CRANFIELD UNIVERSITY

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A NEW MODEL FOR CHIEF INFORMATION OFFICER ROLE EFFECTIVENESS IN DIGITAL ENTERPRISES

SCHOOL OF AEROSPACE TRANSPORT AND MANUFACTURING

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ABSTRACT

Relatively high turnover rates for CIOs have endured since the role was conceived in the 1980s. Whilst the CIO has been studied as IT leadership and management research since the 1980s, a coherent theory to explain CIO role effectiveness has eluded practitioners. The author believes that rapidly changing expectations for an already ambiguous role, continuing use of inappropriate performance assessment frameworks, coupled with lack of personal development opportunities, represent major factors for continued demotivation and turnover. To help address Chief Information Officer (CIO) demotivation and reduce the impact of CIO turnover, the author developed and validated a new CIO role effectiveness model.

The author conducted a literature review and analysed UK CIO job advertisements as a means for capturing changing expectations for the CIOs behaviours and attributes. The result was developed into a conceptual model that was validated through a survey with participation from 82 UK CIOs, and 106 CIO stakeholders. Comparing expectations, the author finds that, as environments become increasingly dynamic and levels of digital maturity increase, most CIOs and their stakeholders expect: (i) that CIOs will transition their behaviours from change orientated behaviours towards relationship orientated behaviours; (ii) to agree more on the importance of the CIOs personal (demographic) attributes, the CIOs conceptual, human, and technical skills, the CIOs knowledge about stakeholders, IT and the business, and how CIOs should be assessed and (hence motivated). The author also finds continued disagreement about what CIOs are expected to learn and the sources of that learning. Acknowledging that expectations relate to changing situational variables, the author concludes that, whilst the new CIO effectiveness model doesn't represent a deterministic solution for the relationships between expected behaviours and attributes, it does provide a new means for mentoring CIOs and their stakeholders, for their given situation, to identify and address misalignment in expectations for CIO effectiveness.

Keywords:

Expectation Enactment, Role Making, IS Leadership, Digital Leadership, Dynamic Capabilities, Job Advert Analysis, Multi-Method, Pragmatism

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DISSEMINATION

Academic conference papers

Harding, D. J., & Fan, I.-S. (2021). Perspectives on the Chief Digital Information Officer Role: A Study of UK CIO Job Adverts. (BAM 2021 Conference)

Harding, D.J., Fan, I.-S., 2017. Environmental Modelling of the Chief Information Officer, in: UKAIS 2017: Ubiquitous Information Systems: Surviving & Thriving in a Connected Society. Paper 14. Oxford, UK, pp. 1–27. https://aisel.aisnet.org/ukais2017/78

Practitioner conference presentations and papers

Harding, D.J. (2020). From CIO to Business Leader. CIO 2020 Summit. Available at: IDG CIO Summit 2020. (Ac. 04/08/21)

Harding, D. J., & Fan, I.-S. (2020). Perspectives on the UKs Chief Information Officer Role: A Comparison of Advertised UK CIO Job Role Requirements with CIO Assessment Literature. NVivo Virtual Conference 2020. NVivo Virtual Conference 2020 (Ac. 04/08/21)

Practitioner Articles

Harding, D.J. (2021). Becoming data-driven: Lessons from the Metropolitan Police Service. Tech Monitor. Available at: Becoming Data Driven at the MPS (Ac. 12/07/21)

Harding, D.J. (2021). Four fundamental issues that contribute to CIO turnover. Tech Monitor. Available at: Fundamental Issues of CIO Turnover (Ac. 01/06/21)

Harding, D.J. (2021). Who is leading digital transformation? Not CIOs, job ads suggest. Tech Monitor. Available at: Who is Leading Digital Transformation? (Ac. 03/05/21)

Harding, D.J. (2021). A data-driven approach to digital maturity. Tech Monitor. Available at: Data Driven Approach to Digital Transformation (Ac. 05/04/21)

Harding, D.J. (2021). Why digital transformation challenges long-held beliefs about strategy. Tech Monitor. Available at: Why Digital Transformation Challenges long held beliefs (Ac. 02/03/21)

Harding, D.J. (2021). What does digital transformation actually mean? Tech Monitor. Available at: What does Digital Transformation mean?(Ac. 01/02/21)

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LIST OF ABBREVIATIONS

BTM	Business Technology Management
CDO	Chief Digital Officer (may also refer to Chief Data Officer)
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CFM	Cash flow margin (accounting metric)
CIO	Chief Information Officer
CxO	Chief 'X' Officer (general term for any executive holding a tile of 'Chief'. Can also refer to members of the Top-Management Team (TMT)
DBS	Digital Business Strategy
ERP	Enterprise Resource Planning (often referring to an IT system)
ICO	Information Commissioners Office (non-departmental public body which reports directly to the United Kingdom Parliament)
ICT	Information, Computing and Technology (often used to denote the IT department or IT capabilities)
IFRS	International Financial Reporting Standards
ISO	Information Systems Organisation (often referred to as the IT department)
ISS	Information Sub-Systems
IT	Information Technology
ITS	Information Technology Systems
ITO	Information Technology Organisation (often referred to as the IT department)
MCS	Management Control Systems (i.e., IT systems)
nCIO	An individual who has significant experience of working closely with a CIO
RBV	Resource Based View Theory (also referred to as RBT)
RT	Role Theory
RoA	Returns on Assets (accounting metric - defined as net profit / total assets)
RoE	Return on Equity (accounting metric)
RoS	Returns on Sales (accounting metric - profit margin of the firm or net profit/revenue)
SaaS	Software as a Service

SCA	Sustained Competitive Advantage (after the RBV)
SIS	Strategic Information System (can refer to priorities or levels of importance for IT projects)
SMACIT	Social Media, Applications, Cloud, and Internet of Things (Generalised acronym representing Digital Technologies)
TMT	Top Management Team (an alternative description for those empowered to shape and lead the realisation of business strategy, in many cases the board of Directors, including the CEO). This is also defined as the CEO and the most senior and influential executives in the organization, reporting directly to the CEO cf.(Finkelstein and Hambrick, 1996)
VRIN	‘Valuable’, ‘Rare’, ‘Inimitable’ and ‘Non-Substitutable’ resources for attaining Sustained Competitive Advantage (SCA)

1 INTRODUCTION

This chapter explains the authors motivations for the research. Acknowledging the effects of rapidly evolving expectations on CIO motivation, the author proposes the development of a new CIO role effectiveness model.

1.1 Real World Problem: CIO Relevance

Acknowledging his pragmatic world view, developed from over twenty years of IT consultancy experience, the author has noted that CIOs are becoming:

1. Increasingly critical in helping their organizations achieve sustained critical advantage (SCA); and
2. Increasingly demotivated, as evidenced by consistently high turnover rates

To address CIO demotivation and to help reduce the impact of CIO turnover, the author intends to develop a new CIO mentoring service.

Whilst there are likely to be multiple reasons for continued CIO demotivation, the author believes that two underlying issues contribute significantly to the problem:

1. CIOs are experiencing a significant upturn in changing expectations for their role; and
2. CIOs have limited opportunities to access structured learning to remain effective in meeting these changing expectations

Researchers in the field of Information Systems (IS) Leadership have tracked emerging expectations for the CIOs role since its inception in the 1980s'. As technologies have evolved, so have expectations for the role; CIOs have exchanged their roles for managing the day-to-day operations of their IT departments, for business leadership roles. Expectations for this latter role demand that CIOs adopt the role of strategist, influencing stakeholders to appreciate how the latest developments in IT can be exploited to generate sustained competitive advantage. However, this transition hasn't been binary; CIOs have been expected to manage their IT departments effectively, whilst simultaneously leading enterprise-wide IT enabled transformation programmes to achieve and maintain digital maturity.

As CIOs try to cope with the list of expanding expectations, digital technologies[1] are fuelling the development of increasingly dynamic environments. Digital technologies that provide access to real-time changes in the global marketplace expose organisations to increasing rates of change. In response organizations expect to create and exploit increasingly dynamic capabilities. To respond effectively, CIOs are now expected to cope with increasingly volatile demands for change and the rapidly changing expectations associated with them.

