potential product identification → Developing product concept

E.2 ROUTINES IN PORTFOLIO MANAGEMENT: CASE STUDY 3-MULTIPRODUCTCO

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Business planning	●			<i>I see when they make the business plan – they propose a new product development plan based on market needs, based on the opportunity they see. (INT-DCMBS, p.22)</i>	<i>We have a [planning] cycle every year; it's called business planning, prepared in Quarter 4... (INT-DCMBS, p.12)</i>	<i>...marketing, alongside divisions heads; business, sales and technical – all undertake a coordination meeting – we call it a business plan meeting. In that business plan meeting, we look into, “Oh, these are the market needs, and the size is like this. What products do we have? What products are we able to launch this year?” – what products will continue to sell this year, what products we’ll discontinue because, for example, they’re unprofitable. (INT-DTRD, p.23)</i>	
Market research	●	●		<i>... identify the market opportunity... [The marketer] looks at what the trend looks like. They classify the customers, then determine their target market... They really have to research too – market research. (INT-DTRD, p.18, 11-12)</i>	<i>Idea Phase Objective: Identify the market potential for new product or service ideas; Gather Voice of Market (VOM) input and identify attractive market segments; evaluate the market opportunity against BU strategic direction and BU financial objectives. (DOC2, p.15)</i>		<i>There might still be gaps [between the products] currently in the market and consumer requirements. So, we try to position [ourselves] in the middle; [we enquire] as to what extent the consumers can still absorb [new products] (INT-DCB, p.9)</i>
Consumer research	●	●		<i>...we do ethnography research; conducting FGD, we talk to the consumers. For example, [investigating] what their behaviour in cleaning the house is like, how they store [the cleaning tools], what the cleaning frequency is, who does it... Then, for example, their habits; what their mopping habits are, how they hold a broom, how they sweep. We study all of them. (INT-DCB, p.8)</i>	<i>...we’ve been looking into what the consumer insight is first... for the preliminary data; after that, we have backup from the research [department]... We’re always backed up by research... (INT-MB1, p.17)</i>		<i>Concept Phase Objective: Gather customer needs (VOC) and translate into ranked product requirements. (DOC2, p.16)</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Global portfolio analysis	●			<i>Initially, it starts from the [global] portfolio – the product portfolio analysis, really... Occasionally there’s a direction from the global [office] that this is the focus of category to be pushed... (INT-HBD, p.2)</i>		<i>...we have a large source of supply of products,... local and global. The marketer just shops around; Japan has these products, Korea has these, the US has these... (INT-DCMBS, p.13)</i>	<i>...when they see that the portfolio available in the US can still meet local market needs, why bother to develop [our own] new products? (INT-DTRD, p.22)</i>
Potential products identification	●	●	●	<i>This is one we study – [is it] OK for the kitchen? What kind of products are actually needed? For the bathroom, what kind of products are required? What’s it like for living room? Well, the [needs of the] bedroom we consider more or less similar to those of the living room. (INT-DCB, p.11)</i> <i>...from the beginning it’s been determined that we are gonna produce four types of paper packs with different designs and fragrance. (OBS-MBM1, p.2)</i>	<i>Concept Phase Objective: Gather customer needs (VOC) and translate into ranked product requirements. (DOC2, p.16)</i>		<i>What I do in the beginning is, I conduct interviews with my colleagues, categorised as young mothers. I looked around their bathroom... [to see] what sort of things were actually in place in the bathroom... so it became visible: there is a brush, and some used toothbrushes, a used cloth... So then... I carry out a kind of mapping; for the toilet area, what consumers have at home, what we actually have, then what competitors have, [and] what are the missing items? (INT-MBM1, p.2-3)</i>
Invention submission	●			<i>...nevertheless, it doesn’t mean that we must stick to the global portfolio. If, for example, we want to have a new product, we can go into class 4 – new products for existing markets; even though it’s not available in the global [portfolio]... this isn’t a problem, as we can perform our own invention submission. (INT-DTRD, p.9)</i>			<i>...well, while we search [for a product] in the global arena, and it’s showing no availability; or [if] available, the price is very high, then we’ll decide, ‘Let’s do it here’. (INT-HBD, p.14)</i>
Developing product concepts	●		●	<i>Concept Phase Objective: Gather customer needs (VOC) and translate into ranked product requirements; Develop and evaluate multiple product or service concepts. (DOC2, p.16)</i>		<i>Then we have a discussion with the manufacturing engineer: “Oh, if this is the specification, the manufacturing process should be like this. Those are the materials [needed]”... then, we come up with the [production] cost. [Then we] come back to marketing to check whether the cost is [within range]. If it’s too high, we have to repeat the steps from the specification and</i>	<i>...start from VOC, [then] we [find] the gap; we identify first the criteria for product design: what the users characters are like, are they female, are they male, what is the age? From that, then, we generate the concepts: what materials suit best for female, what the materials for male are like, from the technology we have, which one that can be used, what the ideal production is like... [we prepare]</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Channel determination	●	●		As we build a category, we might find the potential of this product is very high. However, we can't sell it through our existing highway channels as this used to fail, because there's no sales[person] able to sell it through those channels. So we have to [cancel] the product idea. This is the most important consideration – because it's occurred in the past. (INT-HBD, p.3)	It has been justified from the beginning that the project is designated to penetrate [the market] via the mini market channels. (OBS-MBM1, p.4)	design. (INT-DCB, p.19)	sketch, mock-up until consumer test. (INT-PD, p.2) We've determined beforehand via which channels the product will be sold. For example, we'll sell the product in GT [general trade]; in commercial [team], we, as the representative of the market, firstly [will examine] whether the product will be accepted [in that channel] or not. (INT-MS, p.7)
Preliminary design	●		●	Concept Core Deliverable Definitions: Product Design Requirements–These are the engineering Critical Functional Requirements for the product. They would typically be found along the top of the 1st HOQ [House of Quality] and would include target values. (DOC2, p.25)		R&D and technical team discuss with manufacturing: "Oh, if the specification's like this, then to manufacturing it should be like this; what kind materials are [required]?" Then the cost emerges. After that, [R&D] comes back to marketing, [discussing]: "If those cost that much, does it fit [with the budget]? Well, it's too high. OK, do it again, [revise] the design." (INT-DCB, p.19)	...after [obtaining VOC] we go to a concept. We provide several alternative options, normally in the form of sketches; indeed, visual [presentation can provide] the idea [of the products], whether in 3D or 2D... From those, there has to be estimations, for example, ...the first design defines weight estimation to be so much, the second design defines weight estimation to be so much, the third design defines weight estimation to be so much. (INT-PD, p.15)
Detail design	●			In the detailed design... we determine the colour character we want... we cross-check what the colour character of the product portfolio is, making sure it's in line with others – enabling the brand identity in line with other products... (INT-PD, p.7)			...then the detailed [design], [including] technical drawings, specification details, materials list, [is built]; it'll be used by the sourcing team to establish the price. (INT-PD, p.2)
Design review	●			It might be, for example, the production [department] which says whether the design is to be like that, or the way to produce it should be like this; the material should be this – which is difficult to source or we have		It might be, for example, that the production [department] says if the design is like that, ...OK, that means the designer needs to alter the design. (INT-DCB, p.19)	Yes, usually if there is a change in packaging or design that will increase the converting cost,... [the product designer] will inform me to re-run the costing. (INT-FC, p.5)

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Laboratory test	●	●		<p><i>import it. OK, that means the designer needs to alter the design. (INT-DCB, p.19)</i></p> <p><i>...we conduct tests. From the materials aspect, what it's supposed to be; why people like this material more. We do tests in the laboratory and consumer tests. (INT-PD, p.6)</i></p>		<p><i>Has the product been tried for 30 days? (DCMBS). Yes, it has; [this performance] is based on the test results, otherwise I wouldn't dare [to proceed it]. [To conduct the test], I got support from the technical [department] (MBM1). (OBS-DCMBS,MBM1, p.11)</i></p>	<p><i>... besides the product designer, there's another team, from the technical department. which performs tests in the laboratory... so as the product is ready, then it's tested in term of what the quality's like. (INT-HBD, p.15)</i></p>
Consumer testing	●		●	<p><i>[From] a sketch, a mock-up, up until the consumer test. Actually, in almost every process the consumer test must be in place; this enables us to validate the test result, examining whether it's consistently in-line or not, from beginning to end, which ones fit more with [customer requirements]. (INT-PD, p.2)</i></p> <p><i>Development Phase Objective: Field test the product to validate customer acceptance... (DOC2, p.18)</i></p>	<p><i>We usually, after having a number of prototypes, conduct consumer tests. (INT-DCB, p.20)</i></p>		<p><i>So once we have a mock-up, we carry out research with consumers. The consumers give inputs: "Why is the colour like this? Why is it uncomfortable when you wear it?" (INT-DCB, p.20)</i></p>
Build business case	●	●	●	<p><i>...the synthesis of idea, concept and feasibility [analysis] becomes a business case... (INT-MT, p.13)</i></p> <p><i>For the AF²⁴¹, you need to prepare the cost analysis; it must be detailed. For the packaging, [decide] what should be stated in the agreement, as it'll be developed by local [vendor], won't it? (OBS-DCB, p.42)</i></p>	<p><i>Feasibility Phase Objective:</i></p> <ul style="list-style-type: none"> <i>• Select the best concept and identify the technical solution.</i> <i>• Demonstrate that the solution is stable* when stressed with nominal noise.</i> <i>• Validate that the solution meets the customer requirements.</i> <i>• Quantify the value proposition for the solution with the customer.</i> 	<p><i>When a prototype is in place... the feasibility [analysis] begins. There are prototypes and calculations; the costs are already known, and the cost estimation is presented. The marketer, supply chain, sourcing or manufacturing people are there [to be involved]. (INT-DCMBS, p.28)</i></p>	<p><i>Why we propose this idea, why this project has to be in place; how much the price is, how much the forecast is. What the product we're gonna launch looks like, what the concept's like. Well, then if this [project] involves third parties, [we need to check] whether we have prepared the... [non disclosure agreement]. Then also [we look at] the review of the life cycle management or [environment, health and safety]</i></p>

²⁴¹ A type of product being developed

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Resource analysis	●		●	Because to launch [products], especially in the consumer business, requires a huge A&P budget (INT-DTRD, p.30)	<ul style="list-style-type: none"> Develop the business case for the project. (DOC2, p.17) <p>An Idea Phase project plan usually includes a project charter (in scope, out of scope), identifies the team sponsor, team members and resource needs, and high level milestones. (DOC2, p.24)</p>		<p>aspects of this product. (INT-MT, p.13-14)</p> <p>The next consideration [in selecting new products] is resources. There are two kinds of resources: people and funding. Well, [regarding] people, [we] need to consider that the sales team only works via the super highway [distribution channels]; then in terms of marketing, the brand marketing or channel marketing are really limited. [We need to know] what tasks they focus on now... Then, as for the funding resources, the A&P budget is limited really. If we launch a product, it must have funding; meanwhile the existing products also need funding – we can't let them go... So are we able to fund this new product or not? (INT-HBD, p.4)</p>
Landing review	●		●	So basically, a landing review is the initial filter for conducting the prioritisation [of projects]. [It's] to determine which projects are indeed necessary to be followed up; it [also determines] which methods are to be used [for follow-up] (INT-MT, p.1)	For the landing review, I reserve one day a month when [the project owners] can come to me, [the technical and R&D director], Mr. 'H' [Technical manager] and Mr. 'G' [Corporate marketing and business services group director] (INT-DTRD, p.26)	In landing review, the review is carried out by a panel which consists of technical manager, business group and BSG [business services group] who is Mr. 'G' [Corporate marketing and business services group director]. (INT-MT, p.18)	Landing review is conducted at the beginning [of NPI process] to determine the next step of review, whether it is full gate review or mini gate review (NSRev). (Email-MT, 15-04-2016)
New SKU review request	●	●		...The marketer submits a request for a new SKU review. We use the facility on the electronic database, called NSREV...All this data needs to be entered into the database; so from the forecast aspect, like sales estimation, then price, margin, OI. This system is a routine – the review is really according to systems; [we get] a notification email, [stating]			...the thing is, you need three months to prepare the SKU in the SOS; so... let's say now the product is about to come, then count backwards to when [you have to] request the SKU. If possible [make the request] as soon as possible; so that's why I said 'bring it up' if you have the data. (OBS-DCMBS, p.29)

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
				<i>'approve', and OK to proceed [the request] to the next process. (INT-MT, p.11)</i>			
Presentation to leadership team	●		●	<i>Because [the project] has an impact on profit, sales – the top-line and so forth – we have to provide all of that information; then [we] have to conduct presentations. If, for example, the target [market] is big and the opportunity is very vast, [then the presentations] would [involve] the MD [managing director]. (INT-MBM2, p.5)</i>	<i>Feasibility Phase Objective: Select the best concept and identify the technical solution. (DOC2, p.17)</i>	<i>...when the division heads present their business plan and the source of growth to all the LTs [leadership teams] – [attended by] not only the LT from technical but also the LTs from supply chain and manufacturing – we all ask about... [the business plan] and what support they need from each function... (INT-DTRD, p.33)</i>	
New stock review	●		●	<i>Then we look at the class of NPI ... If the class is 1 or 2, then we go through the NSREV process or mini gate review. (INT-MT, p.1) NPI Process Flow (DOC3, p.4-5)</i>	<i>We focus only on top projects which will undergo gate reviews. Other than that, we use e-NPI [electronic NPI]. It still carries out the reviews, but it doesn't need to get together in a [meeting] room. (INT-DTRD, p.24)</i>		<i>...as the NSREV process is short, we look directly at what the price is, what the profit is; as the investment's actually not that huge, we're not concerned with too much, as long as the sales are big enough and the profit achieves our target. If so, then, 'Please launch'... in here, the marketer submits the SKU review request using the electronic database facility, called NSREV (INT-MT, p.10-11)</i>
NPI gate review	●		●	<i>Well, the next review applied for class 3, 4 or 5 [NPI] [is called] NPI gate review – new product introduction gate review. The complete gates are [stages] 1, 2, 3, 4, 5, 6, 7; from idea, concept, feasibility, [development], scale-up, launch to post-launch. We group the first-three steps into one feasibility gate. All the information related to ideas, concept and feasibility are thus combined; we then review them at the feasibility gate review stage. (INT-MT, p.13)</i>	<i>NPI Process Flow-Detail: Gate Review Session; monthly basis; involves MD, Business, Finance, Supply Chain, Manufacturing (DOC3, p.4)</i>		<i>The NPI is a seven-phase/six- gate process: idea–concept–feasibility–development–scale-up–launch–post-launch (DOC2, p.5)</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Post launch review	●		●	<i>Post-Launch Phase Objective: Manage product value chain for maximum return over its life cycle with day-to-day business operations, using the control plans verified in the launch phase. (DOC2, p.21)</i>	<i>Post-launch is normally conducted three to six months after launch; it's to see what the commercialisation is like, whether it's running [well] or not, what the product life cycle is like... And [then there's] the post-launch, which is [based] more on the first-year sales report and vendor evaluation. (INT-DTRD, p.24-25)</i>		<i>I have experience of a product having been launched but failing in the market; after three months, I killed it immediately (INT-HBD, p.16)</i>
Existing products review	●		●	<i>We still have to review [the products] in the store; are they still moving? Why are they not moving? Whether there are new better competitors or [the products] are indeed not relevant anymore for the market... So for me, there's no such word as 'done'; [the products in the market] indeed always need to be reviewed. (INT-DCB, p.26)</i>	<i>...So for me, there's no such word as 'done'; [the products in the market] indeed always need to be reviewed. (INT-DCB, p.26)</i>		<i>Post-Launch Phase Objective: Gather customer feedback to identify opportunities for product improvements, line extensions, and new products. (DOC2, p.21)</i>
Product specification validation	●		●	<i>For [product] development, there's vendor process assessment, product specification and validation, an e-sourcing database, scale-up, the master agreement, the QA system, the real QA QC, and then the process validation. (INT-DTRD, p.25)</i>	<i>Development Core Deliverable Definitions: Validated Robust Product—A product that has been optimised to make it insensitive to noise (common cause variation... (DOC2, p.29).</i>		<i>Then, as part of product specification validation, the [product specification], which [previously] was still a concept, is refined [to decide] whether this [specification] is really feasible, and whether the materials are indeed available in the market, and are able to be used. (INT-MT, p.14)</i>
Sourcing	●		●	<i>...sourcing is a function that links the marketer with the vendors... [we look into] the pricing structure... Sourcing takes a role in persuading vendors, as they seeking a profit [as well]; so we strive for a middle point between the vendors and our side. (INT-PS, p.10-11)</i>	<i>Gate Review Document: e-Sourcing Database (DOC3, p.7)</i>	<i>Well, then there's also an e-sourcing database. So the sourcing team has its own database; we have to input the [product specification] data into the e-sourcing database to be followed up by the sourcing team (INT-MT, p.14)</i>	
Process validation	●	●	●	<i>Then [there's] the process validation – what the production process is like. Well, in here we actually involve the manufacturing team. In the</i>	<i>Gate Review Document: Process Validation (DOC3, p.7)</i>		<i>There are no manufacturing people, right? ...[In regards to] the process validation, have the steps been approved? ...So [we] need to check</i>

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
				<i>manufacturing team there's a particular section which deals with manufacturing contracts. (INT-MT, p.14)</i>			<i>the process validation. We must have a homework; the homework is, as just mentioned, [about] QA [quality assurance] and QC [quality control]... so every step they [take to come to a] decision on 'go/no go' or '... [not good] or good', [we need to know] what the parameters are on their side. And then, before they send the finished goods to us, what the parameters [used] are; also, what the QC checks on our side are like? (OBS-DTRD, p.19)</i>
Vendor process assessment	●		●	<i>.. OK, we decide to make [the product in-house]. After that we'll start to select the vendors; those likely to have potential will be assessed. (INT-PE, p.1)</i>	<i>Gate Review Document: Vendor Process Assessment (DOC3, p.7)</i>	<i>While in 'development', we're already in the development stage for realising the product... For example, there are purchases from external parties, [so we should undertake] a vendor process assessment – whether the vendors have been assessed or not; what the score is, acceptable or not. (INT-MT, p.14)</i>	
Production scale-up	●		●	<i>Scale-Up Phase Objective: Optimize the process at the targeted manufacturing site and demonstrate long term capability. (DOC2, p.19)</i>		<i>It will help in the scale-up [process]; for example, in the contract manufacturer or in-house [production], technical [department] participates in monitoring [the process] as to whether it runs well or not. That's our role. (INT-MT, p.23)</i>	<i>After [identifying the critical process], we will carry out what it's called scale up. So from one piece we replicate it into a small quantity of products; may be 10, depending on its difficulty level. For simple products, we need only once scale-up [process]. We [think] it's enough; OK, let's make decision preparing the mass production plan. (INT-PE, p.2)</i>
Product test	●		●	<i>So, while people might develop brushes without having conducted any test, we actually have machines for carrying out tests on brushes; [this enables] us to know how many thousand or ten-thousand times they run into the weight reduction of their bristles. We have the complete data on that. (INT-DTRD, p.29)</i>	<i>Development Phase Objective: Verify product capability against the customer tolerances. (DOC.p.18)</i>	<i>After that, we run our first production test, or in our term called T0. We observe and review what are the critical [points] to quality. We divide the CTQ points into two categories: appearance and functions... that's conducted by the product design team, process engineer and quality control. (INT-PD, p.2)</i>	