For CIOs to remain relevant in these new, digitally enabled environments, they need to learn to continuously adapt their own capabilities. However, in a vain attempt to help CIOs discover and address their personal limitations in meeting such expectations, many organizations persist with traditional practices for CIO assessment. CIOs are expected to meet expectations for IT and business 'performance' whilst maintaining business-IT 'alignment'. Whilst attainment of such goals appears reassuring, the author questions its ongoing validity. For example, if organizations persevere with setting and managing annual budgets, then unexpected in-year changes (in the market and hence the business) are not only likely to represent a continuous source of surprise for the CIO, but they are also likely to restrict the CIOs ability to respond effectively. Expectations for increasing levels of agility in IT are sure to be tested.

1.2 Research Opportunity

Research attempting to articulate how CIOs should learn to effectively address expectations has:

1. Focused on developing frameworks and models that claim to have established deterministic relationships between CIO attributes antecedent to an increasingly long list of stakeholder expectations for a given circumstance or at a single point in time; and
2. Acknowledged the relevance of, and shortfalls in CIO university education and professional training

[1] E.g., Big Data, AI, Cloud based services, etc.

However:

1. Whilst acknowledging the high degree of contingency between expectations for the CIO and their dynamically changing business environments, research has only produced models that appear useful for a given point in time, or in relatively ‘static’ environments; and
2. Research providing insights into how CIOs can learn to continuously address rapidly changing expectations appears virtually non-existent

The lack of research into the development of new ways and means for practicing CIOs to learn to address the issues and opportunities arising from digitally enabled, increasingly dynamic environments, provides an opportunity to make a new, significant contribution to the field of IS leadership.

1.3 Research Aim & Objectives

In making this contribution, the author aims:

To develop a new CIO effectiveness model to help CIOs and their stakeholders improve how they communicate dynamically changing expectations for the CIOs role

As traditional approaches for CIO assessment become less useful, and the rate of changing expectations for the CIO continue to increase, CIOs need access to an alternative means of assessment and development if they are to maintain their levels of motivation. The author believes that if CIOs can improve their capabilities in setting and managing the dynamically changing expectations of their stakeholders, then they will have access to an alternative means to continue to demonstrate their effectiveness. Proposing that a new CIO mentoring service would contribute to helping CIOs develop such capabilities, the author aims to develop a new CIO role expectation model which articulates this new this means. The author claims that research addressing this aim is significant as it will impact:

1. IS Leadership researchers, revealing a new ‘means’ for identifying how CIOs can learn to assess and address changing expectations for their role; and
2. IS Practitioners, as: (i). relatively high CIO turnover rates could be addressed if CIOs can access a means to continuously learn, and (ii). the risks

associated with high CIO turnover rates on modern enterprises are mitigated, improving potential for achieving/ maintaining SCA through effective use of digital technologies

However, to meet this aim, in todays' increasingly dynamic business environments, the author proposes that is necessary to clearly identify:

1. Which stakeholders hold which expectations for the CIOs role; and
2. How well those expectations align with the CIOs own expectations for their role

before a decision can be made on how to address any differences in expectation. This leads to the research question:

'In increasingly dynamic environments, how to determine the degree of expectation alignment between CIOs and their stakeholders for a CIOs most important attributes when effectively managing rapidly changing expectations for the CIOs most effective behaviours?'

As will be shown in the literature review, the author shows that expectations can be articulated in terms of the CIOs attributes and the CIOs behaviours for a given circumstance or environment. In progressing answers to this question, the author intends to fulfil the objectives:

1. To identify, through literature review gaps in understanding about:
    a. Stakeholder expectations of the CIO
    b. The relevance of digitally enabled dynamic environments on stakeholder expectations
    c. CIO attributes which are considered to relate to rapidly changing stakeholder expectations in such environments; and
    d. The barriers to personal development that CIOs experience when attempting to learn to meet these expectations
2. To develop new theoretical constructs that model changing expectations for the CIO

3. To test and validate this model by analysing empirical data collated from UK CIOs and a broad range of their stakeholders
4. To assess the:
    a. Validity of the approach
    b. Usefulness of the model
    c. Contribution of the research to the literature on IS leadership
5. To identify future research that may further our understanding of the CIOs effectiveness in dynamically changing environments

1.4 Thesis Structure

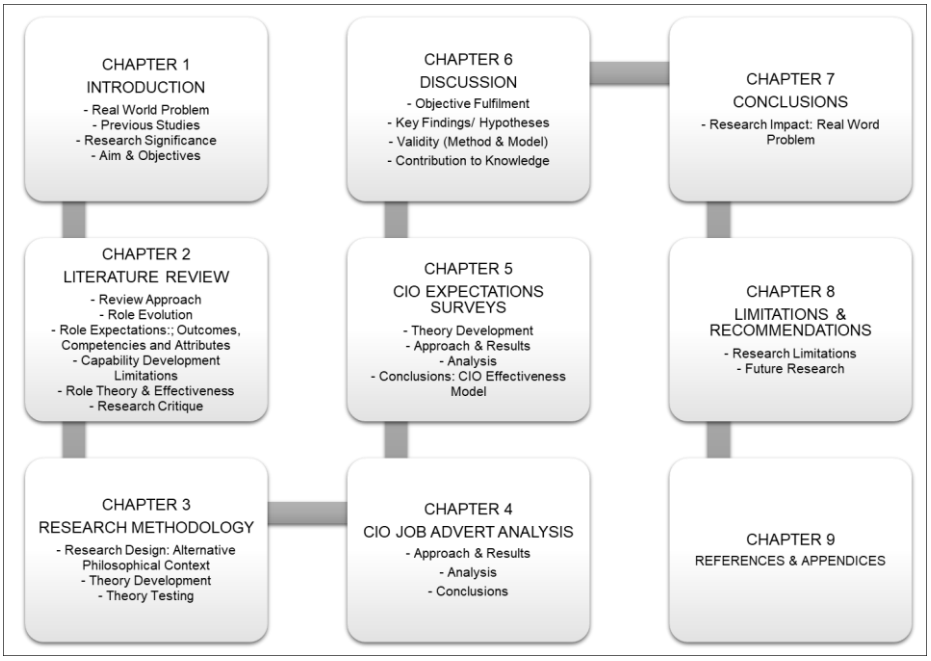

Figure 1: Thesis Structure

In meeting these objectives, this thesis is structured as follows:

1. Chapter 1: provides a summary of this research and the rationale for investigating the CIOs role. The aim and objectives are the research are provided along with a declaration of contribution to knowledge for researchers and practitioners
2. Chapter 2: presents a detailed critique of the current body of knowledge of the CIO. The major themes discussed are:
    a. CIO Role Evolution – how role expectations have expanded as the role has evolved in line with technology changes

b. Role expectations – a more detailed review of what various stakeholders expect from the CIO, in terms of:
    - Outcomes – where researchers have investigated a variety of expectations that the author has classified in terms of 'performance', 'business-IT alignment' and 'role enactment';
    - Competency & attributes – where researchers have sought to identify relationships between a CIOs demographics (e.g., age, experience, education, etc.), their social capital (structural power, etc.), their competencies, their skills, and the knowledge that a CIO is expected to have in order to deliver the outcomes described above
c. Role capability development – a review of the research investigating the issues facing CIOs who seek to develop in their roles
d. Reflecting on alternative contexts for investigating the CIO:
    - a behavioural perspective for effective CIO expectations management, as described by Organizational Role Theory; and
    - an alternative view on expectation assessment, role effectiveness
e. Research critique - reflecting on the literature review, the author identifies where research has yet to address the question of correlation between CIO attributes and CIO expectations in increasingly dynamic environments

3. Chapter 3: adopting an alternative philosophical perspective, the author develops a new a theoretical model for CIO role effectiveness and proposes a multi-method approach for developing, testing, and validating theory to finalise variables and constructs for this model
4. Chapter 4: to identify current expectations for UK CIOs, and to develop new, theoretical constructs for the proposed CIO effectiveness model, the author details the results of an analysis of publicly advertised UK CIO job adverts
5. Chapter 5: reflecting on the literature review and the results from the Job Advert analysis, the author develops new hypotheses and finalises constructs to develop two survey instruments. Explaining the approach to sample

management, data collection and analysis, the author presents a summary of CIO and CIO stakeholder expectations for CIO behaviours and CIO attributes in increasingly digitally mature environments