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Actions	Repetition	Multiple Participants	Interdependent Actions
Store listing	●	●		<p><i>How many stores will be targeted?</i> (DCMBS)</p> <p><i>All accounts are mini market accounts.</i> (MBM2)</p> <p><i>Have [they] been processed for a listing? Is a listing needed for mini markets?</i> (DCMBS)</p> <p><i>The listing process is underway now</i> (MBM2)</p> <p>(OBS-DCMBS and MBM2, p.4)</p>	<p><i>The thing is, [I'm worried that] the past case [that happened] to 'N'²⁴² will happen here; the listing took too long in the end</i> (DCMBS)</p> <p>(OBS-DCMBS, p.4)</p>		<p><i>...A listing will be carried out at a number of stores. What the store selection is like, what the positioning in those stores are like, how the marketing programmes in those stores are like, and so forth;... in the consumer [market] the [nature] of the business is like that, quite difficult.</i> (INT-DTRD, p.28)</p>
Developing marketing programme	●	●	●	<p><i>...What the marketing programmes need to be like to attract customers to come into the book stores, or [when they] come to the DIY [shelves], seeing our various products, they take them.</i> (INT-MS, p.9)</p>	<p><i>Development Phase Objective: Field test the product to validate customer acceptance and develop a marketing plan to maximize the value proposition.</i> (DOC2, p.18)</p>		<p><i>...what usually happens, if the pipeline [of distribution] is close to [the company], [the store listing] is done first; and the [marketing] campaign is most influential [in there]. Meanwhile, if [the pipeline] is out of town, such as Sumatera, the store listing is done afterward.</i> (OBS-DCMBS, p.5)</p>

²⁴² A company's product brand initial

E.3 UNVERIFIED FIRST-ORDER CODES AS ROUTINES: CASE STUDY 3-MULTIPRODUCTCO

First-Order Codes	Data Sources		
	Int	Obs	Doc
Channel expansion	●		
Final price authorisation	●		
Finding supply data	●		
Monthly meeting-Design development	●		
Monthly meeting-Process development	●		
Order to vendor completion	●		
Outsource	●		
Patent	●		
Product benchmarking	●		
Secondary research	●		
Spiral process	●		

E.4 RELATIONSHIPS BETWEEN ROUTINES: CASE STUDY 3-MULTIPRODUCTCO

ROUTINES		SUPPORTING EVIDENCE FROM DATA SOURCES													
		1 Business Planning	2 Market and Industry Analysis	5 Concept Development	6 Design	7 Build Business Case	8 Project Prioritisation	9 Management Review	10 Product Development	12 Launch Planning					
1 Business Planning	Business planning			↔											<p>We have a [planning] cycle every year, it's called business planning... as we have a plan, we can see what we 're looking for... what sort of products would be introduced... We might get [product ideas] from the global [portfolio]: "We have a new product, really; it's succeeding in Argentina, for example. Indonesia's market is similar to that of Argentina's, so let offer it". (INT-DCMBS, p.12)</p> <p>...if they get final with the business plan final, [they] come up with a list of sources of growth, either from the share gain or new products... (INT-DTRD, p.32-33)</p>
2 Market and Industry Analysis	Market research	→													<p>What I see is, when they develop the business plan, they're proposing a plan of new product development based on their market needs, by identifying the presence of opportunities. (INT-DCMBS, p.22)</p>
	Consumer research			→											<p>They'll come up with [product] ideas, based on... them having research too, market research. (INT-DTRD, p.12)</p> <p>Then they'll look into what the current trend is like; they must be coming up with, 'This is the product portfolio that we have this year'... (INT-DTRD, p.11)</p> <p>Why should the living room be clean? Because that's shown off. They receive guests in the living room, so they'll be proud if the guests [comment], 'Wow, the house is very clean'. So that's what emerges from the research. OK, finally [we found that] most important are the areas of the living room, kitchen and bathroom... for the kitchen, actually, what kind of products are needed? For the bathroom, what kind of products are required? What's it like for living room; well, the bedroom we</p>

ROUTINES	1 Business Planning Business planning	2 Market and Industry Analysis	5 Concept Development Potential product identification Developing product concepts	6 Design Preliminary design Detail design Consumer testing	7 Build Business Case Build business case	8 Project Prioritisation Landing review	9 Management Review New stock review NPI gate review	10 Product Development Production scale up	12 Launch Planning Developing marketing program	SUPPORTING EVIDENCE FROM DATA SOURCES
				→						consider more or less similar to the living room. (INT-DCB, p.11) Sometimes, for some big projects, we ask for help from a third party. So [we go] to MarketResearchCo ²⁴³ , or ones who are ethnography experts. What the insight's like – sometimes we also throw them our product [to see] what the inputs they give are like. From there, [we proceed] to the preliminary design. (INT-PD, p.2)
5 Concept Development										
Global portfolio analysis	→		→							We have a [planning] cycle every year, it's called business planning... As we have a plan, we can see what we're looking for... what sort of products would be introduced... We might get [product ideas] from the global [portfolio]: "We have a new product, really; it succeeds in Argentina, for example. Indonesia's market similar to that of Argentina's, so let offer it". (INT-DCMBS, p.12)
Potential product identification			→							Initially we start from the [global] product portfolio analysis... Normally directives from the global [office] ask us to focus on particular categories... Nevertheless, we don't completely take the directions into consideration ... we need to analyse the domestic market situation first, then we look into our existing product portfolio and identify the potential of each category. [Finally], we decide which [product]categories are to be pushed forward in Indonesia. (INT-HBD, p.2)
Developing product				→						...Let's say we need a brush with excellent cleaning ability, which is also able to reach the edges; usually, the edges of [the floor tiles] are difficult to reach. [One that 's] easy to handle, right? One with a handgrip does exist; for example, one from the US uses a handgrip, [so it's] easy to handle. OK, that's the concept [we aim for]; then Mr.'G' [designer] will develop something. (INT-DTRD, p.12)
					→					So marketing has the requirement [of any new products]; next, the team of Ms. 'D' [the technical and R&D director] is one which will develop the specifications. (INT-DCB, p.19)
										The NPI team identifies the superior product concept to meet the customer needs – then what's the

²⁴³ A Market research company

ROUTINES	1 Business Planning Business planning	2 Market and Industry Analysis	5 Concept Development Potential product identification Developing product concepts	6 Design Preliminary design Detail design Consumer testing	7 Build Business Case Build business case	8 Project Prioritisation Landing review	9 Management Review New stock review NPI gate review	10 Product Development Production scale up	12 Launch Planning Developing marketing program	SUPPORTING EVIDENCE FROM DATA SOURCES
concept										<i>feasibility [analysis]? Certainly we look at whether it's feasible to build this product. (INT-DTRD, p.22)</i>
6 Design										
Preliminary design					↔					<i>The R&D and technical teams discuss with manufacturing: 'Oh, if the specification's like this, then to manufacture it should be like that; what kind of materials are [required]?' Then the cost emerges. After that, [R&D] comes back to marketing [to discuss]: 'If the cost of those is so much, does that fit [with the budget]? Well, it's too high. OK, do it again: [revise] the design.' (INT-DCB, p.19)</i>
Consumer testing				↔						<i>...once we have a mock up, we research it with the consumer. The consumer gives thier input again; 'Why is the colour like this?', 'Why isn't it comfortable to use it?'... We alter it again, goare back to product design. They alter the design again, finding a better colour; then we research it again. (INT-DCB, p.20)</i>
7 Build Business Case										
Build business case						→		↔		<i>So, [the managers] prepare the NPI [new product introduction] proposal. Then the proposal is submitted and reviewed in the landing review session. (INT-MT, p.1)</i> <i>Then we prepare the business case, for example, how many [units] approximately are we able to sell. Well, that'll be... we call it a gate review. There are regular reviews: there could be, if I'm not mistaken, three, four or five gate reviews; that [project] will be discussed by everyone together, involving personnel up to the MD, depending on the scale of the project. (INT-DCB, p.14)</i> <i>...From the first step, we look at the business first; if it's OK, [we look at] whether the cost is OK. Normally [the scores] are red, yellow and green. Green means OK, 'go'. But, Red means there's something making us unsure – so it's either improved or killed. Yellow usually means there's something, [maybe the feasibility analysis], which should be revised. (INT-DCB, p.16)</i>
8 Project Prioritisation										
Landing review							→			<i>...see, the result from this landing review..., this is an initial stage [at which] we can really drop or delay a project or new product proposal. And then at the second [option] stage, we can proceed the project to mini gate review, or we call it NSREV; then this third one is [for] the project which [needs</i>

ROUTINES	1 <i>Business Planning</i> Business planning	2 <i>Market and Industry Analysis</i>	5 <i>Concept Development</i> Potential product identification Developing product concepts	6 <i>Design</i> Preliminary design Detail design Consumer testing	7 <i>Build Business Case</i> Build business case	8 <i>Project Prioritisation</i> Landing review	9 <i>Management Review</i> New stock review NPI gate review	10 <i>Product Development</i> Production scale up	12 <i>Launch Planning</i> Developing marketing program	SUPPORTING EVIDENCE FROM DATA SOURCES
										to get] <i>through the full gate review or NPI.</i> (INT-MT, p.1) <i>NPI-New Process Flow</i> (DOC3, slide 2, 4, 5)
							→			<i>...normally, Ms. 'D' [the technical and R&D director] or Mr. 'H' [the technical manager] compile all the NPIs [from] the whole company; from there, they select, for example, the top 20... these top 20... are examined [to decide] which ones are class 1, class 2, class 3; class 3 should go to the NPI [new product introduction] gate review.</i> (INT-HBD, p.27) <i>NPI-New Process Flow</i> (DOC3, slide 2, 4, 5)
9 Management Review										
NPI gate review								↔		<i>...[for example, let's say] I want to develop a pen with a certain price and design. When we scale up, [we discover] OK, this can match [the requirements], for example. In the gate review, we'll then adjust [the product] with [management's] approval... after [the adjustments] for the scale-up are clear, then we'll have a directive. OK, we can continue. The cost is appropriate; the features will be made appropriate by doing this or that. We'll proceed... to continue to scale-up again, then go to the last scale-up...</i> (INT-EP, p.9)
Post launch review							→			<i>After one year of selling, the OI got around 15% to 18%; so I went into the MD's [managing director] room again. I was asked to present [the project] again. I was given a three-month period: if I failed to make [the OI] positive, kill [the project]!</i> (INT-HBD, p.18)
10 Product Development										
Production scale-up									→	<i>In the launching plan, the final price is actually there. When [the product is to be launched] we know already [the price] for the scale-up [state].</i> (INT-DTRD, p.29)

**E.5 ROUTINES IN PORTFOLIO MANAGEMENT-SIMULATION ANALYSIS:
CASE STUDY 3-MULTIPRODUCTCO**

Routines	Representative Quote	Corresponding Conversations in the Simulation	#	Representative Quotes
Business Planning				
Business planning	<i>...Marketing, alongside divisional heads – business, sales and technical – all undertake a coordination meeting; we call it a business plan meeting. In that business plan meeting, we look into, “Oh, these are the market needs and the size is like this. What products we have, what products we’re able to launch this year” – what products will continue to sell this year, what products we’ll discontinue because, for example, they’re unprofitable. (INT-DTRD, p.23)</i>	Identifying strategy	1	<i>OK, meaning that the strategy in here is to increase revenue... the new markets to expand the [customer] base, opening new markets appropriately (SIM-DCMBS, 00:00:00-00:00:15)</i>
		Considering strategy	7	<i>That’s from a financial aspect, [whereas] this concerns where the company’s going. This market is an entry point [by which] to dominate a new market (SIM-MS, 00:36:05-00:36:23)</i>
Market and Industry Analysis				
Market research	<i>... identify the market opportunity... The [marketer] will look at what the trend looks like. They classify the customers then determine their target market... They really do have research too, market research. (INT-DTRD, p.18, 11-12)</i>	Identifying market characteristics	1	<i>From what I see, it seems the industry is very competitive (SIM-MBM3)</i> <i>It means that in a such competitive [industry] the products [offered] for the mature market are decaying, right? We can’t play with the price anymore. (SIM-DCMBS) (SIM-DCMBS, MBM3, 00:00:33-00:00:57)</i>
Consumer research	<i>...we ‘ve been looking into what the consumer insight is first... for the preliminary data; after that we have backup from the research... We’re always backed up by research... (INT-MB1, p.17)</i>	Identifying consumer perspective	1	<i>From the consumers’ point of view, ‘Castor’ is the most interesting one. (SIM-MBM3)</i> <i>‘Castor’, from the five-year projection, is OK; from the NPV is OK (SIM-MBM2) (SIM-MBM2, MBM3, 00:15:02-00:15:26)</i>
New Product Explorations				
Potential products identification	<i>This is one we study: OK for the kitchen, actually what kind of products are needed? For the bathroom, what kind of products are required? What’s it like for the living room; well, the bedroom, we consider to be more or less similar to the living room. (INT-DCB, p.11)</i> <i>...from the beginning, it’s been determined that we’re gonna produce four types of paper packs with different designs and fragrances. (OBS-MBM1, p.2)</i>	Entry point to new market	3	<i>...that [project] becomes an entry point, right? It’s the ‘door knocker’ (SIM-MS, 00:36:29-00:36:37)</i>
		Adding new projects into a portfolio	1	<i>If we intend to have extra projects, which projects do we want to include? (SIM-EP)</i> <i>At the most, it’s between ‘Betria’ and... (SIM-DCMBS)</i> <i>‘Antares’ (SIM-HD) (SIM-DCMBS, HD, EP, 00:33:18-00:33:30)</i>
		Portfolio balance	1	<i>...so if [there’s] three [product groups], [we allocate products to] each in terms of the short-term,</i>

Routines	Representative Quote	Corresponding Conversations in the Simulation	#	Representative Quotes
				<i>mid-term and long-term. We can define that short-term [projects] are launched less than one year, mid-term: one to 2 years, or around three years. (SIM-DCMBS, 00:01:32-00:02:07)</i>
Build Business Case				
Build business case	<i>...in the business case we present the potential market to be so much; then we plan, in the first year, in which [channels] we'll pipeline the products first. Sometimes we don't use all the channels at once. (INT-DCB, p.22)</i>	Considering development time	2	<i>I feel that [projects] like 'Atlas' iare very long term, even though the NPV is immense. (SIM-MBM3, 00:09:48-00:10:02)</i>
		Timeline	6	<i>Another interesting thing which needs to be carried out is the preparation of a timeline for the launch... (SIM-DCMBS, 00:29:31-00:29:43)</i>
		IP and control concern	1	<i>In my opinion, for 'Castor' the risk looks lower... The non-financial risk... However, there's a clause [in the case] that the formulation is carried out a third party; it's like us. (SIM-MBM3)</i> <i>OK – there's an IP concern, right? (SIM-DCMBS)</i> <i>Yes, IP and control perhaps. (SIM-MBM3)</i> <i>(SIM-DCMBS, MBM3, 00:14:22-00:14:59)</i>
Resource analysis	<i>The next consideration [in selecting new products] is resources. There's two kinds of resources: people and funding. Well, [about] people: [we] need to consider that the sales team only works in the super highway [distribution channels]; as for marketing, the brand marketing and channel marketing are really limited. [We need to know] what tasks they're focusing on now... Then, in terms of the funding resources, the A&P budget is limited really. If we launch a product, it must have funding; meanwhile the existing products also need funding; we can't let them go... are we able to fund this new product or not? (INT-HBD, p.4)</i>	Considering resource issue	7	<i>It ['Antares'] is a new brand (SIM-MBM3)</i> <i>The resources are not available right? (SIM-DCMBS)</i> <i>Yes, there are not resources (SIM-HD)</i> <i>New brand means requiring effort (SIM-DCMBS)</i> <i>Yes, huge effort (SIM-HD)</i> <i>(SIM-DCMBS, HD, MBM3, 00:26:40-00:26:54)</i>
Project Prioritisation				
Landing review	<i>So basically, the landing review is the initial filter for conducting the prioritisation [of projects]. [It's] to determine which projects are indeed necessary to be followed up; it [also determines] which methods should be used [for follow-up] (INT-MT, p.1)</i>	Financial vs marketing driven	1	<i>Now the question is whether, if we have the option, [we should choose] financial-driven or marketing-driven [projects]? (SIM-DCMBS)</i> <i>If we look here, the number one ['Antares'] is a financial-driven [project] (SIM-HD)</i> <i>(SIM-DCMBS, HD, 00:21:27-00:21:41)</i>

Routines	Representative Quote	Corresponding Conversations in the Simulation	#	Representative Quotes
		Financial and technical	1	<i>...from a number of factors, we consider technical and financial aspects. (SIM-DCMBS, 00:39:09-00:39:22)</i>
		Considering ratio of development cost to NPV	4	<i>if we look at the ratio, the development cost to NPV ratio, the smallest one actually is... (SIM-MBM3)</i> <i>'Asterion' (SIM-HD)</i> <i>(SIM-MBM3, HD, 00:12:28-00:12:40)</i>
		Considering NPV	3	<i>Go for Bellatrix, because it contributes a higher NPV (SIM-HD, 00:19:41-00:19:54)</i>
		Applying portfolio method	1	<i>...this another one: please calculate the [ratio] development cost to NPV. If the ratio is too high, like 50% of the NPV, what for? (SIM-DCMBS, 00:09:21-00:09:34)</i>
		Considering technical probability (Risk)	1	<i>...the technical probability is the highest, isn't it? ... 'Betria' is 80%, really (SIM-MBM3)</i> <i>The others are also high, aren't they? (SIM-MBM2)</i> <i>'Capella' 80%, 'Asterion' 85% (SIM-HD)</i> <i>(SIM-HD, MBM2, MBM3, 00:04:39-00:05:03)</i>
		Portfolio selection decision	1	<i>OK, so do we agree or not [with selecting] the four [projects]? ...'Asterion', 'Bellatrix', 'Capella' and 'Castor' (SIM-DCMBS, 00:27:03-00:27:16)</i>
		Prioritisation	7	<i>So if we want to launch product group B, [select] just one – not both of them... (SIM-MBM3)</i> <i>In that category, which one is the most detrimental? ...the options are: we select bot,h or only one of them. It's possible [to select] one out of 'Bellatrix' and ' 'Betria' is possible, isn't it? (SIM-DCMBS)</i> <i>(SIM-DCMBS, MBM3, 00:19:07-00:19:40)</i>
		Marketing process based prioritisation	1	<i>From the marketing process, we can see that these four [projects] are the most possible ones; and we have come out with the order sequence (SIM-DCMBS, 00:39:15-00:39:33)</i>
		Product characteristics	3	<i>I'm actually not very keen on product group B (SIM-MBM2)</i> <i>Yeah, because the NPV of product group B looks small, doesn't it? 27B is the smallest (DCMBS)</i> <i>However, [it's in] a mature market (SIM-MBM2)</i>