6. Chapter 6: discusses the implications of the results of the analysis; reflecting on the approach, findings, and model validity the author claims a new contribution to the field of IS leadership
7. Chapter 7: draws conclusions about the applicability of role-making to progressing the study of CIO role effectiveness in digital enterprises and the ramifications of this for researchers and practitioners,
8. Chapter 8: reflects on the suitability and limitations of the methods employed in reaching this conclusion, and recommendations for where researchers should consider focusing their attention for building on these findings
9. Chapter 9: contains the references cited throughout this research and detailed results from the JA analysis and the two expectations surveys

2 LITERATURE REVIEW

In meeting objective one of this research, this Chapter:

1. Explains the approach taken to identify CIO research considered most relevant to this study; and
2. Provides a critique of the claims made by previous researchers, specifically, the expectations held by CIO stakeholders:
    a. For how CIOs are expected to impact their organizations; and
    b. Which capabilities a CIO is expected to have in order to deliver that impact

2.1 Approach

In planning an approach for review of relevant IS leadership literature, the author developed literature review questions that would help identify literature most relevant to the research problem. The author used an iterative process of searching, screening, and evaluation, adapted from the systematic literature review approach Figure 2:

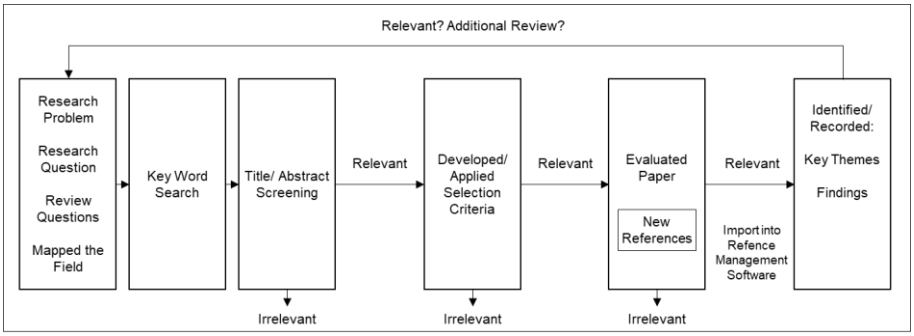

Figure 2: Literature Review Approach

To begin the process, the author developed three review questions that, if addressed would help identify literature that best explains stakeholder expectation and how CIOs may have fulfilled those expectations. Specifically:

1. How has the CIOs role and capabilities been defined?
2. In what way have CIOs been expected to impact their organisations? And
3. What have been the expectations for the CIOs performance when delivering that impact?

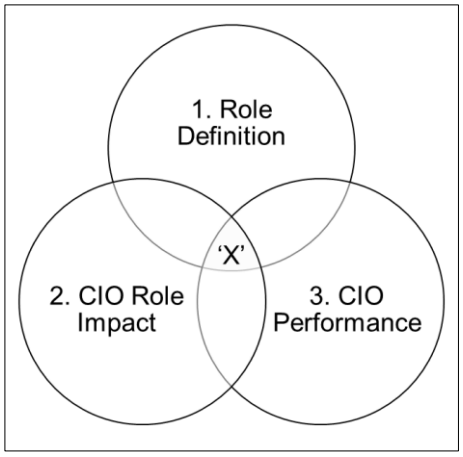

Figure 3: IS leadership literature Field Mapping

Recognising that these three review questions were likely to identify studies that contained overlapping themes (denoted by 'X' in Figure 3), the author also considered:

1. If differing combinations of expected CIO impact and performance had produced differing definitions for the CIOs role? And,
2. If differing definitions were in evidence, what unique capabilities (i.e., skills, attitudes, etc.) were CIOs expected to possess?

2.1.1 Key Word Search

To identify research pertaining to these review questions, the author performed a key word search, that considered words associated with CIO:

1. Impact: from the perspective of CIO stakeholders and what they may consider to be a measure of success, and
2. Performance assessment: in terms of individual performance and reward from the perspective of the individual CIO and their employer

To understand current definitions for the CIOs role, CIO definitions were considered at two 'levels':

1. General Level – to try and identify definitions of the CIOs role; and
2. Specific Level – to try and identify factors that had been grouped together to describe attributes of the role

1a. Role Definition - General	1b. Role Definition - Capabilities
“CIO AND Role”	“CIO AND Skills”
“CIO AND Description”	“CIO AND Attributes”
“CIO AND Type”	“CIO AND Knowledge”
“CIO AND Definition”	“CIO AND Competency”
“CIO AND Classification”	“CIO AND Competencies”
“CIO AND Category”	“CIO AND Capability”
“CIO AND Characterisation”	“CIO AND Capabilities”
“CIO AND Classification”	“CIO AND Behaviours”
“CIO AND Profile”	“CIO AND Attitude”
“CIO AND Position”	
2. Role Impact - Organisational	**3. CIO Performance/ Reward**
“CIO AND Firm Value”	“CIO AND Appointment”
“CIO AND Firm Performance”	“CIO AND Assessment”
“CI OAND Profit”	“CIO AND Appraisal”
“CIO AND Impact”	“CIO AND Evaluation”
“CIO AND Benefit”	“CIO AND Performance”
“CIO AND Cost Reduction”	“CIO AND Achievement”
“CIO AND Cost Saving”	“CIO AND Value”
“CIO AND Efficiency”	“CIO AND Reward”
“CIO AND Productivity”	“CIO AND Motivation”
“CIO AND Customer”	
“CIO AND Supplier”	
“CIO AND Partner”	
“CIO AND IT”	
“CIO AND Business”	

Table 1: Key Word Search

Table 1 presents the key words used to search academic data bases considered most appropriate to the field of information systems leadership[2]. Note all searches were repeated for the phrase ‘CIO’ and ‘Chief Information Officer’ from the year 1980. Counts of the results of these four searches are summarised in

[2] SCOPUS, ABIINFORM and EBSCOHOST

Table 2, which also shows the volumes of research papers discounted at each stage of the sifting process.

	Database			
Search String	**SCOPUS**	**ABI/INFORM**	**EBSCOhost†**	
1a. CIO Definition - General	228	25	2122	
1b. Role Definition - Specific	147	523	805	
2. CIO Performance/ Reward	627	537	2265	
3. Role Impact - Organisational	371	1154	5992	
Total Pre-Validation	**1373**	**2240**	**11184**	
Total After Removing Duplicates	238	980	589	
Total After Title/ Abstract Cleaning	95	392	236	
Total After Selection Criteria Applied	46	190	114	**Totals**
Total After Evaluated (Themes)	**20**	**83**	**50**	**152**

Table 2: Literature Selection Counts

As initial results for each search string were significantly large, a first round of cleansing was completed in MS Excel (using the duplicate function), which reduced the total of counts considerably (i.e., from 14797 to 1807). Subsequent screening of the titles and abstracts reduced this count to 723. At this point the author applied previously prepared 'selection criteria' (see section A.1) in order to complete a final round of evaluation which left 152 research papers[3].

As a result of this process, the author identified the following major themes pertinent to the research:

1. Role Evolution culminating in increasing levels of Role Adaptiveness:
    a. Over the last forty years, as IT evolved to become a more critical resource, expectations for the CIOs role have expanded; and

[3] Whilst this was a final count of peer reviewed papers from the key word search, detailed review of each paper revealed additional references to other papers, books, and articles which (where appropriate) are referenced in the literature review

   b. As a result of increasingly (digitally enabled) dynamic environments, the CIOs role has reached the point where they are now expected to become increasingly adaptive. CIOs who fail to achieve this risk losing their hard-won remits to emerging, new digital executives
2. Role Expectations, in terms of:
   a. Performance: objective expectations for CIO impact and their performance when achieving that impact
   b. CIO Attributes: individual, personal attributes deemed most relevant to CIO role performance
3. Role Capability Assessment and Development: key considerations for how CIOs can improve their capabilities to meet changing expectations. through assessment and learning
4. Role Theory: an alternative perspective to CIO role performance; and
5. Role Effectiveness: relatively more subjective expectations to 'enact' Managerial, Leadership and 'Salient' role activities

2.2 Role Evolution

The Chief Information Officer (CIO) (Synott, W., 1987), the executive accountable for managing all aspects of information technology since the 1980s[4] is one of the few executive roles that spans all organisational functions[5].