Routines	Representative Quote	Corresponding Conversations in the Simulation	#	Representative Quotes
(SIM-DCMBS, MBM2, 00:03:39-00:03:59)				
Management Review				
NPI gate review	<i>We even put a filter now: 'why is this [product developed]? Can it be sold? It may be a dead stock. Who are the markets? Are they able to buy this product? Is there any competitor? Who are the channels? ...we ask all of them [in the review], otherwise all [project proposals] will go through. (INT-DCMBS, p.13)</i>	Market risk	1	<i>it means that, looking at the history of 'Asterion', we have to mitigate... That's is a big risk that we face. (SIM-MBM3, 00:37:15-00:37:28)</i>
Existing products review	<i>We should still review [the products] in the store; are they still moving? Why are they not moving? Whether there are new better competitors or indeed, [the products] aren't relevant anymore for the market... So to me, there is no such word as 'done'; [the products in the market] indeed should always be reviewed. (INT-DCB, p.26)</i>	Evaluating current projects	1	<i>...so put it like this: we look at the raw idea first. Consider 'Betria' and 'Bellatrix' first. 'Bellatrix' has been in the market; the question is, should it be stopped or not. 'Ongoing' means being sold. (SIM-DCMBS, 00:4:07- 00:04:25)</i>
Launch Planning				
Developing marketing programme	<i>...what the marketing programmes need to be like to attract customers to come into the book stores, or [when they] come to the DIY [shelves] and, seeing our various products, they take them. (INT-MS, p.9)</i>	Marketing communication program	2	<i>Besides the business decision, there's a marketing factor [that should be considered] for 'Asterion'; it failed once because of... (SIM-MBM3)</i> <i>... [You mean] the content of 'X' – but it's being rectified (SIM-MBM2)</i> <i>Exactly, but it means that later, for the launch, we'll need... (SIM-MBM3)</i> <i>...[to provide] education (MBM2)</i> <i>Yes – we need to prepare new investment for communications and education. I think that's a risk, really... (SIM-MBM3)</i> <i>(SIM-MBM2, MBM3, 00:13:48-00:14:24)</i>

E.6 THE ESPOUSED BUSINESS STRATEGY CONSIDERED IN THE ROUTINES: CASE STUDY 3-MULTIPRODUCTCO

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Organisational Goals					
Business size	● ●		<i>To have a large scale of business, and also having superior profits (INT-MT, p.20)</i>	<p>Business Planning: Business planning <i>...In that business plan meeting, we look into, 'Oh these are the market needs, and the size is like this...' (INT-DTRD, p.23)</i></p> <p>Market Analysis: Market research <i>This, for example, is one of the first local projects... We determined first what the business opportunity and market size were like; this was prepared by the business team... (INT-PD, p.5-6)</i></p> <p>Concept Development: Potential product identification <i>...strategically, we actually intended to increase demand in the office market, because so far our growth in this area doesn't seem significant. Meanwhile, the office [products] contribute 70% to [the brand division]; so we want to enlarge the office market through this product. (OBS-MBM2, p.23)</i> <i>'P' brand is strong enough, so we think we need to enter [the 'O' market] to enlarge the market size. Because we now focus on ...enlarging the size. (OBS-MBM2, p.36-37)</i></p>	
Sales (top line)	● ●		<i>...one of our targets is the top line. The top line is not volume, [but] sales in USD (as we are a multinational company, sales are in USD). However, it's not just the top line... we have top-line and bottom-line targets. (INT-DTRD, p.23)</i>	<p>Market Analysis: Market research <i>For example, one of our first local projects was brushes... We define the business opportunity, and what the market and the sales are like; this [analysis] is made by business team... (INT-PD, p.5-6)</i></p> <p>Concept Development Potential product identification <i>By looking at how much the potential sales are, and then we look at how much the costs are, how much the profitability is; well, we look at those, basically. [From these figures] we set out the priority of the products to be developed. (INT-MBM1, p.9)</i></p> <p>Project Prioritisation:</p>	

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Profitability (bottom line)	● ●		<p><i>Number one is profitability... [profitability] for the total range of products. (INT, HBD, p.7)</i></p> <p><i>For products in this tier, the GM target is fairly high... we'll certainly increase the GM. We want this product to lift up our GM. (OBS-MBM2, p.38)</i></p>	Landing review	<p><i>Normally, [the technical and R&D directors] and [the technical manager] compile the whole corporate NPI. From there they select the top 20 [projects]. The consideration could be sales, and next the potential to succeed over [the competition]... (INT-HBD, p.27)</i></p> <p>Management Review:</p>
				Presentation to LT	<p><i>Because [the project] has an impact on profit, sales – the top line and so forth – we have to provide all of that information; then [we] have to conduct presentations. If, for example, the target [market] is big and the opportunity is very vast, [then the presentations] would [involve] the MD. (INT-MBM2, p.5)</i></p>
				New stock review	<p><i>...as the NSREV process is short, we directly look into what the price is what the profit is; as the investment is actually not that huge, so we are not concerned with too much as long as whether the sales is big enough and the profit achieves our target., then please launch... in here the marketer submits the SKU review request using the electronic database facility, called NSREV (INT-MT, p.10-11)</i></p>
				NPI gate review	<p><i>'I commented about the distribution plan just now, because you mentioned [you will distribute the product through] 10,000 stores. Without underestimating it, ... within three months, could all those 10,000 be covered? If not, it would impact on the sales achievement.'</i> (OBS-DCMBS, p.20)</p>
				Business Planning:	
				Business planning	<p><i>We're advised what the strategy is. For example, this year we'll focus on... cleaning equipment. Well, we'll focus on them, because may be their margins are great... (INT-MS, p.4)</i></p>
				Concept Development:	
				Potential product identification	<p><i>We see from..., how much potential sales are, then how much costs are; we consider what the profitability is. Well, we see from those things... how to set out the priority of the products to be developed. (INT-MBM1, p.7)</i></p>
				Build Business Case:	
				Build business case	<p><i>Finance is involved – the finance counsellor; ...they normally just calculate the profitability... If a prototype is in place... the</i></p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
					<i>feasibility [analysis] begins. There are prototypes and calculations; the costs are already known, then the cost estimation is presented. (INT-DCMBS, p.28)</i>
				Project Prioritisation:	
				Landing review	<i>Well, the bases for determining [projects] are the measures we use here [in the landing review], ranging from profit, margin and sales estimation; then probability of the success, either in terms of marketing or technical. After these emerge, a collective decision is made. (INT-MT, p.18)</i>
				New SKU request	<i>...if I analyse [a new project] at the beginning of NPI, we'll look firstly at our current SKU; we compare this year's and last year's [operating profits], and then this year's [operating profit] with our budget. We want to see the SKU profitability of business group division, right up to commodity levels... (INT-FC, p.3)</i>
				Management Review:	
				New stock review	<i>...if [development] is just sort of converting [from the existing global portfolio], the only things we look at are whether the cost and pricing are OK – how about the profitability? That's normally performed at division head level. (INT-MBM1, p.7)</i>
				NPI gate review	<i>...later, in the gate review we discuss... as in the vision they have to go after top line, they have to [focus on seeking] what sort of products they have to sell. However, we have to be aware that the target is not only top line but also bottom line (INT-DTRD, p.18)</i>
				Post launch review	<i>[After launch, the company measures the success of the portfolio] through the 'product mix report' [produced by] finance, FC. I'll draw data from SAP... so I can calculate the profitability until the SKU level (INT-FC, p.12-13)</i>
				Product Development:	
				Production scale up	<i>We actually had one NPI [project] which was not profitable. There were some deviations in the middle [of production] which had not been captured during the scale-up process... At that time we had to improve the quality, which required higher cost. In the end, this caused the profitability to go down. (INT-EP, p.11)</i>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Market share	● ●		<i>The second one [goal] is gaining share; market share and shelf share. (INT-HBD, p.8)</i> <i>...then we talk about market share; our share is actually still better than competitors. (OBS-MBM2, p.36)</i>	<p>Business Planning:</p> <p>Business planning <i>If... [the managers] have [reached] the final business plan, coming up with a list of source of growth, either from share gain or new products, they present again in front of LT and [the managing director]. (INT-DTRD, p.33)</i></p> <p>Concept Development:</p> <p>Potential product identification <i>When we launched a non-scratch [scourer]... we considered that it might result in the cannibalisation [of other, similar products]... but [we launched it] because we aspired to a bigger goal; we're gonna increase [the market] share – the total share was to be achieved. (INT-HBD, p.20-21)</i></p> <p>Management Review:</p> <p>Post launch review <i>...after launch, the success [of new products] is seen from... the top line (the sales value) and the bottom line (the profit). The sales might be low, the profit also might be low; [nevertheless, if] the market share [increases] from 5% to 20%, this can be a success point. (INT-MT, p.21)</i></p>	
Brand position	●		<i>For the consumer [business], besides large business scale and superior profit, it can bring out the MultiproductCo brand, because [its products] go for retail [business]. (INT-MT, p.20)</i>	<p>Design:</p> <p>Detail design <i>In detail design... we determine the colour character we want... We cross-check the colour character of the product portfolio, making sure it's in line with others. Enabling the brand identity to be in-line with other products. (INT-PD, p.7)</i></p>	
Competitive strategy					
Technology Innovation	● ●		<i>Our competitors are many; local [competitors] are already able to produce [similar products]. Well, the difference is, MultiproductCo has [advanced] technology. (INT-DCB, p.5)</i>	<p>Concept Development:</p> <p>Global portfolio analysis <i>.. [Marketing] searches for [new potential products] from the SOS. We, [as a corporate], have worldwide subsidiaries anywhere; for example, we don't now pick new products from the US [collection] anymore, unless for some technology-based products which aren't yet available here... (INT-DTRD, p.11)</i></p> <p>Potential product identification <i>For the kitchen, we have a speciality in fibre. MultiproductCo's technology is in there. Ok – fibre. What are we gonna use it for?... (INT-MBM1, p.13)</i></p> <p>Developing product <i>In [product concept] development ...of the technology we have</i></p>	

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Channel	•	•	<p>...if we mention platform strategy, the first one indeed addresses the [distribution] channel. So we develop channels that are relevant for us. (INT-DCB, p.7)</p>	<p>concept</p> <p><i>which one that can be used... (INT-PD, p.2)</i></p> <p>Project Prioritisation:</p> <p>Landing review</p> <p><i>Landing Review Document: RWW [Real-Win-Worth]-Does the technology exist in the Division? Inside [MultiproductCo]? (DOC3, p.3)</i></p> <p>Management Review:</p> <p>NPI gate review</p> <p><i>...[In the gate review, we also review] the manufacturing aspects, from cost, then in terms of intellectual property. For example, have we checked whether there are other [companies] with the same technology who have launched their products ahead of us? (INT-DCB, 16)</i></p> <p>Business Planning:</p> <p>Business planning</p> <p><i>...[the consumer business director] then the MD need to provide targets. For example, for this year, [the sales of] new products have to reach so much; it actually comes from ourselves, [planning], though... What growth do you want achieve this year? Are there new channels you're gonna open?... (INT-MBM2, p.13)</i></p> <p>Market Analysis:</p> <p>Market research</p> <p><i>This, for example, is one of the first local projects... First we determined what the business opportunity and market size were like; this was prepared by the business team. Then [we also analysed] the business landscape, potential clients, channels, and then the target markets. (INT-PD, p.5-6)</i></p> <p>Concept Development:</p> <p>Potential product identification</p> <p><i>We normally [look at] the market, and analyse what Indonesia's market situation is like. From the product portfolio we have, we identify the potential of each [product] category; then decide which categories we want to focus on in the Indonesia market. (INT-HBD, p.2)</i></p> <p><i>Initially we start from the [global] product portfolio analysis... normally, a directive from the global [office] asks us to focus on particular categories... Nevertheless, we don't entirely consider the directives ... we need to analyse the domestic market situation first, then we look into our existing product</i></p>	

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
					<i>portfolio and identify the potential of each category. [Finally], we decide which [product] categories are to be pushed forward in Indonesia. (INT-HBD, p.2)</i>
				Channel determination	<i>[Before a product is developed] we've determined the channel where it's gonna be sold. For example, [say] we want to sell the product on the GT channel; we in the commercial [division] as the representatives of the market, will [give advice] as to whether the product will be accepted or not. (INT-MS, p.7)</i>
				Build Business case:	
				Build business case	<i>...in the business case, we present the potential market as being so much; then we have a plan – in the first year, via which [channels] we'll pipeline our products first. Sometimes we don't use every channel at once. (INT-DCB, p.22)</i>
				Project Prioritisation:	
				Landing review	<i>Landing Review Document: RWW [Real-Win-Worth]- Do we have adequate channel strength in the market? (Market coverage) (DOC3, p.3)</i>
				Management Review:	
				NPI gate review	<i>We even insert a filter now: 'Why has this [product been developed]? Can it be sold? It might be dead stock. Who are the markets? Are they able to buy this product? Is there any competitor? Who are the channels? ...we ask all of these [in the review], otherwise all the [project proposals] will go through. (INT-DCMBS, p.13)</i>
				Post launch review	<i>...After scale-up comes post-launch, then [the channels] are reviewed: are they the right channels [by which to distribute the products]? (INT-PD, p.12)</i>
				Product Development:	
				Production scale up	<i>Scale Up Core Deliverable Definitions: Market Launch Plan-The global launch plan with items such as end user, distributor, channel, sales staff literature, and collateral identified. (DOC2, p.32)</i>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Differentiation	●	●	So that's actually the differentiation... (INT-DCB, p.5) What is the differentiation like; is this [product differentiation] is the same as that of the regular [products]? (OBS-DCB, p.29)	–	–
Product portfolio	●		So if we talk about a platform strategy, indeed, it leads to a complete [portfolio], [in which the products] support one to another and also fit local needs. (INT-DCB, p.12)	<p>Launch Planning:</p> <p>Store listing</p> <p>–</p> <p>Market Analysis:</p> <p>Consumer research</p> <p>Concept Development:</p> <p>Potential product identification</p> <p>Project Prioritisation:</p> <p>Landing review</p> <p>Management Review:</p> <p>Existing products review</p>	<p>...the challenge, I think, is greater when we launch the product. It's enough that we have a good product with a good price. [If] we have an outstanding performance product compared to that of competitors and with an affordable price, but we don't have right number of channels, then [our product] won't boom (INT-DCB, p.28)</p> <p>We actually always begin from the [consumer] room. [We identify] what the consumer needs are, and we want to be able to provide their needs as completely as possible. That's what the portfolio is like. (INT-MBM1, 14)</p> <p>Well, from the [marketing] insight, we then look at what products we have now – the current portfolio – then we identify what the gaps are, and therefore what [kind of products] we should ideally have. (INT-MBM1, p.2)</p> <p>Afterwards we have some products or projects; we use a C&E matrix like this. This is one which could [be used to] manage the portfolio here [in the landing review] and which we make a priority. (INT-MT, p.3)</p> <p>We actually have to review the products regularly. I, together with my team, normally review the portfolio; we call it SKU rationalisation. (INT-DCB, p.26)</p>
Communication	●	●	... so we can instead develop increasingly [higher] tier [products]. In the end, I think the important thing (and the utmost challenge) is education [about the products] and	<p>Market Analysis:</p> <p>Consumer research</p>	<p>...we conducted research... among students. We wanted to investigate their behaviour in terms of how they used stationery to how they bought it. The research basically looked</p>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs			
			<i>communication [to the consumers]. (INT-DCB, p.7)</i>		<i>into the whole thing... to reveal everything... [including] what type of communication should be carried out, up to what kind of product they need. (INT-MBM2, p.2)</i>
				Launch Planning: Developing marketing programme	<i>...because '1' [brand] is not really known yet as a tool for [supporting] meetings and brainstorming. So we should take it [to consumers]; the communication [used to introduce it] should be huge. (OBS-MBM2, p.23)</i>
Capabilities					
Developing people	●		<i>...if we mention platform strategy... third is people, developing people (INT-DCB, p.7)</i>	–	
Productivity	●		<i>...if we mention platform strategy... and fourth is indeed productivity (INT-DCB, p.7)</i>	–	

E.7 ROUTINES AND ELEMENTS OF BUSINESS STRATEGY: CASE STUDY 3-MULTIPRODUCTCO

BUSINESS STRATEGY	<i>Business Planning</i>	<i>Market and Industry Analysis</i>	<i>New Product Research</i>	<i>Ideas Provision</i>	<i>Concept Development</i>	<i>Design</i>	<i>Build Business Case</i>	<i>Project Prioritisation</i>	<i>Management Review</i>	<i>Product Development</i>	<i>Project Review</i>	<i>Launch Planning</i>	<i>Whole Portfolio Management</i>
Organisational Goals (OG)													
Business size	●	●			●								
Sales		●			●			●	●				
Profitability	●				●		●	●	●	●			
Market share	●				●			●	●				
Brand position						●							
Proportions-OG	3/5 (60%)	2/5 (40%)			4/5 (80%)	1/5 (10%)	1/5 (20%)	3/5 (60%)	3/5 (60%)	1/5 (20%)			
Competitive Strategy (CS)													
Technology innovation					●			●	●				
Channel	●	●			●		●	●	●	●		●	
Differentiation													
Product portfolio		●			●			●	●				
Communication		●										●	
Proportions-CS	1/5 (20%)	3/5 (60%)			3/5 (60%)		1/5 (20%)	3/5 (60%)	3/5 (60%)	1/5 (20%)		2/5 (40%)	
Capabilities (C)													
Developing people													
Productivity													
Proportions-C													
Overall Proportions	4/12 (33%)	5/12 (42%)			7/12 (58%)	1/12 (8%)	2/12 (17%)	6/12 (50%)	6/12 (50%)	2/12 (17%)		2/12 (17%)	32%

**APPENDIX F DATA SUPPORTING CASE STUDY 4-
AUTOCOMPCO**

F.1 FIRST-ORDER CODING AN INTERVIEW: CASE STUDY 4-AUTOCOMPCO

Transcript	First-Order Codes
R&D Manager, p.5	
<p><u>...Where we are going to go, really. [we are going to develop] Mirror [products] ; we map it. OK, the one likely to be the trend is like this. We realise we're not a leader in the mirror industry. We're just a small company. In Indonesia, to be honest, we're the only one developing mirrors; the others are Japanese companies which have opened factories in Indonesia. Well, we ensure that, when I was assigned by Mr. 'A'... I looked at what they had been doing, what their portfolio was; and then I cross-checked with Indonesia: what the environment is like, what the people are like... whether the customers want to have [different] models or just a common model, because some considerations they have mean [those models] are not required...</u></p>	<p>Annual meeting</p> <p>Product research and concept</p> <p>Market research</p>
<p><u>I watched over our competitors, because we're not a leader: we're a follower. However, [we're not] a follower which takes the wrong [way]. If possible, we take over [new product ideas] which, in their countries, are already matured; at the same time, they haven't noticed that apparently the market in Indonesia is unique.</u></p>	<p>Product research and concept</p>
<p><u>We tried to develop a sort of a hydrophilic glass, in which when water drops on it, the water flows down right away. It's actually a long-established technology; however as we see, the rainfall in Indonesia is high and ambience is humid, so it would better if we have such coating technology, even though in Taiwan, Japan... our competitors have already had that kind of technology... but what I mean is, given the facilities we have, whether we're able to develop on our own; if possible, we're the first one to offer it to customers.</u></p>	
R&D Manager, p.5	
<p><u>After we visit automotive exhibitions, [we see that] a single form can be made to be applied in various brand makers. Therefore, when we talk about [developing new products] with small investment, besides a mirror, ...since last year we've developed a room lamp.</u></p>	<p>Mapping potential customers and products → Product research and concept design</p>