However, dramatic changes in information technologies have '…*transformed IT from a back-room utility to a strategic organizational resource*,' (p.386) (Ross and Feeny, 2000). An exponential growth in the availability and use of information systems has created technologies that are now '…*commodities as ubiquitous as labor*,' (p.1) (Correia and Joia, 2014).

The effects of this growth on the CIOs role have been charted by CIO researchers for many years. The CIOs position has traversed from:

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[4] Willian Synott was credited with coining the label "chief information officer" in a speech at the 1980 Information Management Exposition and Conference (Peppard et al., 2011)

[5] The author would argue that whilst the CFO and the CHRO have a similar vantage point, their own functions are also heavily reliant on the products and services provided by the CIO

'…keeper of the infrastructure, under the CFO, to an executive managing the organisations information with a seat at the executive table', (p. 1878) (Fortino, 2008).

Similar views, citing a near tandem relationship between the role and changes in technologies have also been aired, e.g., as described by (Ross and Feeny, 2000) who track role changes across eras of technological change and (Weiss and Adams, 2010) who claim that the role has evolved from a glorified data processing manager, to technocrat, to business executive, culminating in a 4th evolution, a mix of business executive and technocrat.

Although specific dates for such transitions haven't been agreed, it seems reasonable to assume that the introduction of Enterprise Resource Planning (ERP) systems in the late 1990's and early 2000's[6] frames this transition period well, as:

1. ERP system implementation and development represents one of the earliest examples of enterprise-wide business change; and
2. CIOs would therefore experience a significant upturn in their exposure to enterprise-wide business stakeholders

CIOs considering the impact of business change, whether because of 'everyday' operational IT changes, or as a result of the delivery of enterprise wide-systems, needed to develop considerable, wide-spread leverage with functional managers and leaders outside of the IT department. This expansion in remit meant that CIOs were expected to shift their focus away from day-to-day managerial activities in the IT department and start to exert influence more widely. This distinction meant that CIOs were expected to transition from managerial roles into leadership roles. However, whilst the causes and effects of such transitions can be debated, the role has not simply evolved from that of manager to leader but has expanded to encompass many aspects of both roles. However, this transition is incomplete, the CIO is now exposed to increasingly dynamic environments.

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[6] According to (Ross and Feeny, 2000), the Y2K issue was also largely perceived to have accelerated ERP adoption

2.2.1 Dynamic Capabilities & Role Adaptiveness

In keeping with research objective 1(b), understanding the relevance of increasingly dynamic environments on stakeholder expectations for the CIO, the author now examines expectations in terms of a CIOs level of adaptiveness.

Such is the rate of expected business change, organizations are now expected to develop and apply ever more 'dynamic capabilities,' when responding to digital disruption (Karimi and Walter, 2015) and (Schallmo et al., 2019), when maintaining alignment between digital strategies and resources (Yeow et al., 2018).

Organizations planning to develop ever more dynamic capabilities expect to undergo a 'digital transformation' (Berghaus and Back, 2016) in order to improve their 'digital maturity,' (Remane et al., 2017). However, whilst debate continues about possible definitions for digital transformation (Vial, 2019)[7], researchers claim that there remains a significant gap between the hype surrounding digital transformation and actual practice (Wade et al., 2020)[8].

Despite the challenges facing CIOs as they attempt to remain abreast of latest technologies and trends, researchers have made some progress in determining *what* CIOs need to do as they help their organizations respond to digital technologies. Members of the Top Management Team (TMT), seeking to develop more responsive or dynamic capabilities (Teece et al., 1997) through the adoption of digital technologies (Yeow et al., 2018) should consider securing CIOs who can seamlessly switch between multiple managerial roles (Grover et al., 1993) and leadership roles (Mclean and Smits, 2014) as demanded from the new, digitally enabled, highly dynamic environments.

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7 Who discover some twenty-three unique definitions in their literature review

8 Who question the relevancy of this 'digital hype;' which not only appears scant but goes largely unnoticed in the rush to promote 'digital transformations' that achieve greater levels of 'digital maturity.'

The seemingly symbiotic relationship between the role and evolving technologies is likely to endure (Macaulay, 2018)[9]; and as technologies continue to change and evolve, so must the CIOs role. However, whilst research has focused expectations for *what* CIOs should do for a given circumstance, their remains a gap in our understanding of *how* CIOs should enact that which is expected from them.

2.2.1.1 Dynamic Capabilities

CIOs will be expected to deal effectively with increased demands for change, from a growingly more diverse range of sources:

> *The CIO's environment is dynamic and uncertain; reflecting the changing internal and external environment consisting of fluctuating internal customer needs as well as rapidly changing technology,' (p.1) (Kalgovas et al., 2014)*

The CIO has been closely linked with digital technologies and digital transformation for some time now (Gartner, 2015), (Bygstad et al., 2017), (Ellis and Heneghan, 2018) and CEOs are cognisant of predictions for the ongoing importance and relevance of the role in continuing to advance digital transformation (Leong et al., 2013), (Qualtrough, 2017), (Raskino, 2017), (Marshall, 2017) and (Macaulay, 2018).

However, for CIOs to respond effectively to the expected challenges arising from digital transformation (i.e., the creation of more dynamic capabilities), it appears that they will have to become effective in responding to more frequent (and possibly more disruptive) requests for change; and if these requests are now sourced more widely from across the extended (more integrated) enterprise, then CIOs will also need to be effective at dealing with growing variations in requests and expectations.

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[9] Gartner asked 460 business leaders from organisations with more than $50 million in annual revenue which C-suite roles were driving, and which were blocking digital business change initiatives. CIOs came out as the top enabler

Traditionally, CIOs have provided effective and efficient IT capabilities, by attempting to periodically align their IT resources with (strategically driven pre-planned) business demands. However, this activity has relied on a fundamental assumption, that business requirements shape IT's capabilities. However, there has been a growing perception that the role of technology has changed, and that digital technologies now form the core part of the business strategy, they are deemed 'strategic assets' to the extent where they are highly influential in helping shape new 'digital business strategies'.

2.2.1.1.1 Digital Business Strategy

As with much of the IS leadership literature, perspectives on digital strategy formulation have evolved over time. For example, in their article 'What is your digital strategy?' (Mithas and Lucas, 2010) suggest that organisations should move away from pursuing questions regarding return on IT investment and should instead ask the question '...*how can we use technology as a strategic asset to enable new competencies or maintain a competitive advantage*?' (p.4). In developing IT as a strategic asset, leaders should use their digital business strategy to synchronise '...*digital assets and IT infrastructure*...' with their business strategy. However, strategy formulation is one thing, successful enactment and delivery (the researchers suggest) relies on CEOs and CIOs to invest in cross firm digital literacy[10], achieved by senior executives '...*investing in the education of key professionals*...' which should be '…*followed by a continuous dialogue between business and IT personnel*,' (p.5).

Alternatively, (Bharawwaj et al., 2013) suggest that IT and business strategies should fuse into a single digital business strategy. Reflecting on papers published by (Pagani, 2013) and (Mithas et al., 2013), the researchers conceptualise four themes for digital business strategy i.e., Scope (that goes beyond traditional firm boundaries and supply chains and out into 'dynamic ecosystems')[11], Scale (i.e., scale up/ scale down dynamic capabilities enabled through cloud-based

[10] Comprising of three pillars: understanding of how business strategy and IT strategy should synchronise, how IT should be governed and how the firm should manage its IT infrastructure

[11] And considers digitization of products and services

infrastructure)[12], Speed (especially, decision making when responding to changes in customer behaviours and/ or in the context of developing insights from vast amounts of big data)[13] and Value creation (especially considering the democratisation of content creation and sharing)[14]. The researchers claim that the adoption of their four themes should enable '...*thinking on digital business strategy and help provide a framework to define the next generation of insights*,' (p.471). An alternative perspective to a strategically informed approach to digital technology, is a focus on the transformation activities that many organisations would have to undergo in their pursuit of technology adoption. In 2015, in their conceptual paper contrasting digital strategies with IT strategies (Matt et al., 2015) observe that IT strategies, which focus on IT infrastructure restrict '…*the product-centric and customer-centric opportunities that arise from new digital technologies, which often cross firms' borders*..' and that they (IT strategies) don't account for the '…*transformation of products, processes and structural aspects that go along with the integration of technologies,*' (p.339). As such the researchers propose a new transformation framework that comprises four dimensions that *digital transformation strategies* should encompass, namely: Structural Changes, Use of Technologies, Changes in Value Creation and Financial aspects. Further, the researchers emphasise the importance of the process (or procedure) of developing a digital transformation strategy suggesting that (to date) there was '…*no clear answer,*' (p.341) as to which role should oversee the digital strategy.