F.2 ROUTINES IN PORTFOLIO MANAGEMENT: CASE STUDY 4-AUTOCOMPCO

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Pre-Annual meeting	●			<i>I'm responsible for mapping what kind of products would be developed; whether they're aligned with the planning of the marketing division. That happens in a pre-[annual] meeting, in which discussions between divisions occur...</i> (INT-MRD, p.7)		[Those who attended a pre-annual meeting] are department heads and division heads, or some other [participants] could be senior section heads who can give their views. (INT-MRD, p.14)	<i>... If an agreement is reached in one division that, "Oh, OK next year we'll develop these customers with these products, with the budget of that much", then we bring it to a annual meeting.</i> (INT-MRD, p.7)
Annual meeting	●			<i>...we have [an annual] meeting in December to [discuss] the following year's [plan]. We determine [the company's] targets...</i> (INT-DHEM, p.10)	<i>What kind of projects we're gonna run in the following year are normally decided at the end of the year. We usually [do] it in October or November.</i> (INT-MEPJ, p.27)	<i>...the pre-[annual] meeting is only within divisions... whereas in a annual meeting, all divisions meet each other.</i> (INT-MRD, p.14)	<i>...the order of the pre-[annual] meeting and annual meeting [is as follows]: ...proposals [of new projects] should be presented from departments are then cross-checked at division level; then they are cross-checked again at AutocompCo level...</i> (INT-MRD, p.10)
Presenting development plan to group company	●			<i>We only discuss as far as mapping projects... We propose the FS of a project... which needs so much investment; [then] we submit it to GroupCo. The FS is studied by GroupCo; [if they say] 'OK', then the budget will be released.</i> (INT-MMT, p.22)		<i>...even though the COO considers the project to be very good, if GroupCo's policy is different, well, "Sorry, [it has to be] cut".</i> (INT-MRD, p.10)	<i>...next, [the results] from the annual meeting are brought in to GroupCo; the management should present them: "We will do these [projects] next year"...</i> (INT-MRD, p.7)
Market research	●	●		<i>Own products are ones for which really we do our own market research... [We study] what the customers and end users are like; we look into the market segment...</i> (INT-MEPJ, p.1)	<i>Normally, this [market] study is purposed mainly for the [company's] own products.</i> (INT-MRD, p.10)	<i>The role of the marketing team is actually to see what the market's like, where it moves to. It's not only the trend of the models but also the direction of industry policy.</i> (INT-DHP, p.14)	<i>Development Experience: Project 'X' After Market-Market Study, Market Investigation, Market Scanning</i> (DOC1, p.30)
Mapping potential customers and products	●			<i>Marketing has mapped potential customers. They have had insight for the year 2015 – what new products are in the minor chain and the major chain; what the opportunities are like. These have been portrayed since the</i>		<i>...for RDDP [request for design and developing parts] products, we ask marketing what the new models for next year at like, up until 2017. We'll try to map [the potential products]...</i>	<i>I'm responsible for the mapping of what kind of products would be developed; whether they're aligned with the planning of the marketing division...</i> (INT-MRD, p.7)

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Product research and concept design	●	●		beginning. (INT-MEPC, p.9) ...while we receive [product] drawings from customer, we also do our own research and development... For example, for the products from 'H' and 'T' ²⁴⁴ ... [R&D] have already had the [products] drawings – so we just need to follow those drawings... (INT-MPPIC, p.1)	We always prepare [new models] every year. The target's supposed to be that every two years, [the customers] can launch a new model. So every year we propose to the customers that what we have is this, this, this. (INT-MRD, p.15)	Development Process Chart-Product #2, #3: Product Benchmark (DOC5, p.1; DOC6, p.1)	...well, we start [carrying out] concept design, later we design it; then we offer it to the car manufacturers... Although they haven't requested it, we offer them that design... (INT-CPD, p.1)
Product concept screening	●			In the [ideas] screening we need to show that this [concept] is feasible to be developed. So it never happens that our idea is very beautiful in terms of shape, but difficult to be realised. (INT-MRD, p.16)		In the [ideas] screening, normally we let the designers create more than 10 ideas. Firstly, we call marketing to screen them; then we call our colleagues in engineering to screen them again. Finally, they're refined; [they're] coming with what their costs are... what their prices are, how long the lead time is. (INT-MRD, p.16)	
Design information-RDDP	●	●		R&D will create design info. Design info is a kind concept, [describing] what the shape of this product looks like, what the design is like... it's not a detailed drawing yet. (INT-MEPJ, p.3)	Product Development: Capabilities-Styling Idea (DOC1, p.28)	...R&D will try to capture information to carry out the concept design. Along the way in the concept design, interactions between R&D and Engineering project occur. If things are concerning materials, [R&D] will coordinate with us, [the engineering project team] (INT-MEPJ, p.4)	After [receiving] an RFQ, we conduct an FS. Well, we'll ask R&D to release design info, showing the position of the part and what the space is like. The design info released by R&D is like our reference for preparing the FS. (INT-MEPJ, p.3)
Detail design	●	●		...R&D creates a detail drawing. A detailed drawing is developed following us receiving LOI [letter of intent]. So [it shows] what the dimensions are... (INT-MEPJ, p.5)	Development Process Chart-Product #2, #3: Detail Design (DOC5, p.1; DOC6, p.1) Product Development: Capabilities-Detail Design Idea (DOC1, p.28)		Customers provide drawings after issuing a LOI [letter of intent]. After that, R&D translate the drawings [into detailed drawings]. (INT-MTM, p.12)
Design review	●			A drawing normally needs approval from the designers and the leader.	At the detailed drawing stage, R&D carries out what's called a design	...[A design review] involves internal teams from engineering project,	[the design review is in] the drawing development phase... for RDDP, it's

²⁴⁴ Car manufacturers.

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>Discussion with us can be considered to be a design review; [for example], whether the suppliers can provide one like this. (INT-MPR, 10)</i>	<i>review. A design review is conducted normally at least twice... (INT-MEPJ, p.5)</i>	<i>quality, the workshop team who develops the mold, and marketing who views the business aspects. (INT-MEPJ, p.5)</i>	<i>conducted after the FS. (INT-MEPJ, p.16)</i>
Offering new product concepts to vehicle makers	●			<i>We know that the best-selling cars in Indonesia, for example, is 'H'²⁴⁵ [brand]. We [identify] what kind of accessories are needed that we can offer to 'HM'²⁴⁶. From tha, ...we develop the designs, [then] we offer them (INT-CPD, p.2)</i>			<i>... our colleagues [in R&D] make a number of designs, then submit them to me, then I take them to the customers... [From those models] they select one or two... (INT-MP2, p.7)</i>
RFQ review and Quotation preparation	●	●		<i>So marketing should prepare the quotation, then we offer it to 'CCC' ... Marketing will submit the quotation to 'CCC'... (OBS-SHP, p.21)</i>	<i>Normally we receive a RFQ, a request for quotation, 2-3 months before [submitting the quotation]... We propose a price...The price is normally obtained from product planning [prepared by] R&D... (INT-DHEM, p.11)</i>	<i>...The engineering [project team] carries out the calculation for the quotation first; next, marketing analyses whether the cost is acceptable or not and how much the profit or loss is. After that, we submit it to the customer... (INT-MP1, p.7)</i>	<i>...[the lead time] from RFQ up to when we can provide a quotation, then receiving the LOI [letter of intention] is actually still unsatisfactory. (INT-DHP, p.11)</i>
Feasibility study	●		●	<i>Development Process Chart-Product #1, #2, #3: Feasibility Study (DOC4, p.1; DOC5, p.1; DOC6, p.1)</i>	<i>The engineering [project team] normally conducts a feasibility study when we receive new products; regardless of the type of product from the three types we have... from the FS it can be seen which projects need high investment, and which ones have lower costs and high profits (INT-MPPIC, p.2)</i>	<i>The FS committee is led by engineering project, consisting of R&D, marketing, quality [assurance], and another one... (INT-MRD, p.13)</i>	<i>...when we, [marketing], receive an RFQ, we send a letter to engineering [project] asking for preparation of the feasibility study for this part, including how much the COGM is. (INT-MMT, p.8)</i>
Project budgeting	●			<i>How much is our budget? We calculate OPEX [operating expenditure] for everything related to project operations... We mainly draw up a budget for the production process and mold making... What's the basis? It's based on the LOI [letter</i>		<i>...[The project budget] comes from engineering project. Later on, accounting colleagues provide assistance. Especially marketing: marketing must check it: "Oh, this is excessive; the budget isn't enough"... (INT-MCC, p.10)</i>	<i>In purchasing, we look at how much the offer from the supplier is? If it turns out, [for example], to be only 500-550, then the budget will be set at a maximum of 550. So there's still a saving from the initial COGM, which makes our profit higher. (INT-MMT,</i>

²⁴⁵ A car brand sold in Indonesia

²⁴⁶ The 'H' brand manufacturer

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				of intention] and the COGM we obtain afterwards (INT-MMT, p.4)			p.4)
Management approval	●			...[decisions about a project are determined by] collective consensus. Initially, marketing will make [the decisions], but we, the board of directors, must say, 'OK, how much will the profitability be if we take [on the project]... (INT-COO, p.9)		... the feasibility [study] shows that we have so much opportunity. From the department level's view, we can increase our sales. However, the division level [managers] and the COO might have a different view – so the decision might be [based on that consideration]. (INT-MEPJ, p.14)	If the product isn't profitable, engineering will inform marketing. Then marketing will escalate it to [top management], discussing whether we should continue the project or not. (INT-MP1, p.8)
Project kick-off	●			In a kick-off [meeting], marketing presents the market view [of the project]: what future sales are like, how much additional sales are generated for AutocompCo; then about the timeframe, milestones; who will be involved in the team... (INT-MEPJ, p.5)	...the project team normally releases the list of what projects we get... then they distribute the drawings to the related working areas, like quality, purchasing... (INT-PPIC, p.6)	...marketing is the one who leads the kick-off meeting... [In the meeting we announce] that the company has got projects: this, this, this. 'Please, on this date we should start this thing; on another date, start that thing...' (INT-MMT, p.18)	..as the LOI is released, marketing holds a kick-off [meeting], declaring that the product we offered the other day... [has got its] LOI. (INT-MEPJ, p.5)
Engineering change	●			ECl is Engineering Change Instruction. If in the middle of [the process], customers request a small alteration or tuning, we follow it up, translating to the customers and to the internal [team]. "... [we have] another ECl, please recalculate and re-run [the process]. (INT-MMT, p.12)	It frequently happens that [the development result] doesn't match what the customer [requested]. [Even] after the product is finished, [and we find] that it can't be assembled perfectly, it's a little bit deformed or cant fit tightly, the designer will release an ECl, an engineering change instruction. So, the change instruction to engineering from 'T ²⁴⁷ ' asks for an alteration to the dimension or shape. (INT-MPR, p.14)	...This is a cross-functional team. Once [the change] is announced, the impacts are clear. So all [parties] should start thinking... what purchasing should do, what production should do; R&D should also think [about that]. In the end, we have to secure the company's profitability. (INT-COO, p.9)	
Cost and price adjustment	●			When deciding on a certain mould to produce [for example] in A, marketing monitors the development process, calculating the cost impact when		As I explained before, we always sit together to find a way [to resolve the impact of cost changes]. For example, in the case of price [changes], you can	[Where] an adjustment is made in the middle [of the process], [for example] there's a [price increase] in the purchased part, but the purchasing

²⁴⁷ AutocompCo's customer

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				<i>changes happen. We follow the changes and the resulting impact on the profit. (INT-MMT, p.12)</i>		<i>only adjust the price in December... so please inform me in January. All the COGMs are updated in January; as all purchased part [prices] are updated in January, then I'll calculate [all the price increases] in the cost impact in January. (INT-MMT, p.15)</i>	<i>[department] forget to inform the marketing [department]... as an impact, our profit decreases, So we set a standard time [within which] you can increase your purchased part price... (INT-MMT, p.15)</i>
Mould, tooling and jig development	●			● <i>Then purchasing start sourcing the mould; where it would be made? We do have in-house moulds but the capacity is limited... So if we need a bigger tonnage [mould]... we normally make it outside, in China or Taiwan. Purchasing do the sourcing. (INT-MMT, p.12)</i>	<i>Product Development Scheme: Develop-Infrastructure Setup & Development (DOC3, p.1)</i>		<i>At the Develop [stage], we develop the tooling, mould, CFs, jig... We [then] work together with colleagues from the engineering process at the implementation [stage], in which we prove that the part design and tooling design can pass the test... (INT-MRD, p.11)</i>
Loading capacity preparation	●			● <i>...so we prepare machinery loading... we provide machinery loading data to determine the capacity... (INT-PPIC, p.4)</i>	<i>Product Development Scheme: Develop-Infrastructure Setup & Development (DOC3, p.1)</i>		<i>...we conduct a kick-off meeting to inform all departments that we've got the LOI... Engineering project starts preparing the loading capacity... (INT-MMT, p.12)</i>
Supplier selection and control	●			● <i>During product development, in the supplier selection... [purchasing determines] who has the lowest price, [then] controls the suppliers progress... (INT-MPR, p.23-24)</i>	<i>Product Development Scheme: Develop-Infrastructure Setup & Development (DOC3, p.1)</i>		<i>...after the LOI, the works are mainly purchasing's jobs. Tooling and other things mostly aren't done in-house; it's [only] a few which are done in-house. So they're subcontracted, really. Well, then we're the one who follows up [the processes] to supplier... after that [we] monitor and control the development progress. (INT-MPR, p.6-7)</i>
LVPT	●			● <i>In the development phase, there are... what's called in 'XY' [terms], low volume production trials and high volume production trials – LVPT and HVPT. [These are performed] to see</i>	<i>Product Development Scheme: Develop-Engineering Sample (E/S). (DOC3, p.1)</i>	<i>What Marketing does in SVP²⁴⁸ [process]? Marketing is the one which leads [the process]. We [set up] a kick-off meeting for SVP preparation and follow [it] up until the SVP runs</i>	

²⁴⁸ Small volume production.

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
				[the extent of the gap] <i>between what we quote and [what we achieve] during development phase and during trial.</i> (INT-DHP, p.15)		<i>smoothly in three months.</i> (INT-MMT, p.26)	
HVPT	●	●		<i>At the development phase, there are... what's called in 'XY' [terms], low volume production trials and high volume production trials – LVPT and HVPT. [They are performed] to see [the extent of the gap] between what we quote and [what we achieve] during development phase and during trial.</i> (INT-DHP, p.15)	<i>Product Development Scheme: Implement-Pilot Sample (P/S).</i> (DOC3, p.1)	<i>In each event [in HVPT], we have KPIs, measuring the dimension accuracy, visually, [and] the performance. After all the [participants] agree [to release] the part, then we produce five samples.</i> (INT-MEPJ, p.7)	
Handover project to production	●			<i>From there, we check the quotation: the cycle time, shot per hour, quantity of materials, type of materials used, then the weight of the finished product, the rejection [rate] of a certain type of mould. In this phase, the engineering process [department] acts like 'the midwife during child birth'. They teach the production [department] [about what are actually] the critical and crucial aspects.</i> (INT-DHP, p.17)		<i>We do a handover [the project] to our colleagues in [the] plant... We resume the rejection [rate], cycle time, personnel required. We summarise them and inform the plant people.</i> (INT-MEPJ, p.8)	<i>..., the product is evaluated according to three main aspects: cost, delivery and quality. Before we submit [the project] to the plant, we do the handover [process]...</i> (INT-MEPC, p.2)
Project control	●			<i>...There are projects that take two years from LOI to mass production; other projects take nine months. 'AH' takes 7-9 months, or 1-1.5 years. It's relative. So, the priority is those which have tight schedules; we make extra effort for these [projects]...</i> (INT-MEPJ, p.12)	<i>...we have a weekly meeting to follow up the achievement progress of development [of the project]...</i> (INT-MEPJ, p.6)	<i>... the division head should attend [the meeting] to witness and support [the team]. So the managers from the cross-functional [departments] – purchasing, production, the process engineers – should also attend and fully be involved [in the project control meeting].</i> (INT-COO, p.10)	<i>[Engineering project] and marketing [department] monitor [the project] altogether... If the mould and tooling are produce outside, engineering project, marketing and purchasing will monitor [the project], and accounting will record [the cost incurred].</i> (INT-MCC, p.10)
Product cost review	●			<i>...for new products, we compare the [product cost] with the FS or as we would say, the COGM...</i> (INT-MCC, p.1)	<i>... Now, we start [reviewing a project] from its LOI. So the project is managed continuously. In the past, project management wasn't run collectively, it's just more to ensure that the schedule's fulfilled. However, they didn't care too much about the</i>	<i>...we set the target together in the team. Then we check by how much our colleagues in the field can adjust the price... For example, we have to check the component and material price with purchasing... [we ask] how much they can afford...</i> (INT-MCC,	<i>[We review the cost] up to the level described in the quotation... We review the cost from the quotation until development phase, HVPT phase, and mass production.</i> (INT-DHP, p.15)

First-Order Codes	Data Sources			Routines Characteristics Supporting Evidence			
	Int	Obs	Doc	Pattern of Action	Repetition	Multiple Participants	Interdependent Actions
Three-month production review	●			<i>In term of responsibility, it belongs to the project people. But if we talk about teams, [engineering process] has been involved, even in the trials. Speaking about T0, we're involved in regular meetings to confirm progress. So we expect that in the handover we don't [start from] zero... (INT-MEPC, p.2)</i>	<i>costing – nobody cares about the costing. (INT -COO, p.9)</i> <i>... in new product [development] activities, normally the production [department] is involved right before the mass production...Nevertheless, there's an agreement that in the first three months, [the production] will be monitored by the engineering [project team] (INT- MP2, p.4)</i>	<i>p.5)</i> <i>... three months before a mass production, PPIC starts to handle ordering the materials and components for sub-assembly processes etc... (INT- MPPIC, p.4)</i>	<i>Actually, this part has entered a mass production phase, but the engineering project [team] still hold responsibility and accountability. Actually, in the next three months, [the product] should be in the [production] line; nevertheless, in those three months [the engineering project team is still involved] (INT- MEPJ, p.26)</i>

F.3 UNVERIFIED FIRST-ORDER CODES AS ROUTINES: CASE STUDY 4-AUTOCOMPCO

First-Order Codes	Data Sources		
	Int	Obs	Doc
Bidding	●		
BPI-Business process improvement	●		
Checking fixture	●		
Development test	●		
Development	●		
Economical size	●		
Engineering project	●		
Go-Kill	●		
Linking to goals	●		
Machinery and manpower allocation	●		
Mass production	●		
Non RDDP project	●		
Part validation-Trial	●		
Partnership	●		
PICA	●		
Post-launch review	●		
Postponing the project	●		
Product development process	●		
Product development review	●		
Project governance weekly review	●		
Project performance	●		
Purchase order	●		
Reporting development of new product	●		
Reporting progress to customer	●		
Resource allocation	●		
Spot meeting	●		
Supporting document preparation	●		
Trial	●		
Trial-Tooling	●		

F.4 RELATIONSHIPS BETWEEN ROUTINES: CASE STUDY 4-AUTOCOMPCO

ROUTINES	ROUTINES											SUPPORTING EVIDENCE FROM DATA SOURCES												
	1 Business Planning	Pre-annual meeting	Annual meeting	2 Market and Industry Analysis	5 Concept Development	Product research and concept design	6 Design	Detail design	Design review	7 Build Business Case	Offering product concepts to vehicle makers		RFQ review and Quotation preparation	Feasibility study	9 Management Review	Management approval	10 Product Development	Supplier selection and control	LVPT	11 Project Review	Project control	Product cost review		
1 Business Planning																								
Pre-annual meeting			→																					<i>The pre-Annual meeting arranges a mediation between divisions... if one division achieves an agreement on what product or customers to develop next year, including the cost of the budget, then we'll bring [that result] to a annual meeting. (INT-MRD, p.7)</i>
Annual meeting					→																			<i>At the beginning of the year, we already have guidance as to what kind of products we should develop, including own products. (INT-MRD, p.16)</i>
2 Market and Industry Analysis																								
Market research												→												<i>Normally this [market] study is purposed mainly for own products. We have to study the market on our own, even though we once did a study together with another GroupC business unit, investigating what the customer requests are, what kind of specifications are required, what value we can provide. From this study, normally the feasibility [of the project] emerges. (INT-MRD, p.10)</i>
Mapping potential customers and products		→																						<i>I'm responsible for the mapping of what kind of products would be developed; whether they're aligned with the planning of marketing. That happens in a pre-annual meeting, in which discussions between divisions occur... (INT-MRD, p.7)</i>
					→																			<i>...Afterwards, we went to automotive exhibitions several times, studying that one form of 'IL'²⁴⁹ can be applied to a different brand maker, different car maker... So we started developing 'RL'²⁵⁰ last year. (INT-MRD, p.17)</i>
5 Concept Development																								

²⁴⁹ A product category

²⁵⁰ A product which is categorised as 'IL'

ROUTINES	1 Business Planning	Pre-annual meeting	Annual meeting	2 Market and Industry Analysis	5 Concept Development	Product research and concept design	6 Design	Detail design	Design review	7 Build Business Case	Offering product concepts to vehicle makers	RFQ review and Quotation preparation	Feasibility study	9 Management Review	Management approval	10 Product Development	Supplier selection and control	LVPT	11 Project Review	Project control	Product cost review	SUPPORTING EVIDENCE FROM DATA SOURCES
Product research and concept design								→														<p>...for example, now we're designing a front fender ...well, we start with a concept design, and later we design it... (INT-CPD, p.1)</p> <p>...'RR' is a type of product that we design completely on our own... our colleagues [in R&D] make a number of designs, then submit them to me, which I then take to the customers... [From these models], they select one or two. After that [the models] are brought back and developed further by R&D. Next, we resubmit them to the customers; then, finally, [the models] are actually produced (INT-MP2, p.7)</p>
Design information - RDDP								→														<p>...[we develop] design information first, then we proceed to developing a detailed drawing. (INT-MEPJ, p.16)</p> <p>After [receiving] an RFQ, we conduct an FS. Well, we'll ask R&D to release design info, showing the position of the part and what the space is like. The design info released by R&D is used as our reference for preparing FS. (INT-MEPJ, p.3)</p>
6 Design																						
Detail design										→												<p>...for example, now we are designing a front fender ...well, we start with a concept design, later we design it. Then we offer it to the car manufacturers... Although they haven't requested it, we offer them that design... (INT-CPD, p.1)</p> <p>In the process of making a detailed drawing, R&D [will do] a design review. [We] usually do the design review at least twice... [The participants] involved in the design review are the internal teams from project engineering, quality, workshop ... and marketing for the business view. (INT-MEPJ, p.5)</p>
7 Build Business Case																						
Feasibility study								→														<p>[Design review is in] the drawing development phase... for RDDP, it's conducted after the FS. (INT-MEPJ, p.16)</p> <p>...to marketing, we submit not only the COGM but also the FS forms. On the FS form, the selling price draft is in place, ready to be filled in by marketing based on the COGM. It shows the analysis whether our sales are feasible or not, and whether our product development is feasible or not. If the [study] says it's feasible, we proceed to preparing the quotation. This quotation will be submitted to the customer. (INT-MEPJ, p.4)</p>

ROUTINES	1 Business Planning	Pre-annual meeting	Annual meeting	2 Market and Industry Analysis	5 Concept Development	Product research and concept design	6 Design	Detail design	Design review	7 Build Business Case	Offering product concepts to vehicle makers	RFQ review and Quotation preparation	Feasibility study	9 Management Review	Management approval	10 Product Development	Supplier selection and control	LVPT	11 Project Review	Project control	Product cost review	SUPPORTING EVIDENCE FROM DATA SOURCES
															→							<p>Based on the ISO standard, from FS we need to advance to management approval. What we should consider is in terms of cost, because from the FS we can identify [the products] that need high investment, and those which have lower costs but can generate high profit. (INT-MPPIC, p.2)</p> <p>↔ ...meanwhile, if we analyse new [products], then we refer to and compare with the FS; or we could say the initial COGM. (INT-MCC, p.1)</p> <p>For this project, our plan is, the data should go back to FS. This is the initial COGM, which is 297 grams. Our quotation was also 297 and this is the actual [data], which is 387 grams; so our colleagues in engineering should [verify it] and return it back here. (INT-MCC, p.8)</p>
9 Management Review																						
Cost and price adjustment																	↔					<p>... the supplier selection also creates challenges. The purchasing [department] suggests one that offers a low price; however, the customer prefers one which offers more expensive [materials]; then, the marketing [department] should take responsibility for negotiating [the appropriate cost] with the customer and purchasing department ... (INT-MMT, p.15)</p>
10 Product Development																						
11 Project Review																						
Product cost review																						<p>↔ ...I haven't been involved yet in [reviewing] tooling costs... from the first trial, after the tools are ready, I'll start to have a look at [the cost of the process]... (INT-MCC, p.10)</p>
12 Launch Planning																						

**F.5 ROUTINES IN PORTFOLIO MANAGEMENT-SIMULATION ANALYSIS:
CASE STUDY 4-AUTOCOMPCO**

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
Business Planning				
Pre-annual meeting	<i>I'm responsible for the mapping of what kind of products would be developed; whether they're aligned with the planning of marketing. That happens in a pre-annual meeting, in which discussions between divisions occur...</i> (INT-MRD, p.7)	Proposing first entrant strategy	1	<i>On here it's described that there is a market opportunity. It might be that other companies haven't played in this segment; so how our speed will determine our ability to become the founding father of this product. This is one of the suggestions for our future policy; although in terms of technical probability, which is 75%, ['Castor'] is inferior to 'Betria' and 'Asterion'.</i> (SIM-MEPJ, 00:10:06-00:10:47)
Market and Industry Analysis				
Market research	<i>The role of the marketing team is actually to see what the market is like, where it moves to. It's not only the trend of the models but also the direction of industry policy.</i> (INT-DHP, p.14)	Considering market changes	1	<i>...However, what should be considered as the time to launch needs two years. We need to see our current position, and whether in next two years, changes occur in the market</i> (SIM-MCC, 00:12:29-00:12:44)
Mapping potential customers and products	<i>I'm responsible for the mapping of what kind of products would be developed; whether they're aligned with the planning of marketing...</i> (INT-MRD, p.7)	Focus on sales	5	<i>...rather than investing in small sales [projects], we might invest directly in projects which have a larger sales projection.</i> (SIM-MCC, 00:12:19 -00:12:31)
		Considering high risk opportunity	1	<i>Have a try</i> (SIM-MPR) <i>Just have a try with 'Castor' first; don't try with 'Atlas'. It's scary trying with 'Atlas', because its [technical success] probability is only 40%</i> (SIM-MMT) <i>[You] underestimate our R&D, don't you?</i> (SIM-MPR) <i>No, really</i> (SIM-MMT) (SIM-MPR, MMT, 00:21:51-00:22:11)
		Segmenting the market	1	<i>...so that means there are three [analogous] segments, right? the segment for [company] 'A'; then the segment for [company] 'M' (which is for product group B), and another one, the segment for [company] 'R', and other accessories...</i> (SIM-MMT, 00:03:32-00:04:01)
Concept Development				
Product research and concept design	<i>We always prepare [new models] every year. Our target is supposed to be that every two years, [customers] can launch a new model. So every year we propose to the customers that</i>	Considering advanced technology projects	5	<i>[Regarding 'Atlas'], if [the project is] a success, [the gain] is huge. Considering this as engineers, we're challenged] to seek that success. Mr. 'Y' [the engineering project manager], as an engineer,</i>

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
	<i>what we have is this, this, this.</i> (INT-MRD, p.15)	Innovation	1	<i>will take 'Atlas'. (SIM-MPR, 00:32:10-00:32:33)</i> <i>...[in evaluating a product] we see the future potential, then the required development cost. [Considering] the current situation, what we need to highlight is that we can survive by maintaining our existing [products]. Because [the industry] has been very competitive, innovation should be in place when developing new products (SIM-MEPJ, 00:08:18-00:09:08)</i>

Build Business Case

RFQ Review and quotation preparation	<i>...for example, what we do in RDDP – why is it interesting? Because in [RDDP] we design [the product] on our own. When we receive the RFQ, request for quotation, from customers... we review whether the product [requested] is an RDDP or it's completely a customer's [design]. In RDDP we collaborate with R&D (INT-MEPJ, p.3)</i>	Focus on core products	7	<i>I initially thought [that] we could classify the portfolio; we could take both [products] in product group C. However, Mr. 'N' [the cost control manager] said that this [product group C] is something about lifestyle, in which change is swift. So we need to develop ones which are our company's basic [products]. 65% of our sales, analogous to [company] 'A'²⁵¹, stems from product group A; therefore, it has to be strengthened first, besides, we also have to develop [the new ones]. (SIM-MMT, 00:13:00-00:13:41)</i>
		Defining priority	1	<i>...what's the most rewarding order in term of finance? [We need to define it], so that we have a priority (SIM-MEPC, 00:18:52-00:19:04)</i>
Feasibility study	<i>Engineering [project] normally conducts a feasibility study when we receive new products; regardless of the type of product it is from the three types we have... from the FS it can be seen which projects need high investment; which ones have lower costs and high profits (INT-MPPIC, p.2)</i>	Considering competence	2	<i>We don't consider our competence, do we? (SIM-MEPJ, 00:28:56-00:29:06)</i>
		Considering risk	8	<i>About 'Atlas', I definitely reject it. Firstly, the development cost is too high, then the technical success probability is very low, 40%. It's like gambling with our money; 42B is gone right away on that. (SIM-MMT, 00:06:10-00:06:27)</i>

²⁵¹ A vehicle maker.

Routines	Representative Quote	Corresponding Conversations in Simulation	#	Representative Quotes
		Portfolio valuation criteria	1	<p><i>In terms of business, among those [parameters], which one is the most important to be considered? (SIM-MEPJ)</i></p> <p><i>... the parameters; well, for the portfolio, whether it's NPV, whether it's the development cost or sales? (SIM-MEPJ)</i></p> <p>(SIM-MEPJ, 00:30:10-00:30:35)</p>
		Considering profitability and challenges	1	<p><i>[Product] group A has a margin of 30% which tends to decrease, otherwise the sales should be increased greatly. Because its situation is under pressure; the revenue has become small, operation [costs] increase continuously... [whereas] that doesn't happen for this ['Castor']; the potential is unlimited..., bigger. Well, just what do we want to play with? Do we want to play with this ['Castor']? (SIM-MMT)</i></p> <p><i>But the development is one as a lifestyle [product]... (SIM-MCC)</i></p> <p><i>Well, that the 'plus, plus' [there] are two, right? I mean, 'plus' is in terms of profit and the challenges... (SIM-MMT)</i></p> <p>(SIM-MMT, MMC, 00:44:30-00:45:13)</p>
		Focus on profitability	1	<p><i>...I think, firstly, we [need to consider] the point of view of obtaining high margin and fair investment. Besides, our company is not a new player anymore; we just need to develop it... (SIM-MMT, 00:10:49-00:11:16)</i></p>

F.6 THE ESPOUSED BUSINESS STRATEGY CONSIDERED IN THE ROUTINES: CASE STUDY 4-AUTOCOMPCO

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Organisational Goals					
New product-market development	●		<i>We want to retain the automotive portfolio... moreover, we also aspire to penetrate other transportation [products]. We still try to explore those opportunities... (INT-COO, p.7)</i>	–	–
Product-based development	●		<i>... AutocompCo, with the current milestones, will be moving to focus on product-based [development]. Inevitably, we have to be able to develop our own products... (INT-MEPJ, p.2)</i>	Business Planning: Annual meeting	<i>...In December, we conduct a meeting to set next year's targets... in terms of new product development, [we've decided] to always propose our RDDP²⁵² or customer drawing to the car maker. We consider the RDDP to be our own product... (INT-DHEM, p.10)</i>
Cost	●		<i>...one reason we established a cost control department last year, among others, was because I saw all this time the process [control] was just loose; so nobody controlled [the costs]... Besides, ...the business process itself should be improved continuously, maintained..., and kept challenged to obtain cost reductions... (INT-COO, p.9)</i>	Design: Detail design	<i>...the most important elements in this industry are knowledge about materials, moulds and design. Design itself is connected to all of them. When developing a design without having understanding about mould construction, it brings about a complicated [situation], and will even lead to a high-cost production [process] (INT-COO, p.6)</i>
				Build Business Case: RFQ review and Quotation preparation	<i>What's the priority? The priority is based on which ones fit most closely with the target cost. For example, if there are 10 mirrors, and two of them, after the calculation, require development costs which don't make sense, then it's only the remaining eight which we are after. (INT-MMT, p.2)</i>
				Feasibility study	<i>From the design information, we 'll breakdown the costs to obtain the COGM.. for the production... we collaborate [with other departments] in working on it... we form an FS committee, lead by the engineering project. (INT-MEPJ, p.4)</i>

²⁵² Request for design and drawing product

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs			
Profitability	<ul style="list-style-type: none"> ● ...This is a cross-functional team. Once [the change] is announced, the impacts are clear. So all [parties] should start thinking... what purchasing should do, what production should do; R&D should also think [about that]. In the end, we have to secure the company's profitability. (INT-COO, p.9) 			<p>Management Review:</p> <p>Management approval <i>Based on the ISO standard, from FS we need to advance to management approval. What should we consider is in terms of cost, because from the FS we can identify [the products] that need high investment, and the ones which have lower costs but can generate high profit. (INT-MPPIC, p.2)</i></p> <p>Engineering change <i>Marketing will submit [the proposal] to engineering project, then the engineering project will recalculate the cost and determine whether an additional cost is needed; then [the proposal] will be sent back to marketing ... (INT-MEPC, p.12)</i></p> <p>Product Development:</p> <p>Mold, tooling, jig development <i>...we calculate the best price by choosing the best mould maker... so we can still generate profits with our new models... (INT-COO, p.7)</i></p> <p>HVPT <i>...we can capture the total cost of the products being developed, at HVPT and [the following stages] up to the mass production [stages]... . (INTMEPJ, P.21)</i></p> <p>Handover from project to production <i>Talking about engineering process, one of our concerns is cost. We evaluate the cost... to find out whether it conforms to the target [set by] the project people, called COGM. (INT-MEPC, p.1)</i></p> <p>Project Review:</p> <p>Product cost review <i>... we evaluate [the costs incurred] in the development phase, and the trial HVPT phase up to mass production at the product cost review... (INT-DHP, p.15)</i></p> <p>Market Analysis:</p> <p>Mapping potential customers and products <i>The next [step] is a profitability [analysis]. We do a customer mapping. For example, 2-wheels or 4 wheels [products] have different markets... (INT-MEPC, p.6)</i></p> <p>Build Business Case:</p> <p>RFQ review and Quotation preparation <i>What's the final decision? We prepare the best quotation in terms of two [aspects]: profitability and the company's [objectives]... the decision is finally made by the customer.</i></p>	

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Elements	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
Supporting Evidence				
				(INT-MMT, p.9)
			Feasibility study	<i>Before a [project] kick-off, they a conduct feasibility [study]... when the feasibility [study] is being carried out , we know how much the cost is... then we monitor that after the [project] kick-off. (INT-MFA, p.3)</i>
			Management Review	
			Management approval	<i>... [through] a collective consensus. Initially, the marketing prepares a [proposal] ... however, the board of directors will decide how much the profitability needs to be if we want to take the project... (INT-COO, p.9)</i>
			Project budgeting	<i>The budget is quite strict. If [the cost] is over [budget] we'll reject the project, with the explanation... So there are some projects where the tooling costs exceed the budget; this will lower the margin (INT-MFA, p.12)</i>
			Cost and price adjustments	<i>[Where an] adjustment is [made] in the middle [of process], [for example] there's a [price increase] in a purchased part, but the purchasing [department] forget to inform the marketing [department]... As an impact, our profit decreases, So we set a standard time [within which] you can increase your purchased part price... (INT-MMT, p.15)</i>
			Engineering change	<i>... then we might use extra-tooling to [perform a task] or change the whole tooling [systems]; after that we need to challenge our cost control to [analyse] the impact on profitability...(INT-COO, p.9)</i>
			Product Development:	
			Molding, tooling, jig development	<i>At the offering [stage], we actually offer two [things]: first, the product itself, second the moulding (as we have the capability to make a moulding). We can generate considerable profit [from moulding]. (INT-MEPJ, p.16)</i>
			HVPT	<i>...to obtain the total development costs of these parts, we actually capture them at the HVPT to mass production [stages]... how to maintain the profitability. (INT-MEPJ, p.21)</i>
			Project Review:	
			Project control	<i>We need a further study. If we [add] three mio to the budget,</i>