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12 Determined by network effects and multi-sided business models, and the ability to develop capabilities that can manage increasing huge quantities of data and to partner effectively through alliances and partnerships (through shared digital assets)

13 Also including the acceleration of product launches (e.g., in design and launch), Supply chain orchestration and network formation

14 Through multi-sided business models, by coordinating business models in networks and by leveraging value through industry architectures

Whilst researchers continue their investigations into how digital strategies can be defined[15&16], an alternative avenue of research has focused on the CIOs role when implementing digital strategies.

2.2.1.1.2 Digital Business Strategy Alignment

Whilst the researchers don't always refer directly to the CIO, it's clear from their findings that to achieve an organizational capability to manage continuous alignment between IT and business resources, organizations may have to rethink their current structures and supporting processes if alignment between IT and the business is to improve. Such a move will require a rethink about the scope of the CIOs role and their part in IT resource alignment

Investigating the effects of dynamic environments on resource alignment, (Yeow et al., 2018) conduct a longitudinal case-study on a European sports fashion company. As alignment is expected to be '…*a journey of continuous adaptation and change*', the researchers investigate how IT alignment is achieved '...*in a digital strategy context, where strategy is an emergent fusion of business and IT, and where organizational capabilities evolve constantly,*' (p.44). Focusing on the process of organisational alignment, the researchers analyse data from multiple written sources and from interviews with 42 executives in the TMT to develop a process model that defined 'tensions' at each stage of a three phased alignment process (i.e., exploratory, building and extending). In the formation of the digital strategy, the researchers suggest that in the 'exploratory' phase the '…*aligning process is initiated when the organization takes actions to sense new opportunities and threats and begins to articulate a new strategy*,' (p.55) and that this process draws attention to shortfalls in existing resource capability. Building on these findings the researchers produce a comprehensive list of alignment

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15 Following a comprehensive literature review, (Schallmo et al., 2018) propose that a digital strategy is the '…*strategic form of digitization intentions of companies*,' that its objectives are '… *to create new or to maintain competitive advantages*,' and that within the digital strategy '…*digital technologies and methods are applied to products, services, processes, and business models*,' (pp. 2-3)

16 Building on this work, (Schallmo et al., 2019) interview thirteen researchers and consultants to propose that the emerging work on digital strategy can be classified into three categories: (i) where corporate strategy and digital strategy are detached, or (ii) where digital strategy is part of corporate strategy, or (iii) where digital strategy is the corporate strategy

actions[17], in terms of 'sensing' (i.e., scanning and learning, 'seizing' (i.e., selecting, designing, committing, transforming, and accessing) and 'transforming' (i.e., creating, accessing, leveraging, releasing). In conclusion the researchers recommend that the TMT should consider developing an entirely new dedicated 'digital department' and be willing to '…*invest in the opportunity and create a new dedicated team to leverage the existing workforce in a cross departmental manner*,' (p.57).

Given this context, organizations have sought to develop new, additional dedicated executive roles to work alongside the CIO to focus on alternative approaches to developing digital capabilities that deliver new, innovative digital products and services.

For example, (Chanias et al., 2019) examined digital strategy development through case study in the financial sector. Following the appointment of a Chief Digital Officer (CDO), the researchers tracked the development of a combined top-down/ bottom-up digital transformation strategy (i.e., Top-down focusing on the development of digitisation of existing products and services, whilst bottom-up focused on the development of new digital products and services). Suggesting that the process of developing a digital transformation strategy '...*is a highly dynamic process involving iterating between learning and doing in terms of digital strategy making*,' (p.14), and that it is '...*always in the making, with no foreseeable end,*' (p.15), the researchers claim that:

1. The digital transformation strategy '…is *business-centric and customer-oriented in its perspective, rather than technology-centric. IT are mostly regarded as an enabling prerequisite*', to the transformation process
2. Changes arising from the digital transformation strategy affects almost '...*all parts of the organization…'*
3. The digital transformation strategy *'…is developed by different stakeholders within the organization and might even be crafted "bottom-up" by opening strategy processes up to the entire organization…'; that*

[17] After (Teece, 2007)

4. Its '…*development requires distinct governance structures*'; and
5. *'…is never "finished", but must be continually reinvented*,' (pp. 13-14)

Having not acknowledged the relevance of the CIOs role to the development (and enactment) of the digital strategy, their findings suggest a profound shift in thinking about digital strategy development and enactment, and the relevance of the CIOs role to that process. In their opinion, the researchers conclude that the development of such a strategy requires a distinct governance structure, under the jurisdiction of the CDO.

In responding to dynamic environments through the development of digitally enabled dynamic capabilities, it's clear that organisations can take a variety of paths in developing their digital strategy[18], their digital transformation strategies[19] or even in developing digital maturity frameworks[20]; regardless of this, researchers agree that whichever approach is taken, the development of a digital strategy will become an ongoing, never-ending process, neatly summated in that:

> *'The dynamism and complexity of the business and technology environment suggest that digital strategy is emergent, iterative, and influenced by evolving organizational capabilities, (p.44) (Yeow et al., 2018)*[21]

In this context, researchers have assessed how dynamic environments require the CIO to become ever more adaptive.

2.2.2 Role Adaptiveness

In assessing the literature that explores where CIOs alter what they do when responding to dynamic environments, the author adopts the term 'CIO role adaptiveness' to refer to investigations that encompass: (i) where CIOs are

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18 E.g., (Spil et al., 2016), (Schallmo et al., 2018), (Schallmo et al., 2019), (Kitsios and Kamariotou, 2019), etc.

19 E.g. (Tekic and Koroteev, 2019), (Assar and Hafsi, 2019),(Fischer et al., 2020)

20 E.g. (Österle and Winter, 2003)), (Becker et al., 2009), (Westerman and McAfee, 2012), (Schumacher et al., 2016), (Chanias and Hess, 2016), (Ramantoko et al., 2018), (Thornley et al., 2019) and (Sundberg et al., 2019)

21 Citing (Galliers, 2011)

expected to develop adaptive IT capabilities and, (ii) changes to their (individual) CIOs role.

The need for organizations to rethink their IT capabilities in the face of dynamic environments has been argued for some time now, as concluded by Feeney and Willcocks:

> '*If organizations are to contemplate the next decade of technological change with any equanimity, then they must design flexible IS arrangements with change in mind*,' (p.21) (Feeny and Willcocks, 1998)

When responding to dynamic environments, CIO researchers have largely concentrated on the concept of 'ambidexterity'. Attainment of ambidexterity requires individual resources to maintain two (potentially opposing) processes; an ability to 'exploit' current knowledge (e.g., to develop internal efficiencies) and 'explore' new knowledge to seek opportunities for innovation and adaptation (March, 1991)[22].

Developing this line of thinking, researchers have contextualised the dynamic capabilities in terms of 'organizational ambidexterity,' or:

> '…the capacity to simultaneously achieve alignment and adaptability at a business-unit level,' (p.209) *(Gibson and Birkinshaw, 2004)*

Whilst organizational ambidexterity appears possible at the business-unit level, especially in the absence of formal structures designed to achieve it, the researchers suggest that there appear to be multiple alternative pathways to achieving business-unit level ambidexterity.