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered		
Key Elements	Data Sources		Supporting Evidence	Routines	Representative Quotes
	Int	Obs Doc			
Operational excellence			<i>The goal is to restore... operational excellence and [establishing] people development... restoring operational excellence is my responsibility... (INT-DHP, p.4)</i>	Product cost review	<i>how much will our profit deteriorate? (OBS-MRD, p.36)</i> <i>...we have a product cost control [team] now... Talking about success, generally, [it's about] whether the product is profitable or not... however, to get there [what should we do accordingly]. Whether since the first time the project development cost according to budget ... (INT-MEPJ, p.16)</i>
				3-month production monitoring	<i>...in the end, it's reflected in the smoothness of the actual mass production....[All aspects run smoothly]... supply, no line stop, no significant problems, no complaints, good profitability, ... We and the customer are happy... These are the functions of marketing: to secure [both parties' interest]; securing profitability as the most important aspect, and making sure our customer can 'smile'... . (INT-MMT, p.14)</i>
Competitive Strategy					
Engineering and design	●		<i>The strength of AutocompCo is its engineering [capability]. We have around 120 engineers, ranging from R&D, process and project to mould making. And our long experience in managing projects as well as creating design associated with the products requested by our customers, especially two- and four-wheel [components]. (INT-COO, p.1)</i>	Concept Development: Product research and concept design Design: Detail design	<i>...I would say that actually, with our own products, like 'M', although the value isn't too great, we can show that with an appropriate design, we can get long-term business. (INT-MRD, p.28)</i> <i>We don't sell reckless design – instead [we sell] responsible design. So we can prove with a responsible design, a thoughtful design, that we actually wouldn't incur loss; even though the company needs to pay more for the development. (INT-MRD, p.28)</i>
Production facility	●	●	<i>It produces high quality parts and tooling from automotive and non-automotive industries using our state-of-the-art machineries (DOC9, p.13)</i>	–	–
Capabilities					

Espoused Business Strategy			Routines in which the Espoused Business Strategy is Considered	
Key Elements	Data Sources		Routines	Representative Quotes
	Int	Obs Doc		
	Supporting Evidence			
Design capability	<p>...AutocompCo needs to enhance the engineering competence so that the customers continue to inspire trust... well this surely requires us to have the knowhow; the knowhow about product design, molding, materials (INT-DHP, p.10)</p>		<p>Market and Industry Analysis:</p> <p>Mapping potential customers and products</p> <p>Build Business Case:</p> <p>RFQ review and quotation preparation</p>	<p>...The after market [revenue contribution] is considerable. Well, the percentage [of total revenue] is still small; however, the profitability is great. So [we do the projects] along with learning... we talk about the after market, we normally talk about design; we take the projects along with improving our competence... (INT-MEPC, p.6)</p> <p>...for example, what we do in RDDP – why is it interesting? Because in {RDDP} we design [the product] on our own. When we receive the RFQ, request for quotation, from customers... we review it, [to decide] whether the product [requested] is an RDDP or it's completely a customer's [design]? In RDDP we collaborate with R&D (INT-MEPJ, p.3)</p>
Market research capability	<p>To proceed to next level and next landscape, we need a sort of market research manager or officer to find out what we can study [further]. (INT-COO, p.4)</p>		–	

F.7 ROUTINES AND ELEMENTS OF BUSINESS STRATEGY: CASE STUDY 4-AUTOCOMPCO

BUSINESS STRATEGY	<i>Business Planning</i>	<i>Market and Industry Analysis</i>	<i>New Product Research</i>	<i>Ideas Provision</i>	<i>Concept Development</i>	<i>Design</i>	<i>Build Business Case</i>	<i>Project Prioritisation</i>	<i>Management Review</i>	<i>Product Development</i>	<i>Project Review</i>	<i>Launch Planning</i>	<i>Whole Portfolio Management</i>
Organisational Goals (OG)													
New product-market development													
Product-based development	●												
Cost					●	●			●	●	●		
Profitability		●					●		●	●	●		
Proportions-OG	1/4 (25%)	1/4 (25%)				1/4 (25%)	2/4 (50%)		2/4 (50%)	2/4 (50%)	2/4 (50%)		
Competitive Strategy (CS)													
Engineering and design					●	●							
Production facility													
Proportions-CS					1/2 (50%)	1/2 (50%)							
Capabilities (C)													
Design		●					●						
Market research													
Proportions-C		1/2 (50%)					1/2 (50%)						
Overall Proportions	1/8 (13%)	2/8 (25%)			1/8 (13%)	2/8 (25%)	3/8 (38%)		2/8 (25%)	2/8 (25%)	2/8 (25%)		22%

APPENDIX G DATA SUPPORTING CROSS-CASE ANALYSIS

G.1 CROSS-CASE COMPARISON: ROUTINES AND SUBROUTINES

Routines And Subroutines					
CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	No	Composite
	Business Planning	Business Planning	Business Planning	1	Business Planning
	Product road map prioritisation (1.1)	Business planning (1.2)	Pre-working meeting	1.1	Product road map prioritisation
	Business planning (1.2)		Working meeting (1.1)	1.2	Business planning
			Presenting development plan to group company		
-	#2*	#1	#1		
Market and Industry Research	Market and Industry Analysis	Market and Industry Analysis	Market and Industry Analysis	2	Market and Industry Analysis
Market research-F (2.1)	Market research (2.1)	Market research (2.1)	Market research (2.1)	2.1	Market research
Consumer research-F (2.2)	Consumer insight research (2.2)	Consumer research (2.2)	Mapping potential customers and products	2.2	Consumer research
Attending exhibitions, seminars-F (2.4)	Industry analysis (2.3)			2.3	Industry analysis
Colour forecasting	Technology development analysis (2.4)			2.4	Technology development analysis
#3	#4	#2	#1		
New Product Research				3	New Product Research
New product research (3.1)				3.1	New product research
Formula collection and research-F (3.2)				3.2	Formula collection and research
Cooperation with external institutions (3.3)				3.3	Cooperation with external institutions
#3					
	Ideas Provision			4	Ideas Provision
	Creativity days (4.1)			4.1	Creativity days
	Idea pooling (4.2)			4.2	Idea pooling
	Open innovation (4.3)			4.3	Open innovation
	Idea screening (4.4)			4.4	Idea screening
-	#4	-	-		

Routines And Subroutines					
CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	No	Composite
Concept Development	Concept Development	Concept Development	Concept Development	5	Concept Development
Product selection (5.1)	Developing product concept (5.2)	Global portfolio analysis (5.1)	Product research and concept design (5.2)	5.1	Potential products identification
Creating product concept-F (5.2)	Formulation preparation (5.4)	Potential products identification (5.1)	Product concept screening (5.3)	5.2	Developing product concepts
Product concept evaluation (5.3)	Developing laboratory scale prototype (5.5)	Developing product concepts (5.2)	Design information-RDDP	5.3	Product concept evaluation
R&D sharing panel	Panel test (5.6)	Channel determination (5.8)		5.4	Formulation preparation
Panel test-F (5.5)	Brand positioning (5.7)	Invention submission		5.5	Developing laboratory scale prototype
	Distribution channel determination (5.8)			5.6	Product test
	Packaging design (5.9)			5.7	Brand positioning
	Technology and process preparation (5.10)			5.8	Channel determination
				5.9	Packaging design
				5.10	Technology and process preparation
#4	#8	#3	#2		
		Design	Design	6	Design
		Preliminary design (6.1)	Detail design (6.1)	6.1	Preliminary design
		Detail design (6.2)	Design review (6.2)	6.2	Detail design
		Design review (6.3)		6.3	Design review
		Laboratory test (6.4)		6.4	Laboratory test
		Consumer testing (6.5)		6.5	Consumer testing
-	-	#5	#2		
Build Business Case	Build Business Case	Build Business Case	Build Business Case	7	Build Business Case
Business feasibility proposal (7.1)	Feasibility study (7.1)	Build business case (7.1)	Feasibility study (7.1)	7.1	Business feasibility proposal
Market test-FGD #1 (7.2)	Market testing (7.2)	Resource analysis (7.3)	Offering new product concepts to vehicle makers	7.2	Market testing

Routines And Subroutines					
CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	No	Composite
Budget allocation (7.3)			RFQ review and Quotation preparation (7.3)	7.3	Resource analysis
Production capabilities evaluation (7.3)					
#3	#2	#2	#2		
		Project Prioritisation		8	Project Prioritisation
		Landing review (8.1)		8.1	Landing review
		New SKU review request			
-	-	#1	-		
Management Review	Management Review	Management Review	Management Review	9	Management Review
Business proposal evaluation (9.4)	Food forum (9.4)	Presentation to leadership team (9.4)	Management approval (9.4)	9.1	NPI gate review
Post-launch review (9.2)	Post launch review (9.2)	NPI gate review (9.1)	Project budgeting	9.2	Post-launch review
Existing product review (9.3)	Existing product review (9.3)	New stock review (9.1)	Project kick-off	9.3	Existing product review
	Brand tracking	Post launch review (9.2)	Engineering change	9.4	Management approval
	Product road map review (9.5)	Existing products review (9.3)	Cost and price review	9.5	Product road map review
#3	#4	#4	#1		
Product Development	Product Development	Product Development	Product Development	10	Product Development
Product development kick-off (10.1)	FDA Registration (10.2)	Product specification validation (10.2)	Mold, tooling and jig development (10.3)	10.1	Product development kick-off
Production scale up-F (10.4)	Developing scale up prototype (10.4)	Sourcing (10.6)	Loading capacity preparation (10.3)	10.2	Product specification validation
Formula development-F (10.2)	Scale up prototype trial (10.5)	Process validation (10.3)	Supplier selection and control (10.7)	10.3	Process validation
Extract development-F (10.2)	Packaging development (10.8)	Vendor process assessment (10.7)	Trial-tooling (10.3)	10.4	Developing scale up prototype
Packaging development-F (10.8)	Project progress review (10.10)	Production scale-up (10.4)	LVPT (10.5)	10.5	Scale up prototype trial
Product appraisal-F (10.5)		Product test (10.5)	HVPT (10.5)	10.6	Sourcing
Market test-FGD #2 (10.9)			Handover project to production (10.11)	10.7	Supplier selection and control
Product development progress coordination (10.10)				10.8	Packaging development

Routines And Subroutines					
CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	No	Composite
				10.9	Market testing
				10.10	Product development progress coordination
				10.11	Handover project to production
#7	#5	#6	#4		
			Project Review	11	Project Review
			Project control (11.1)	11.1	Project control
			Product cost review (11.2)	11.2	Product cost review
			3-month production review (11.3)	11.3	3-month production review
-	-	-	#3		
Launch Planning	Launch Planning	Launch Planning		12	Launch Planning
Developing marketing strategy (12.1)	Market communication (12.1)	Developing marketing programme (12.1)		12.1	Developing marketing strategy
Placement of products at right channels (12.2)	Commercialisation	Store listing (12.2)		12.2	Placement of products at right channels
	Trade promotion (12.2)				
#2	#2	#2	-		

F-Formal subroutine

()-Corresponding subroutines number in the Composite routines

*-The number of subroutines which correspond to those in the composite routines

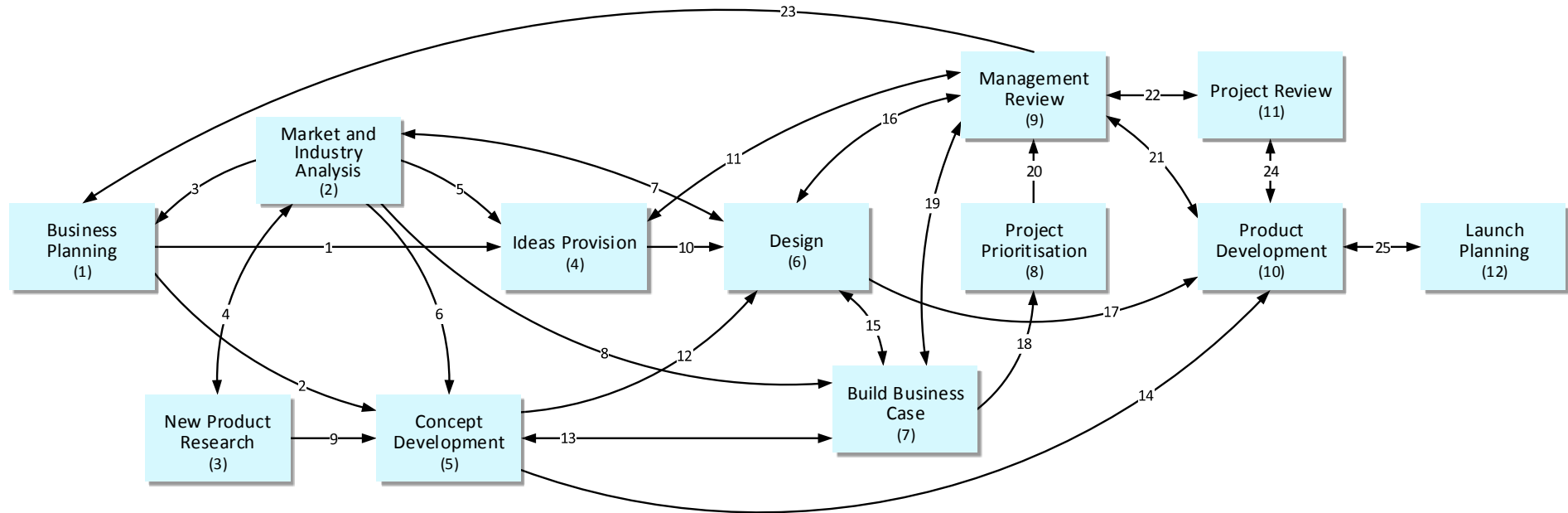
G.2 CROSS-CASE COMPARISON: CONNECTIONS BETWEEN ROUTINES

ROUTINES	1	2	3	4	5	6	7	8	9	10	11	12	CONNECTION NUMBER				
	Business Planning	Market and Industry Research	New Product Research	Ideas Provision	Concept Development	Design	Build Business Case	Project Prioritisation	Management Review	Product Development	Project Review	Launch Planning	COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	COMPOSITE
1 Business Planning				→	→									F2	M2	A2	COM1 COM2
2 Market Study and Industry Research	→		↔	→	→	↔	→						C1 C2	F1 F3 F4	M1 M3 M4	A1 A3 A4	COM3 COM4 COM5 COM6 COM7 Refer to COM7 COM8
3 New Product Research					→								C3				COM9
4 Ideas Provision						→			↔					F5 F6			COM10 COM11
5 Concept Development						→	→	↔					C4 C5		M5 M6	A5 A6	COM12 Refer to COM13 COM13 COM14
6 Design							↔		↔					F7 F8 F9	M7	A7	COM15 COM16 COM17
7 Build Business Case								→							M8		COM18

ROUTINES	1	2	3	4	5	6	7	8	9	10	11	12	CONNECTION NUMBER					
	Business Planning	Market and Industry Research	New Product Research	Ideas Provision	Concept Development	Design	Build Business Case	Project Prioritisation	Management Review	Product Development	Project Review	Launch Planning		COSMETICSCO	FOODCO	MULTIPRODUCTCO	AUTOCOMPCO	COMPOSITE
									→					C6	F10		A8	Refer to COM19
								↔								M9		COM19
8 Project Prioritisation								→								M10		COM20
9 Management Review									↔					C7	F11	M11	A9	COM21
	→									↔					F12		A10	COM22
																		COM23
10 Product Development										↔							A11	COM24
														C8		M12		Refer to COM25
																		COM25
11 Project Review																		
12 Launch Planning																		

- C, F, M, A are connection initials refer to the respective case companies (C-CosmeticsCo; F-FoodCo; M-MultiproductCo; A-AutocompCo)
 - COM is a connection initial refers to the composite routines

G.3 COMPOSITE ROUTINES FRAMEWORK



Note: Number embedded to the connections represents connection number. For example, arrow #1 show the connection between Business Planning and Ideas Provision routines

G.4 GENERIC ELEMENTS OF BUSINESS STRATEGY

	CosmeticsCo	FoodCo	MultiproductCo	AutocompCo	Generic Elements
Organisational Goals	Pioneering Global brands Building future products Featuring local resources and culture Market share Market existence Market expansion Margin Growth	Sales Profitability Growth Market leader	Business size Sales Profitability Market share Brand position	New product-market development Product-based development Cost Profitability	Building future products: Building future products; Pioneering; New product-market development Market leader: Market leader; Market share; Market existence; Market expansion; Business size Brand position: Brand position; Global brands Sales Profitability Growth
Competitive Strategy	Portfolio Focus on core brands Promotion Distribution Responsive to market Availability	Affordable premium product Differentiation Distribution Brand positioning	Technology innovation Channel Differentiation Product portfolio Communication	Engineering and design Production facility	Portfolio; product portfolio Technology innovation; Engineering and design Promotion; communication Distribution; channel Focus on core brands; Affordable premium product; Affordable premium product Differentiation Responsive to market; production facility
Capabilities	R&D human capital Lean marketing organisation Sophisticated and efficient production facilities	Innovation capability R&D capability	Developing people Productivity	Design Market research	R&D capability; Innovation capability; R&D human capital; Design Productivity; Sophisticated and efficient production facilities

G.5 CROSS-CASE COMPARISON: ROUTINES AND BUSINESS STRATEGY

Routines	CosmeticsCo				FoodCo				MultiproductCo				AutocompCo			
	OG	CS	C	%	OG	CS	C	%	OG	CS	C	%	OG	CS	C	%
<i>Business Planning</i>	-	-	-	-	●	●	-	50%	●	●	-	33%	●	-	-	13%
<i>Market and Industry Analysis</i>	●	-	-	17%	●	●	-	30%	●	●	-	42%	●	-	●	25%
<i>New Product Research</i>	●	●	-	22%	-	-	-	-	-	-	-	-	-	-	-	-
<i>Ideas Provision</i>	-	-	-	-	●	●	●	30%	-	-	-	-	-	-	-	-
<i>Concept Development</i>	●	●	-	17%	●	●	-	20%	●	●	-	58%	-	●	-	25%
<i>Design</i>	-	-	-	-	-	-	-	-	●	-	-	8%	●	●	-	25%
<i>Build Business Case</i>	●	●	-	11%	●	●	-	40%	●	●	-	17%	●	-	●	38%
<i>Project Prioritisation</i>	-	-	-	-	-	-	-	-	●	●	-	50%	-	-	-	-
<i>Management Review</i>	●	●	-	28%	●	●	-	60%	●	●	-	50%	●	-	-	25%
<i>Product Development</i>	-	●	-	6%	-	●	-	10%	●	●	-	17%	●	-	-	25%
<i>Project Review</i>	-	-	-	-	-	-	-	-	-	-	-	-	●	-	-	25%
<i>Launch Planning</i>	-	●	-	11%	●	●	-	10%	-	●	-	17%	-	-	-	-
Whole Portfolio Management				16%				31%				32%				22%

Key aspects of business strategy: OG—Organisational goals; CS—Competitive strategy; C—Capabilities

% (the intensity of the link)—The percentage of the elements (in OG, CS and C) involved, compared to the whole elements of the espoused business strategy. See Appendices B3 (CosmeticsCo), C7 (FoodCo), D7 (MultiproductCo) and E7 (AutocompCo) for the sources of the data

G.7 GENERIC ROUTINES AND ELEMENTS OF BUSINESS STRATEGY

BUSINESS STRATEGY	<i>Business Planning</i>					<i>Market and Industry Analysis</i>					<i>New Product Research</i>					<i>Concept Selection and Development</i>					<i>Build Business Case</i>					<i>Project Prioritisation</i>					<i>Management Portfolio Review</i>					<i>Product Development</i>				
	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE	C	F	M	A	GE
Organisational goals (OG)																																								
Building future products					●					●					●																									
Market Leader			●		●			●		●					●					●					●			●		●			●		●					
Brand position															●					●																				
Sales		●			●			●		●			●		●					●					●			●		●		●			●					
Profitability		●	●		●					●					●			●		●					●			●		●			●		●					
Growth		●			●			●		●								●		●								●		●										
GE Proportions-OG	4/6 (67%)					5/6 (83%)					2/6 (33%)					4/6 (67%)					3/6 (50%)					3/6 (50%)					4/6 (67%)					2/6 (17%)				
Competitive Strategy (CS)																																								
Portfolio								●		●			●		●					●					●			●		●										
Technology innovation															●					●					●					●										
Promotion								●		●					●					●					●			●		●		●			●					
Distribution			●		●			●		●					●			●		●					●			●		●		●			●					
Focus on core brands		●			●			●		●			●		●					●					●			●		●										
Differentiation													●		●					●					●															
Responsive to market										●					●																									
GE Proportions-CS	2/7 (29%)					4/7 (57%)					1/7 (14%)					5/7 (71%)					3/7 (43%)					3/7 (43%)					4/7 (57%)					2/7 (29%)				
Capabilities ©																																								
R&D capability										●					●					●					●															
Productivity																																								
GF Proportions-C	-					½ (50%)					-					-					½ (50%)					-					-					-				
Overall GE Proportions	6/15 (40%)					10/15 (67%)					3/15 (20%)					9/15 (47%)					7/15 (60%)					6/15 (40%)					8/15 (53%)					4/15 (27%)				

C-CosmeticsCo; F-FoodCo; M-MultiproductCo; A-AutocompCo; GE-Generic Elements

APPENDIX H GENERIC PALETTE OF ROUTINES ATTRIBUTES

Routines	Aim	Linking to Business Strategy	Key Activities*	Participants
1 Business Planning	To designate strategic direction on product portfolio management	Organisational goals: Market Leader Sales Profitability Growth Competitive strategy: Distribution Focus on core brands	Golden ratio determination (recommendation) Product road mapping Product road map 437prioritization Strategic bucket allocation (recommendation) Product performance targets determination	Senior management; All departments
2 Market and Industry Analysis	To identify market opportunities, competition and trend in technology	Organisational goals: Building future products Market Leader Sales Profitability Growth Competitive strategy: Portfolio Promotion Distribution Focus on core brands Capabilities: R&D capability	Market research Consumer insight research Industry analysis Technology development analysis	Marketing; Business development; R&D
3 New Product Research	To discover novel elements for forming new products	Organisational goals: Building future products Market Leader Competitive strategy: Responsive to market	New technology research New product research	R&D
4 Concept Selection and	To build complete product concepts and design which have considered the	Organisational goals:	Product ideas generation	Marketing; Business development; R&D; Design;

Routines	Aim	Linking to Business Strategy	Key Activities*	Participants
Development	manufacturing processes	Market Leader Brand position Sales Profitability Competitive strategy: Portfolio Technology innovation Distribution Focus on core brands Differentiation	Potential product identification Product concept development Preliminary design Detail design Lab scale prototype development Product testing Consumer testing Manufacturing process preparation Distribution channel analysis	Manufacturing; Purchasing; Sales
5 Build Business Case	To provide the feasibility analysis of the product concepts proposed	Organisational goals: Market Leader Profitability Growth Competitive strategy: Promotion Distribution Differentiation Capabilities: R&D capability	Business proposal preparation Resources analysis Market testing	Marketing; Business development; Finance
6 Project Prioritisation	To select feasible NPD projects	Organisational goals: Market Leader Sales Profitability Competitive strategy: Portfolio Technology innovation Distribution	Business proposal selection	Marketing; Business development; R&D
7 Management Portfolio Review	To evaluate each NPD project proposal and to review the whole product portfolio	Organisational goals: Market Leader	New product introduction (NPI) gate review Post launch review	Senior management; All departments

Routines	Aim	Linking to Business Strategy	Key Activities*	Participants
	To make 'Go' or 'No Go' decisions	Sales Profitability Growth Competitive strategy: Portfolio Technology innovation Distribution Focus on core brands	Existing product review Portfolio review (recommendation) Product road map review	
8 Product Development	To develop production scale products To prepare the marketing strategy and the distribution channels	Organisational goals: Sales Profitability Competitive strategy: Promotion Distribution	Scale up prototype development Scale up prototype trial Sourcing Supplier selection and control Packaging development Project control Product cost review Projects to production transfer Marketing strategy formulation Distribution channels setting up	Manufacturing; R&D; Quality control and Quality assurance; Purchasing; Sales; Marketing; Cost control

Note: * – Associated to the activities in the subroutines

APPENDIX I INTERVIEW QUESTIONNAIRES

INTERVIEW QUESTIONNAIRE FOR DIRECTORS (1 ½ Hours Interview)

Topic	Questions	References	
A. Company's strategy	1. Can you tell me about the company's goals? a. Can you give more detailed descriptions of those goals?	(Bowman, 1998; Finlay, 2000)	
	2. Can you explain the ways to achieve those goals? a. Can you give examples?	(Chakravarthy and Doz, 1992)	
	3. Can you describe the characteristics of your industry? a. Can you describe the market situation? b. Can you describe how the competition in this industry?	(Ali et al., 1993; Cooper, 1984; Duncan, 1972; Killen et al., 2012; MacCormack and Verganti, 2003)	
	4. What is your company's competitive strategy?	(Bowman, 1998; Finlay, 2000)	
	5. What capabilities do you set up to achieve your goals? a. What are the key capabilities?	(Bowman, 1998; Finlay, 2000)	
	B. Innovation and Product Strategy	6. What are your target markets?	(Cooper, 1984, 2005)
		7. What are the market needs?	(Cooper, 1984, 2005)
		8. What products characteristics does the company prepare for those markets?	(Cooper, 1984, 2005)
		9. What differentiates your products with the competitors' products?	(Terwiesch and Ulrich, 2008)
		10. Is there any specific technology that you apply on your products?	(Cooper, 1984, 2005)
C. Portfolio Decision-making process	11. Can you explain how the company makes decisions on product portfolio? a. What existing product portfolio does the company have on the market? b. What product portfolio is the company developing now c. What sort of decisions are made in the portfolio management process? d. How do you determine the product portfolio? e. Do you consider the company's goals in the process? How do you do it? f. Do the decision-making processes refer to the company strategy? How do you do it? g. Who makes decisions on product portfolio	(Cooper, 2005)	

	h. What factors does the company consider when making product portfolio?	
	i. Does the company have a particular procedure? Would you explain it?	
	j. Does the selection process follow that procedure?	
	k. What methods does the company usually use?	
	l. If the circumstances change during the process, how does the company manage the process?	
D. Go/Kill or Prioritisation Decision	12. Can you tell me how the company makes the Go/Kill or prioritisation Decisions?	(Cooper, 2001, 2005; Cooper and Kleinschmidt, 1991)
	a. Who are involved in making these decisions?	
	b. What methods are used?	
	13. In making Go/Kill decisions, do you review the product portfolio resulted in?	
E. Portfolio Review	14. Do you regularly conduct portfolio review?	(Cooper, 2005)
	15. How do you conduct the review?	(Cooper, 2005)
	16. What aspects do you review?	(Cooper, 2005)
	17. What decisions do you make in the review?	(Cooper, 2005)
F. Results-Product Portfolio	18. What existing product portfolio does the company have on the market?	(Anderson Jr. and Joglekar, 2005)
	19. How does the company measure the success of product portfolio?	(Anderson Jr. and Joglekar, 2005)
	20. In terms of those measures, what are the results of the existing product portfolio?	(Anderson Jr. and Joglekar, 2005)
	21. What product portfolio is the company developing now?	
	22. What product portfolio is the company going to develop in the near future?	
	23. Do you have a <i>road map</i> concerning the products which will be developed? Can you explain	(Cooper, 2005)
	24. What problems does the company face in managing the product portfolio? How do you overcome them?	
G. Role of [Division name] Team	25. What is the key role of [Division name] team in the portfolio management process?	
	26. Can you give an example of the contribution of [Division name] team in enabling the portfolio management process to achieve its goals?	

INTERVIEW QUESTIONNAIRE FOR MANAGERS (1 Hour Interview)

Topic	Questions	References
A. Portfolio Decision-making process	<ol style="list-style-type: none"> 1. Can you explain how the company makes decisions on product portfolio? <ol style="list-style-type: none"> a. What existing product portfolio does the company have on the market? b. What product portfolio is the company developing now c. What sort of decisions are made in the portfolio management process? d. How do you determine the product portfolio? e. Do you consider the company's goals in the process? How do you do it? f. Do the decision-making processes refer to the company strategy? How do you do it? g. Who makes decisions on product portfolio h. What factors does the company consider when making product portfolio? i. Does the company have a particular procedure? Would you explain it? j. Does the selection process follow that procedure? k. What methods does the company usually use? l. If the circumstances change during the process, how does the company manage the process? 	(Cooper, 2005)
B. Go/Kill or Prioritisation Decision	<ol style="list-style-type: none"> 2. Can you tell me how the company makes the Go/Kill or prioritisation Decisions? <ol style="list-style-type: none"> a. Who are involved in making these decisions? b. What methods are used? 3. In making Go/Kill decisions, do you review the product portfolio resulted in? 	(Cooper, 2001, 2005; Cooper and Kleinschmidt, 1991)
C. Portfolio Review	<ol style="list-style-type: none"> 4. Do you regularly conduct portfolio review? 5. How do you conduct the review? 6. What aspects do you review? 7. What decisions do you make in the review? 	(Cooper, 2005) (Cooper, 2005) (Cooper, 2005) (Cooper, 2005)
D. Results-Product Portfolio	<ol style="list-style-type: none"> 8. What existing product portfolio does the company have on the market? 9. How does the company measure the success of product portfolio? 10. In terms of those measures, what are the results of the existing product portfolio? 11. What product portfolio is the company developing now? 12. What product portfolio is the company going to develop in the near future? 	(Anderson Jr. and Joglekar, 2005) (Anderson Jr. and Joglekar, 2005) (Anderson Jr. and Joglekar, 2005)

Topic	Questions	References
	13. Do you have a <i>road map</i> concerning the products which will be developed? Can you explain it? 14. What problems does the company face in managing the product portfolio? How do you overcome them?	(Cooper, 2005)
E. Role of [Department name] Team	15. What is the key role of [Department name] team in the portfolio management process? 16. Can you give an example of the contribution of [Department name] team in enabling the portfolio management process to achieve its goals?	

APPENDIX J SIMULATION

J.1 SIMULATION CASE

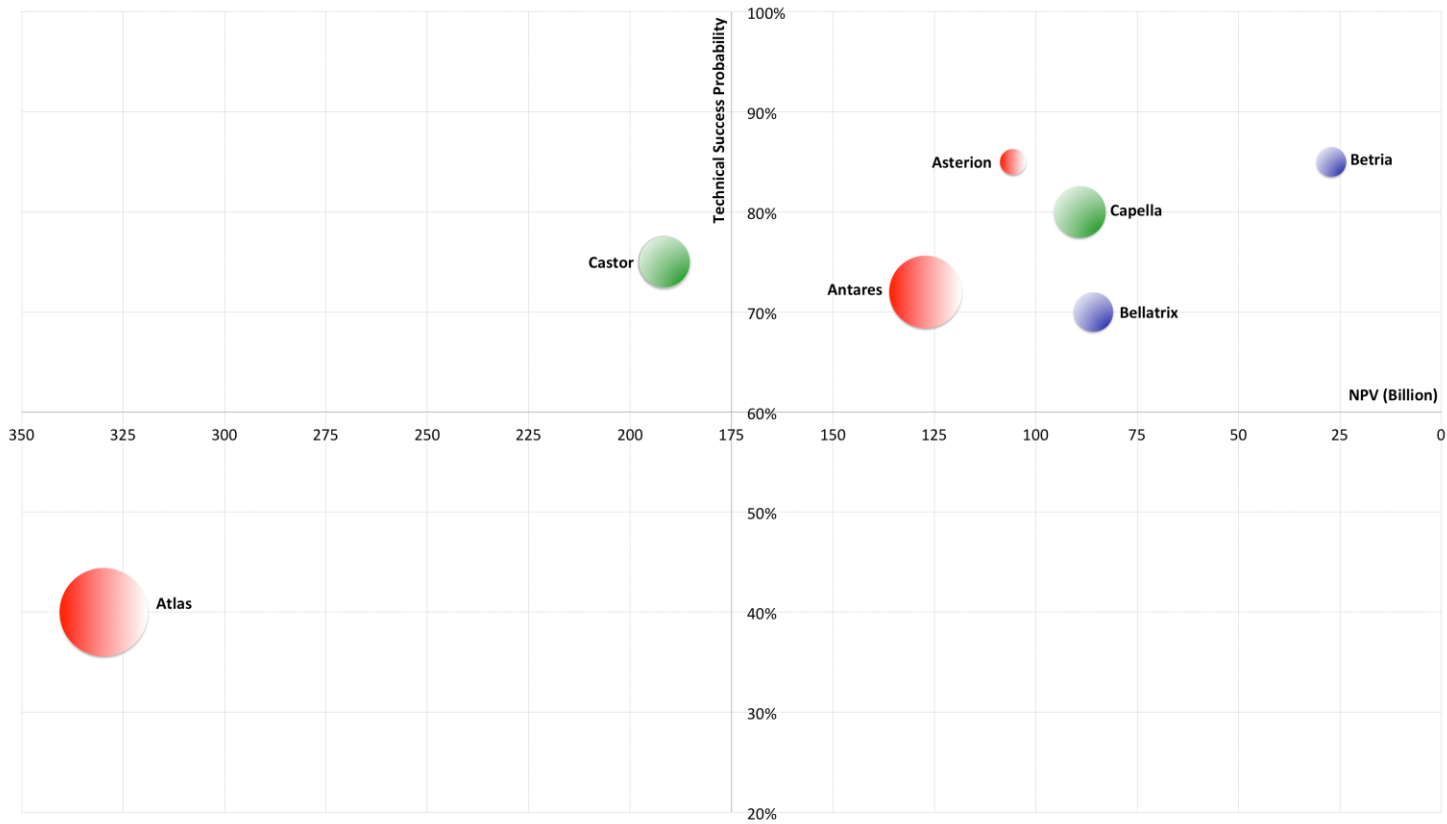
NEW PRODUCT DEVELOPMENT PORTFOLIO DECISION-MAKING

COMPANY				MEETING GOAL			
<ul style="list-style-type: none"> The company has three product groups: A, B, C The existing markets include Indonesia, Philippines and Japan 		<ul style="list-style-type: none"> The company's profitability is currently well above the industry average Allocating a total budget of IDR54 Bn for the new product development projects 		To select a new product development portfolio			
INDUSTRY				STRATEGIC AIMS			
<ul style="list-style-type: none"> Highly competitive environment There has been rapid consolidation in this industry, resulting in several large players which now dominate the markets Profits in this industry have fallen by between 1% and 3% per annum over the last five years 				<ul style="list-style-type: none"> Increasing revenue and halting the decline in profit Penetrating new markets to expand the company's customer base and strengthening the position in the Japan market 			
		PRODUCT GROUP A		PRODUCT GROUP B		PRODUCT GROUP C	
		<ul style="list-style-type: none"> The sales account for 65% of revenues and 50% of gross profit The product has been under pressure from competition, and seen margin come under increasing pressure, declining to an average 30% with sales volumes static Some recent attempts to move into higher price segments have shown very good promise New products planned are strategically important for the business 		<ul style="list-style-type: none"> Mature market The sales contribute 22% to the total revenue The company has invested heavily in growing the brands Approximately half of all marketing spend has been allocated to it The company has strengthened the position of its premier brands in this market This product group has increased revenue by 4% Gross margins are static though the net margins have fallen somewhat with the increased marketing spend 		<ul style="list-style-type: none"> The newest part of the business producing health and lifestyle associated products. This product group represents a strong platform for future growth This market is an attractive segment as the margins are high and not far behind Product Group A margins This product group delivers 13% of total revenue While the company has not traditionally been a player in this sector, there is a widely held view that its traditional strengths in brand management and distribution mean that the business is well positioned to rapidly increase its presence in this rapidly growing market 	
Project Name	ANTARES	ASTERION	ATLAS	BELLATRIX	BETRIA	CAPELLA	CASTOR
Status	Ready to begin	Ongoing	Ready to begin	Ongoing	Ready to begin	Ready to begin	Ready to begin
Deliverables	<ul style="list-style-type: none"> New branded of product Development activities include supply chain investments, new packaging and pre- 	Reduction in "X" content of the premium brand "Asterion Stars" for the US market.	Development of new variety of the primary content which can enhance the main benefit of the product	Addition of two new variants to extend the appeal of the "Bellatrix" brand	<ul style="list-style-type: none"> Launch of the successful "Betria One" brand into a new market: Vietnam New packaging and minor reformulation to meet local favours 	<ul style="list-style-type: none"> A repackaging of "Capella" product for world sports events. Minor reformulation, testing, new containers and promotion 	<ul style="list-style-type: none"> Re-launch of a lifestyle product in the Japan market following success in Indonesia and Philippines. Minor formulation changes, testing,

	launch promotion events						repackaging and promotion
Development Costs (IDR)	28.32 Bn	3.6 Bn (remaining)	42 Bn	8.4 Bn (remaining)	8.4 Bn	14.4 Bn	14.4 Bn
5-Year Sales Projection (IDR)	805 Bn	716 Bn	3,040 Bn	1,320 Bn	148 Bn	724 Bn	1,280 Bn
Time to launch	2 Years	6 Months	8 Years	1.7 Years	1 Year	2 Years	2 Years
Net Present Value-NPV (IDR)	127.2 Bn	105.6 Bn	329.8 Bn	85.8 Bn	27.1 Bn	89.1 Bn	191.5 Bn
Market	This is an entry point into the new strategically-important market	Market research has shown that the lack of success of this product after its launch two years ago is attributable to its being perceived as having too high "X" content. The new development addresses this issue.	This project has the possibility to establish a dominant position for the company based on secure Intellectual Property (IP) and new market paradigm	"Bellatrix" brand is developing steadily and is the basis of company's penetration into these growing markets.	New markets for the company but expected to grow steadily	New market opportunity	New market opportunity
Resource Requirements	A constraining factor for this project is that the human resource would be coming from other projects		There may be additional costs to protect the IP. The legal support required would be outsourced			The development requires experts from the Bellatrix project	This reformulation work will be outsourced
Issues		Improving company's position in the key Japan market.	This is a long term project	<ul style="list-style-type: none"> • This is regarded as a strategically important for the long run • Lack of commitment from the key specialists and support staff 	The size and growth potential need to be proven	This is a low risk entry point to a possible new approach to marketing the company's products	Improving the company's position in the key Japan market
Technical Success Probability	72%	85%	40%	70%	85%	80%	75%

This case is a modified version of a case developed by Dr Chris van der Hoven, visiting fellow at Cranfield School of Management, Dr. Eric Wood, the Graduate School of Business at the University of Cape Town, and Professor Rick Mitchell, visiting fellow at Cranfield School of Management, 2007.