For IT departments, one potential path could be by developing an ambidextrous IS strategy. For example, in striving for increased levels of IS (business-unit

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[22] Who argues that the application of adaptive processes, that refine exploitation more rapidly than exploration, is likely to become effective in the short run but self-destructive in the long run

level) ambidexterity through the application of an ambidextrous IS strategy, CIOs in managerial roles are able to leverage their positional power to (ultimately) impact firm performance[23] (Karpovsky and Galliers, 2013). However, in attempting to create an ambidextrous IS function, the CIO must overcome multiple barriers associated with either balancing both explorative and exploitative activities[24], or those associated with conducting both explorative and exploitative actives[25] (Kalgovas et al., 2014). To overcome these barriers, CIOs are expected to create a KPI structure, separate day to day activities from development type activities, successfully deliver products, use personal influence to become a trusted advisor, allocate funding as a function of revenue, establish flexible outsourcing, and ensure knowledge is shared widely (through team rotations).

Acknowledging that more work is needed, Kalgovas, et al. conclude that a more sophisticated framework will be needed to '…*assist CIOs in exploring emerging technologies and exploiting traditional systems,*' (p.8) simultaneously.

As switching between managerial roles becomes ineffective, CIOs are expected to become ambidextrous in leadership roles. For example, in highly dynamic environments, when assessing whether their organizations have an overt focus on the IT function or the business, CIOs can choose to adopt the most relevant leadership role. For example, building on their previous examination of IS leadership[26], (Mclean and Smits, 2014) investigate, for a given environment, the relevance of CIOs being able to fulfil either a transactional leadership role, or a

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23 Making assumptions based on previous work linking IS strategy to firm performance (Leidner et al., 2011)

24 Indirect reporting or garnering critical support for IS projects

25 Overcoming poor IS credibility, managing an IS Vision that has been imposed on the CIO, securing business sponsorship, having a lack of resources to manage supply side (i.e., supply-side constraints), managing outsourced capabilities with a (highly) transactional vendor, having an over reliance on small numbers of key individuals (fir either exploitation and/ or exploration)

26 See: (McLean and Smits, 2003), which explains analysis of data sourced from a longitudinal study of eleven years' worth of data from the annual SIM IT Trends report

transformational leadership role[27]. Overlaying four 'leadership dimensions' (i.e., Technologist, Enabler, Innovator and Strategist), onto a 2x2 model (that compares the organisations focus of attention (either on IT or the business), with two types of environments (i.e., either a stable or dynamic environment)), researchers propose an integrated model of leadership. The researchers suggest that '…*IS leaders will be required to engage simultaneously in transactional (complexity) and transformational (change) leadership to ensure that the organization's needs for both order and innovation are met*,' (p.5). As such, the researchers claim that in the future, the CIOs main challenges would arise when enacting two of the roles: 'Innovator' and 'Strategist' as organizations will soon realize that '…*knowledge is their most strategically significant resource and that the organization's ability to develop and sustain competitive advantage is directly related to its capacity to master knowledge management*,' (p, 10) [28]. Concluding that in order for CIOs to be perceived as ambidextrous[29], they need to '…*maintain a balance among the roles of technologist, enabler, innovator, and strategist*', to the extent that '…*the acquisition of each new role does not disrupt the successful discharge of previously mastered roles*,' (p.11).

Alternatively, CIOs should alternate their attention between two environmental paradigms, that of 'demand' for IT products and services and for their 'supply'. Analysing data from 620 CIOs[30] (Kitzis and Broadbent, 2003), propose that CIOs face six imperatives (i.e., to Lead, Anticipate, Strategize, Organize, Deliver and Measure). To meet these imperatives, CIOs will need to develop supply and demand side leadership roles, where:

1. Demand-side leadership: focusing on the delivery of cost-effective services, CIOs will need to understand their environments, create their (IT)

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27 The researchers suggest that there are '…*two types of leadership that are essential to ensure the vitality of the I/S function transformational leadership to produce innovation and effectiveness, and transactional leadership to produce stability and efficiency*,' (p.3)

28 Citing (Grant, 1996)

29 i.e., to be equally adept at both exploitation (i.e., transactional leadership) and exploration (i.e., transformational leadership)

30 Who took part in the Gartner Executive Programs CIO Agenda survey

Vision, shape and inform expectations, create clear IT Governance and to weave Business and IT strategies together; whereas

2. Supply-side leadership: focusing on shaping and managing expectations, requires CIOs to communicate their performance, manage Enterprise and IT risks, develop a high performing IS team and build a new IS organization

Suggesting that, whilst CIOs:

> *'…are frequently hired for their business acumen, they're often fired because of a failure – or perceived failure – to deliver on expectations. The message, then, is to ensure that you're perceived as delivering against key expectations,' (p.21)*

As such, the researchers recommend that, depending on their business environments (i.e., fighting for survival, maintaining competitiveness, or breaking away), CIOs will need to '…*broaden their role and assume a new set of responsibilities*,' (p.21) if expectations are to be managed successfully.

Reflecting on this work in their 2005 book, the researchers provide additional insights to their claims and suggest that in meeting the changing demands of their environments, that CIOs will need to switch between the two leadership roles, and that '…*demand and supply sides of the new CIO leadership role build on, and continually reinforce each other*,' (p.32) (Broadbent and Kitzis, 2005)

However, there are critics of these classifications. For example, attempting to '…*assess the completeness*', of these typologies against a case study (Seddon et al., 2008), claim that Broadbent and Kitz's definitions of demand-side and supply-side leadership, which they define in terms of '…*trusted senior executive leader*', or '…*chief technology mechanic*', are '…*too coarse-grained*,' (p.876) requiring further refinement.

To address this criticism, researchers have continued to develop more detailed role descriptions for the CIO. For example, analysing data surveyed from one hundred and seventy four Australian CIOs, (Al-Taie et al., 2018) investigate the

relevance of the six CIO roles developed by (Smaltz et al., 2006a)[31] to the demand and supply side roles proposed by (Broadbent and Kitzis, 2005). Whilst finding relatively weak relationships between four constructs and four roles[32] , the researchers claim that the CIOs role is actually '… *a configuration of distinct roles (or multidimensional construct) that are split between the operational and strategic IT needs of an organization*', and that their results provide evidence *'… on the configuration of roles that the CIO performs and the nature of these roles (technical/supply vs. strategic/demand), which contributes to clarifying the ambiguity surrounding this central role*, ' (p.14).

2.2.3 Role Outlook

Rapidly changing and expanding expectations for the CIOs role has made the CIOs journey to the top extremely difficult. However, difficulties persist.

In 2010, (Peppard, 2010) analysed data from 42 CIO/ CxO interviews to suggest that there was still the '..*stark reality that the CIO role is a confused role in the executive suite.*' (p.75).

Critical of attitudes towards the CIOs role, that the CIO might not be the feted 'mythical' hero for many organisations, Peppard concludes that much of the blame attributed to CIOs (for IT delivery failures) could be misplaced '...*due in large part to inappropriate expectations of the CIO role. Instead, it must be understood that the IT savviness of the CEO and senior leadership team are pivotal to the realization of IT value in today's organizations*.' (p.94).

Reflecting on this and eight years of research, in 2016, (Gerth and Peppard, 2016) suggested those who are calling for the CIOs role to be replaced often fail to consider organisational dynamics and that '..*merely changing the job title won't fix the problem..*' (p.61)

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31 Supply-side roles (i.e., the operational or technical roles: utility provider, information steward, and educator) and Demand-side roles (i.e., the strategic or business roles: integrator, relationship architect, and strategist)

32 Weak relationships between four of their constructs and the relationship architect, information steward, integrator, and utility provider roles, may (according to the researchers) require further investigation through an amended survey instrument

Proposing causes of CIO role derailment[33], in the context of digital transformation, the researchers make a variety of suggestions for both CIOs and CEOs to address each of these causes. That CIOs should:

1. Clearly understand the CEOs vision for IT
2. Recognise the ambiguity of their (CIO) role
3. Deliver on service and solution commitments
4. Build a relationship strategy
5. Proactively define IT success
6. Manage the pace of change; and
7. Speak the language of the business

Whilst CEOs should:

1. Acknowledge the roles of the C-suite (per se)
2. Define the CIOs role
3. Communicate expectations of the CIOs role
4. Increase the digital literacy of the leadership team; and
5. Encourage and evaluate CIO/ TMT collaboration

Further, perhaps digital technologies could only be effectively assimilated if the very nature of organisational IT capability was changed?