J.2 RISK-REWARD DIAGRAM



● Product Group A
 ● Product Group B
 ● Product Group C
 Size of bubble: Development costs

J.3 SIMULATION RESULTS: PORTFOLIO DECISION

CosmeticsCo	FoodCo	MultiproductCo	AutocompCo
Asterion	Asterion	<i>Phase 1:</i>	Asterion
Betria	Betria	Asterion	Betria
Belatrix	Bellatrix	Bellatrix	Bellatrix
Castor	Castor	Castor	Castor
Capella	Capella	Capella	Capella
		<i>Phase 2: (reinvestment)</i>	
		Antares	

APPENDIX K DATA COLLECTION PLAN DETAILS

Task No	Data Collection Source		Objectives	Participants	Task Descriptions	Data Recording
1		Kick-off Meeting	To present the research plan and gain management's commitment	CEO All Directors	<ul style="list-style-type: none"> • Introduction • Research Plan • Scheduling 	<ul style="list-style-type: none"> • Field notes
2	DOC 1	Documents 1	To gather information about company's recent and past performance and the future plan		<ul style="list-style-type: none"> • Corporate's profile • Annual report • NPD and PM manual • PM summary (e.g. Risk-Return Matrix) • Product Data Sheet 	<ul style="list-style-type: none"> • Documents • Computer files
3	INT 1	Interviews 1	To gather the information of <ul style="list-style-type: none"> • Company's business and product strategy • The portfolio management process at the strategic level 	CEO Directors: <ul style="list-style-type: none"> • R&D • Marketing 	<ul style="list-style-type: none"> • Company's strategy • Innovation and product strategy • Portfolio management process • Decision-making process 	<ul style="list-style-type: none"> • Audio recordings • Field notes
4	INT 2	Interviews 2	To gather the information of: <ul style="list-style-type: none"> • Company's business and product strategy • The portfolio management process from the corporate level's point of view 	Directors: <ul style="list-style-type: none"> • Finance • Manufacturing • Supply Chain Management 	<ul style="list-style-type: none"> • Company's strategy • Innovation and product strategy • Portfolio management process • Decision-making process 	<ul style="list-style-type: none"> • Audio recordings • Field notes
5	INT 3	Interviews 3	To gather the information of <ul style="list-style-type: none"> • The portfolio management process at the operative and strategic (partly) levels • The NPD process at the operative level 	Managers: <ul style="list-style-type: none"> • Product Development • Marketing • Key Account 	<ul style="list-style-type: none"> • New product development process • Portfolio management process 	<ul style="list-style-type: none"> • Audio recordings • Field notes
6	DOC 2	Documents 2	To gather supporting documents related to the portfolio management process		<ul style="list-style-type: none"> • Forms • Reports • NPD's Minutes of Meetings (MOM) • Manuals 	<ul style="list-style-type: none"> • Documents • Computer files
7	INT 4	Interview 4	To gather the information of <ul style="list-style-type: none"> • The portfolio management process at the operative and strategic (partly) levels 	Managers: <ul style="list-style-type: none"> • Engineering • Production • Material Planning 	<ul style="list-style-type: none"> • New product development process • Portfolio management process • Decision-making process 	<ul style="list-style-type: none"> • Audio recordings • Field notes

Task No	Data Collection Source		Objectives	Participants	Task Descriptions	Data Recording
8	MOB	Meeting Observation	<ul style="list-style-type: none"> The NPD process at the operative level To investigate how directors and managers interact to make decisions in a natural setting	Directors Managers	Observing a strategic level portfolio decision-making meeting	<ul style="list-style-type: none"> Audio or Video recordings Field notes
9	SIM	Simulation	To investigate how the individuals deal with the portfolio decision-making process under a designed setting, isolated from political and environmental factors	Directors Managers	A role play of a portfolio decision-making process	<ul style="list-style-type: none"> Video recordings Field notes
10	INT 5	Interview 5	To gather the information of <ul style="list-style-type: none"> The portfolio management process at the operative and strategic (partly) levels The NPD process at the operative level 	Managers: <ul style="list-style-type: none"> Purchasing Distribution Finance 	<ul style="list-style-type: none"> New product development process Portfolio management process Decision-making process 	<ul style="list-style-type: none"> Audio Recordings Field notes
11	INT 6	Interviews 6	To obtain feedback from directors and managers regarding the information gathered.	<ul style="list-style-type: none"> CEO R&D Directors Product Development managers 	<ul style="list-style-type: none"> Verifying the data gathered Complementing the evidences collected 	<ul style="list-style-type: none"> Audio Records Field notes
12		Closing Meeting	To report and validate the results of the study.	1. CEO and All Directors 2. All Managers	<ul style="list-style-type: none"> Reporting the <i>Interim Site Summary</i> Results validation Evaluation 	<ul style="list-style-type: none"> Audio Recordings Field notes

APPENDIX L RESEARCH JOURNAL

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
8 Dec 2014	10.00-11.00	CosmeticsCo	1	Introductory meeting Plant and company museum tour	Innovation Centre Director; Applied Research Manager	Data Collection Plan	Books, product brochures and pictures
9 Dec 2014	14.00-15.00	MultiproductCo	1	Introductory meeting 1	Corporate Marketing Country Leader	Data Collection Plan	
11 Dec 2014	12.00-13.00	AutocompCo	1	Introductory meeting	Business Development Director of the Holding Company (Contact Person)		
12 Dec 2014	08.00-09.00	AutocompCo	2	Introductory meeting 1	Chief Operating Officer	Research Summary and Data Collection Plan (sent by email after the meeting)	
16 Dec 2014	14.00-15.00	FoodCo	1	Introductory meeting • Research Objectives and Planning • Brief presentation on the Company's NPD process	Marketing Insight General Manager		Slides: The Flow Seven Stages, sent by email on 22 Jul 2015
18 Dec 2014	09.00-11.00	CosmeticsCo	2	Presentation on the company profile Discussion	Innovation Centre Director; Applied Research Manager		Presentation slides
29 Dec 2014	11.00-12.30	FoodCo	2	Interview	Manufacturing Director		Interview recording
9 Jan 2015	14.00-15.30	CosmeticsCo	3	Interview	Sales General Manager		
12 Jan 2015	09.00-11.30	CosmeticsCo	4	Interviews	Managers of Research, Purchasing		
13 Jan 2015	09.00-16.00	CosmeticsCo	5	Interviews	FINAD Deputy Director; Product Development Manager; Sales Marketing Director #1		
14 Jan 2015	09.00-12.00	CosmeticsCo	6	Interviews	Sales Marketing Director 2		
14 Jan 2015	15.00-17.00	AutocompCo	3	Introductory meeting 2 • Company profile presentation • Research objectives and planning presentation	All Department Head		

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
	17.00-18.00			Informal discussion	Technical and Marketing Division Head; Plant Division Head		
15 Jan 2015	09.00-15.30	CosmeticsCo	7	Interviews	Marketing Deputy Director; Marketing General Manager		
19 Jan 2015	14.00-16.15	CosmeticsCo	8	Interviews	Plant Manager; Corporate Technical Engineer		
21 Jan 2015	15.00-18.00	AutocompCo	4	Interviews	Production Managers of Plant #1, Plant #2; Engineering Process Manager		
23 Jan 2015	14.00-15.00	AutocompCo	5	Interview	Marketing Manager		
26 Jan 2015	14.00-15.00	MultiproductCo	2	Introductory meeting 2	Directors of Corporate Marketing and Business Service, Technical and R&D		
29 Jan 2015	09.00-15.30	MultiproductCo	3	Interviews	Technical and R&D Country Leader; Technical Manager; Product Designer		
30 Jan 2015	08.00-10.00	AutocompCo	6	Interviews	Managers of PPIC, Finance and Accounting		
3 Feb 2015	14.00-15.00	AutocompCo	7	Interview	R&D Manager		Product development scheme; Development process charts-product #1, #2, #3; product development achievement
4 Feb 2015	10.00-11.00	FoodCo	3	Interview	Manufacturing Head for Dairy Products		
4 Feb 2015	15.30-17.00	MultiproductCo	4	Interview	Corporate Marketing Country Leader		
9 Feb 2015	08.00-09.30	AutocompCo	8	Interview	Engineering Project Manager		Minutes of meeting of a weekly project review
11 Feb 2015	10.00-10.30	MultiproductCo	5	Interview	Consumer Business Country Leader		
12 Feb 2015	08.00-09.30 13.00-16.00	FoodCo	4	Interviews	Directors of Strategic Procurement, Finance; Managers of SCM, Finance		

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
16 Feb 2015	09.00-10.00 13.00-14.00 15.00-16.00	AutocompCo	9	Interviews	Managers of Cost Control, Product Improvement, Purchasing		
20 Feb 2015	17.00-18.00	MultiproductCo	6	Interview	Business Division Head		
26 Feb 2015	08.00-09.00	AutocompCo	10	Interview	Chief Operating Officer		
26 Feb 2015	13.30-14.30	Bicycle-Manufacturer	1	Introductory meeting	Marketing Director		
27 Feb 2015	09.00-10.00 11.00-12.00	FoodCo	5	Interview Interview	Marketing #1 General Manager Distribution Manager		
2 Mar 2015	10.00-12.00 13.30-14.30	MultiproductCo	7	Interviews Interviews	Process Engineer; Finance Counsel; SCM Manager; Planner Specialist Brand Marketing #2 Manager		
3 Mar 2015	16.00-17.00	AutocompCo	11	Interview	Engineering Project Manager		
4 Mar 2015	13.00-14.00	FoodCo	6	Interview	Trade Marketing Manager		
11 Mar 2015	07.45-11.00 11.00-12.00	CosmeticsCo	9	Interviews Meeting for discussing simulation and NDA	Applied Research Manager; Innovation Centre Director Innovation Centre Director; Applied Research Manager		
12 Mar 2015	13.30-14.30	Bicycle-Manufacturer	2	Interview	Sales & Marketing Manager		
13 Mar 2015	13.00-15.00	FoodCo	7	• Interview • FGD-Consumer Insights	Consumer Insight Manager		
16 Mar 2015	10.00-11.00	CosmeticsCo	10	Simulation preparation meeting	Innovation Centre Director; Applied Research Manager		
16 Mar 2015	14.00-15.00	FoodCo	8	Interview	Marketing #2 General Manager		
18 Mar 2015	09.00-12.00	CosmeticsCo	11	Meeting Observation	Managers of Group Brand, Product Group; Product Executive; Supervisors of R&D, Formulation; Specialist of Formulation; Coordinator of Registration		
19 Mar 2015	12.00-13.00	AutocompCo	12	Closing meeting Simulation	Chief Operating Officer Managers of, Marketing and		

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
					Technical, Engineering Project Engineering Process, Cost Control, Purchasing; Marketing Officer		
20 Mar 2015	09.00-10.00	MultiproductCo	8	Simulation	Corporate Marketing and Business Service Director; Division Head; Brand Marketing Managers: #1, #2; Sales Manager; Process Engineer		
20 Mar 2015	12.00-13.00	FoodCo	9	Interview	Chief Executive Officer		
20 Mar 2015	16.00-17.00	FoodCo	10	Simulation	Directors of Finance, Manufacturing, Strategic Procurement; General Managers of Marketing #1,#2, Marketing Insight; Managers of Finance, Supply Chain, Trade Marketing		
23 Mar 2015	10.00-11.00	CosmeticsCo	12	Simulation	Director of Innovation Centre; Deputy Director of Sales and Marketing; Managers of, Product Development, Research Applied Research		
23 Mar 2015	12.00-13.00	CosmeticsCo	13	Closing meeting	Innovation Centre Director; Applied Research Manager		Company Profile footage, Annual Report
24 Mar 2015	09.00-10.00	MultiproductCo	9	Closing meeting	Corporate Marketing and Business Service Director		<ul style="list-style-type: none"> • Company profile • Sent by email: Company profile, Introduction to NPI process and NPI forms (excel worksheets)
25 Mar 2015	08.00-10.00	AutocompCo	13	Interviews	Division Heads of Engineering and Marketing, QC and HSE; Plant Head		
28 Mar 2015	08.00-09.00	AutocompCo	14	Closing meeting	Director at the Holding Company		
31 Mar 2015	13.30-14.30	Home-AppliancesCo	1	Introductory meeting	Director		
1 Apr 2015	15.00-16.00	CosmeticsCo	14	Video Clips	Sales and Marketing Director		

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
4 Apr 2015	13.00-14.00	FootwearCo	1	Introductory meeting 1	Human Resources Director		
6 Apr 2015	14.00-15.00	CosmeticsCo	15	Meeting observation	Managers of Group Brand, Product Group; Product Executive; Supervisors of R&D, Formulation; Specialist of Formulation; Coordinator of Registration		
8 Apr 2015	09.00-10.00	Home-AppliancesCo	2	Meeting observation	Marketing Director, all managers		
8 Apr 2015	14.00-15.00	Home-AppliancesCo	3	Interview	Marketing Director		
8 Apr 2015	14.00-15.30	MultiproductCo	10	Meeting observation	Directors of Technical and R&D, Consumer Business, Corporate Marketing Business Service Group; Managers of Technical, Sales, Brand Marketing #1, #2, #3 and #4; Finance and Accounting #1 and #2; Product Designer		Six scoring sheets documents
9 Apr 2015	08.00-11.00	AutocompCo	15	Meeting observation 1	This is a business process improvement (BPI) review meeting. It is not included in the observation data		
10 Apr 2015	09.00-10.00	Home-AppliancesCo	4	Interviews	Managers of Retail Sales, Modern Market Sales		
10 Apr 2015	14.00-15.00	MultiproductCo	11	Interview	Sales Manager		
16 Apr 2015	09.00-10.00	AutocompCo	16	Meeting observation 2	Manager of R&D; Section Heads of Procurement, Laboratory ; Leader of Engineering Project; Project Controller Product Development; Marketing, 4-Wheel Products; Design Engineers #1, #2; Staff of Procurement, Production Planning and Inventory Control, Supplier Development		
17 Apr 2015	10.00-11.00	MultiproductCo	12	Video clips	Corporate Marketing and Business Service Group		

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
20 Apr 2015	09.00-10.00	FoodCo	11	Closing meeting	Country Leader General Managers of Marketing #1, Marketing Insight; Customer Insights Manager		
				Meeting observation	Marketing General Manager; Brand Marketing Manager,		
24 Apr 2015	09.00-10.00	FootwearCo	2	Introductory meeting 1	Retail Director; HR Manager		
29 Apr 2015		AutocompCo	–		HRD Manager		Sent by email: Company profile and organisation chart documents
26 May 2015	12.45-13.50 (GMT)	FootwearCo	–	Interview-Telephone	Merchandising Manager		
8 July 2015	09.00-10.30 (GMT)	FootwearCo	–	Interview-Skype	E-Commerce Manager		
3 Aug 2015	07.30-08.30 (GMT)	FootwearCo	–	Interview-Telephone	Chief Designer		Blue Print timetable fro planning and freezing, New article procedure and new collection procedure, received by email on 04-08-2015
4 Aug 2015	10.00-11.00 (GMT)	FootwearCo	–	Interview-Skype	Raw Material Purchasing Manager		
28 Dec 2015	14.00-15.00	FoodCo	12	Progress report meeting • Additional documents required • Additional explanation concerning product development process	Marketing Insight General Manager		<ul style="list-style-type: none"> • Company profile, project management template and NPD form, received via email on 30-12-2015 • Discussion recording
19 Apr 2016		MultiproductCo	–		Technical Leader (formerly Technical Manager)		Received via email: <ul style="list-style-type: none"> • Landing review explanation • Slides: NPI-New Process Flow
26 Apr 2016		FoodCo	–		Marketing Insight General Manager		A text message explaining the role of Food Forum

Date	Time	Company	Visit #	Agenda	Participants	Data Provided	Data Collected
3 May 2016		FoodCo	–		Marketing Manager - Dairy Products		meeting An email confirming the name of the 20 April 2016's meeting observed
23 Jun 2016		MultiproductCo	–		Country Leader (former Business Head)		Received via email the organisation structure a business unit
28 Jun 2016		CosmeticsCo	–		Innovation Centre Director		An email explaining the reason that BOD meetings cannot be accessed and the role of the meetings.
29 Jun 2016		CosmeticsCo	–		Innovation Centre Director		A text message describing the role of deputy directors in BOD
28 Aug 2016		FoodCo	–		Marketing Insight General Manager		A text message explaining the role of Business Development and Marketing Insight divisions.

APPENDIX M RESEARCH SUMMARY

New Product Development Portfolio Management: Unravelling the Routines in the Decision-Making Processes

Research Background

The biggest challenge companies face in managing product innovation is determining the most promising new product development (NPD) projects from the many ideas generated²⁵³—this is known as *portfolio management*. Despite its significance for company strategy, portfolio management is still not well understood and so Cranfield School of Management is conducting a detailed study of portfolio management in order to help improve the process. Only five leading organisations will be involved in the research—selected from a range of sectors, and all facing challenges with their portfolio management. In conducting this research, Cranfield recognises the confidential nature of companies' product portfolios and so the raw data gathered will be kept confidential. In addition to academic papers, the research will generate practical recommendations for the participating companies.

Research Objectives

1. To identify your organisation's current process for portfolio management.
2. To identify the underlying mechanisms in which portfolio decisions are made.
3. To evaluate the linkage between your organisation's business strategy and its portfolio decision-making processes.
4. To identify effective approaches to portfolio management and provide feedback to companies.

²⁵³ See "A Dark Art No More", *The Economist*, (Special Report on Innovation), October 13th 2007, p. 11-16

Research Methodology

The data collection process, which takes 15 working days, comprises four steps:

- Interviews with the directors and managers involved in the portfolio management process.
- Observation of a portfolio management meeting.
- Analysis of documents, e.g., company's profile, portfolio management standard operating procedures, project archives and portfolio management minutes of meeting.
- A short simulation of a portfolio decision-making process.

Required Support from your Company

The participating company is expected to grant the following support:

- The consent of the directors and managers involved in the portfolio management process to be interviewed, and for this to be recorded
- Permission for the researchers to observe, and, if allowed, to film or record, the portfolio management meeting.
- Providing access to the relevant documents.
- The consent of the directors and managers involved in the portfolio management process to participate in a short portfolio management process simulation (45 minutes).

Value for Your Company

The results of the research for the participating company will be:

- Gaining a comprehensive picture and analysis of your organisation's current portfolio management process

You will receive direct feedback on your current process with concrete suggestions for potential improvements.