In his paper entitled 'Rethinking the concept of the IS organisation', (Peppard, 2016) proposes that perceptions of the '...*IS organization as a separate sub-unit may actually be contributing to problems that organizations have with their IT investments, particularly the inability to deliver business value*,' (p.96).

And '...*if the ability to continuously generate value through IT is to be found in the very fabric of the organization, then isolating IT and designating it to be managed by an organizational sub-unit is likely to be a flawed practice*,' (p.97).

[33] (i). Misunderstanding the transitional situation organisations are entering (ii). ambiguity in defining IT success (iii). ambiguity in CIO role expectations (iv). poor relationship management with peers, and (v). pushing change in the wrong place

If CIOs are to remain focused on infrastructure and services and centralised IS capabilities are to be diluted further, then it is not surprising that the role is under threat from new, technology savvy C-suite level executives[34].

Surveying 1508 CIOs across sixty countries, in 2013, (Weill and Woerner, 2013) suggested that in response to digital technologies, CIOs '…*wanted to move from the more traditional IT service types towards* (what the researchers identify as) *one of the new types*,' (p.66), embodied through the time allocated to four new activities:

1. IT Services activities: managing multiple stakeholders to ensure delivery of IT infrastructure, applications, projects, and related services (44% of their time)
2. Embedded activities: working with non-IT colleagues to progress business strategy, business process optimisation, etc. (36% of their time)
3. External Customer activities: meeting with external customers to establish electronic linkages (10% of their time); and
4. Enterprise Process activities: managing enterprise processes and associated digital platform to include shared services, product development, operations, etc. (10% of their time)

Following this analysis, the researchers surveyed a further 282 non-IT executives, and concluded that:

> *'…CxOs expect an effective CIO to do much more to ensure the success of the enterprise in a digital economy. This means CIOs need to spend less time managing IT services and more*

[34] Peppard acknowledges that, as result of digital technologies, several other C-suite level technical roles have emerged to include the Chief Data Officer (also CDO), the Chief Information Security Officer (CISO), etc. Whilst these roles have impacted the CIO, the author deems that the Chief Digital Officer represents the biggest 'threat' to the CIOs jurisdiction. (Note: Although the role of the Chief Marketing Officer (CMO) has been heavily associated with digital technologies and indeed may come into conflict with the CIO (see: (Whitler et al., 2017)), it is the authors opinion that the Chief Digital Officer role has a much stronger association with cross functional digital transformation than the CMO)

time delivering broader business value. If they don't, CEOs may appoint other executives to drive that value.' (p.74)

To free up their time from managing IT services, the researchers suggested that CIOs should: (i) mentor their teams to take up more of their (CIO) workload, (ii) embed more effective IT governance and (iii) make better use of their 'partner ecosystem.''

In 2016, (Horlacher and Hess, 2016) built on these assumptions, suggesting that '...*some CIOs have difficulties in adjusting to their broadened area of responsibilities… which seems to have reached a level of complexity that makes it increasingly difficult for one person to assume alone*.' (p.5126). In response to this, many organisations had appointed a Chief Digital Officer (CDO)[35].

Developing cross industry case studies, through CDO interviews, the Horlacher and Hess sought to provide clarity to the definition of the CDO role and how it would complement the CIOs role. Adopting managerial frameworks that describe a CIOs tasks (supply-side and demand-side, as described by (Broadbent and Kitzis, 2005) and later by (Chen et al., 2010b)) and applying Mintzberg's managerial role framework (Mintzberg, 1973)), the researchers concluded that the priorities of the CDO should encapsulate a focus on:

1. Demand-side tasks (i.e., the exploration of new IT-enabled innovations and the relevance of these to their organisation); and
2. The roles of entrepreneur, spokesman and leader

In relation to the CIO, the researchers also suggested that the CDOs role was '...*symbiotic and interdependent*', on the CIOs role and that CDOs were '...*responsible for the strategic and communicational aspects of the digital transformation*', whilst CIOs and CTOs should focus more on the '...*technical aspects*,' (p.5134).

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[35] MTV Networks hired the first CDO ever in 2005. According to the researchers, '..since then, the number of CDOs has roughly doubled each year and is forecasted to reach 2,000 by the end of *2015. The CDO is one of the fastest-growing C-level positions and although 88% of CDOs have been hired in the U.S., the CDO is a global phenomenon*.' (p.5126)

Calling for more research into the 'variables' on which the CIOs role is dependent, and further comparative studies (between the specific tasks and roles adopted and performed by CDO and CIOs), the researchers suggest that CDOs could contribute to the success of their organisations whilst complementing the CIOs role.

Accepting of the rise of the CDO role, and in response to the increasing needs of digital transformation, researchers continue to investigate the potential of CIO-CDO relationship , (Hansen and Sia, 2015), (Hess et al., 2016), (Singh and Hess, 2017) , (Locoro and Ravarini, 2019) and the effects of this on the CIOs role.

For example, following a literature review and subsequent interviews with seventeen CIOs, (Chun and Mooney, 2009), found that:

1. CIOs had '...*orientated their roles and responsibilities to match the IS infrastructure and strategy of the firm*,' (p.330); and had
2. *'…settled into one of two distinctive roles: (1) an executive that focuses on invigorating the firm's IT infrastructure to achieve an ROI on the company's IT investments, and (2) another that is tasked with increasing revenue generation and the visioning and implementation of new IS throughout the corporation for business innovation*,' (p.330); and
3. The degree to which '…*a firm's strategy and processes are IT-enabled*' *and '...a firm's IS architecture infrastructure was standardized*', had '...*a profound influence on the CIO's ability to change and evolve in his/her roles and responsibilities*,' (p.331)

As such the researchers suggested that the CIOs role may have already split between:

1. The strategist that would '...*work with other C-level executives inside and outside of the firm to change the firm's strategy and processes*', a role the researchers term the Chief Innovations Officer; or
2. The technical manager, who would manage '…*the firm's existing legacy IS infrastructure and cost-cutting initiatives*' and be '...responsible for both

the demand and supply side of IS management', which the authors refer to as the more traditional Chief Technology Officer (CTO).

However, CIOs expected to work alongside a CDO, should expect that their role may evolve beyond that split proposed[36] by (Chun and Mooney, 2009) into that of '…*Agility IT Director*,' (p.15). Suggesting that as '…*digital literacy becomes an indispensable CxO characteristic*,' (p.14), CIOs should expect to revert to focusing on the IT landscape, complementing the CDO, to ensure agility and adaptiveness in their IT organisations. The researchers even go as far to suggest that the future trajectory of the CIO is not necessary towards the CEO role (as suggested by (Gottschalk, 2007)), but into that of the CDO.

Whilst this doesn't bode well for aspiring CIOs, researchers have yet to show if this predicted, retrograde move has materialised.

In 2016, an alternative (and perhaps more positive) perspective on the CIOs future role (when working with CDOs) is offered by Horlacher and Haffke. (Horlacher, 2016a) suggests that the development of shared understanding of each other's role might improve the CIO-CDO dyadic, whilst (Haffke et al., 2016) suggests that the CIOs role may have reached '...*an inflection point*', that requires organizations to consider '...*four distinct CDO role-types*'[37], (p.1). For the CIO, this would mean that: (i) the CDO would become an 'ambassador' for the IT function, (ii) the CIO would revert to their area of expertise, potentially bringing some a measure of relief for some CIOs, and (iii) to maintain tight business-IT alignment, the CDO and CIO would need to agree IT priorities jointly.

As predictions for the future CIOs role unfold, one thing is certain, expectations for the role will continue to shift and change. In response to this, CIOs must therefore find a way to continue to maintain and develop their capabilities if they are to remain effective, and ultimately, relevant.

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[36] Into an '...*exploration-focused "Chief Innovations Officer" as well as a more exploitation-focused "Chief Technology Officer", which can potentially be subsumed under the Ambidextrous CIO role*,' (p.14)

[37] Evangelist, Coordinator, Innovator, and Advocate

2.3 Role Expectations

In keeping with research objective 1(a), understanding stakeholder expectations for the CIO, the author now examines CIO expectations in terms of the outcomes expected from CIOs who are judged competent, or having the 'right' attributes.

Literature review reveals that researchers have assumed two major perspectives in their examination of the CIO: (i). that the CIO is a 'critical resource' and (ii). as a critical resource, the CIO is expected deliver on pre-determined (or expected) outcomes. This first perspective is largely contextualised in Resource Based Theory (also referred to as the Resource Based View, RBV) (Barney, 1991). Barney suggests that firms can achieve 'sustained competitive advantage' (or SCA) by developing certain critical internal 'resources' (Wernerfelt, 1984) to develop superior financial performance[38]. It is in the gift of the organisation to acquire, maintain and develop such resources and that these resources should focus on creating 'value' as a means for achieving SCA (Porter, 1985).

Researchers assuming the second perspective, focus on how CIOs are deemed to have been successful when attempting to fulfil expectations as a critical resource[39]. Much of the research examining expectations for the CIO as a critical resource attempt to establish causal relationships between various expectations for the CIO (i.e., in terms of how well they are delivering pre-determined outcomes) and multiple characteristics and 'attributes' of the individual CIO, or representations of a CIOs 'capability'.

Due to the diversity of these expectations, the author adopts two terms to categorise these expectations. Firstly, CIO 'outcomes' describes expectations for the outcomes that CIOs are (deemed to be) accountable and responsible for, and secondly, expectations for a CIOs capability, deemed prerequisite to the achievement of those outcomes, described in terms of a CIOs 'attributes'. In the

[38] Barney describes such resources as being, 'Valuable', 'Rare', 'Inimitable' and 'Non-Substitutable' (or VRIN)' (p.105) (Barney, 1991)

[39] Cf. (Wade and Hulland, 2004)

following sections, the author focuses on the first of these two categories of expectation, outcomes.

2.3.1 Outcomes: Performance, Alignment & Role Enactment

As literature review has revealed a great deal of variation in stakeholder expectations for both dimensions (i.e., role definition and outcomes), the author provides additional sub-classifications for these expectations on outcomes.

The first category, 'Performance,' refers to expectations for CIOs to have directly, positively impacted various, tangible measures of both tactical and strategic measures of performance. The second category of expectation, which appears largely subjective, focuses on the CIOs relationship with on ongoing structural alignment between the 'business' and 'IT'. This body of work centres largely on the CIO being associated with conducting various collaborative planning activities that ensure IT resources are available to meet the (sometimes changing) objectives of the business

The third category also appears subjective in its nature, termed 'role enactment', it consists of studies where researchers have identified where CIOs have been deemed to have fulfilled an expectation to enact an expected role (or grouped roles) effectively.

Arguably, the first and third categories represent a change in emphasis for expectations as the role expanded from an operational focus to include a more strategic focus. However, in terms of a timeline, dates for this transition between expectations (from performance to effective role enactment) remain unclear.

As with much of the CIO research there are also exceptions to the creation of generalist categories for expectations. For example, some studies focused on expectations for CIOs to enact roles effectively also contain expectations for firm performance, whilst expectations for performance also contain subjective assessments of expectation. Similarly, structural alignment studies include the effects of expected (ongoing) alignment activities on a mixture of both subjective expectations (i.e., the level of IT 'assimilation') and more tangible measures of performance, such as revenue and cost.

For all three categories, researchers have largely focused on internally sourced expectations i.e., individual stakeholders employed within the CIOs organization, such as the CIOs superior, the Chief Executive Officer (CEO), the CIOs peer group in the board room, grouped as members of the top management team (or TMT) and the CIOs subordinates, grouped either as 'IT' or 'IT Managers'. Literature review has revealed few studies that consider expectations from stakeholders outside of the organization (such as business customers, and partners such as 3rd party service providers and vendors, etc.)

2.3.1.1 Performance

The first category of expectations for CIO outcomes, termed performance, identifies CIO expectations contextualised in terms of IT Performance and Business Performance. The evolution of research that focuses on expectations for CIO performance appear to have (roughly) followed the expanding remit of the CIO. Broadly, CIO performance expectations research has evolved from a focus on running efficient and effective IT operations, through to increasing expectations (over time) for CIOs to demonstrate where IT positively impacts business operations and eventually, overall firm level performance.

2.3.1.1.1 IT Performance

During the 1990s, expectations for CIO performance centred almost entirely on reducing the cost of IT. CIOs were expected to either centralise IT infrastructure capabilities whilst simultaneously decentralising IT applications (Brown, 1993) or, strike a balance between the cost and benefits of developing IT operations that were partly centralised and/or fully decentralised (inter, intra or even external to the enterprise)) (Rockart et al., 1996)[40].

[40] The researchers refer to a paper by (Hodgkinson, 1996) that explains how a 'federal IT' organization may capture the benefits from both a decentralised IT function (e.g., being responsive to business unit needs), and a centralised IT function (e.g., where scales of economy can be achieved)

However, whilst reducing costs, CIOs were also expected to maintain IT capabilities. For example, CIOs were expected to manage 'eight imperatives'[41] and outsource IT operations whilst retaining greater levels of IT and business expertise to meet the '…*strategic needs of the organization…*', (p.29) (Rockart et al., 1996).

Companies seeking to reduce IT costs whilst avoiding the complexities of outsourcing, expected their CIOs to prepare IT capabilities that were '…*core to the businesses' future capacity to exploit IT successfully*,' (p.10) (Feeny and Willcocks, 1998). To do this, the researchers claimed that CIOs were expected to develop both their technical and business skills, to manage a balance between short and long-term activities and to maintain a motivating context through the use of 'values'. However, in consideration of their findings and recommendations the researchers concluded that such a spectrum of capabilities would likely cause conflict and indecision for individuals, especially if IT functions were eventually to be reduced in size and (potentially, eventually) outsourced.

As the trend for operational cost reduction through outsourcing grew in popularity throughout the 1990s and 2000s, organizational expectations for the CIOs role also changed as companies looked past the mere outsourcing of 'just' IT and started to outsource (what was considered to be) low value adding business operations[42]. For example, in a 1997 study of US, Japanese and Finnish organisations by (Apte et al., 1997), the researchers found that whilst CIOs had initially taken a more dominant role when initiating the outsourcing strategy, as the scale and risk of outsourcing increased, CEO become more involved and the CIOs involvement diminished. However, noting that exclusion of the CIO from the

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41 Being: (i) achieving two-way strategic alignment; (ii) developing effective line partnerships; (iii) delivering and implementing new systems; (iv) building and managing infrastructure; (v) reskilling the IT organization; (vi) managing vendor partnerships; (vii) building high performance and (viii) redesigning and managing the "federal" IT organization

42 As the outsourcing trend continued throughout the late 1990' and early 2000's, researchers claimed that outsourcing now represented a vehicle for much more than 'just' cost reduction. Outsourcing was a (i) mechanism for helping manage rapid technological change, (ii) means to help firms become more flexible (enabling them to focus on the core business) and (ii) response to competition in the global marketplace (Zhu et al., 2001)

decision making process[43] appeared alongside a growing dissatisfaction with outsourcing, (Dibbern et al., 2004) found that companies were '*..finding that their flexibility is not as enhanced as they thought it would be with outsourcing, and that service levels they thought would improve have actually dropped*,' (p.89)[44].

CIOs expected to preside over an outsourced function could perhaps find themselves in a new position of power; as 'sages' who would correct '…*the errors other non-IT managers make when adopting new IT*,' rather than behave as '…*technology advocates who lead by blazing new paths themselves*,' (p.239) (Gefen et al., 2011). In this new role, CIOs reporting into CFOs were expected to increase their level of collaboration with the CFO to ensure that the CFO not only understood the impact of new technologies on company finances, but also understood the impact of costly business change in relation to the expected benefits (Mclaughlin, 2007).

As organizations started to realise the emerging potential of IT as a more strategic asset (and not just in terms of a cost centre), expectations for the IT department began to change. Changing expectations for IT as a more critical strategic resource began to encompass expectations for the CIO. Charting this trend (Earl and Feeny, 1994) noted that CEOs and CIOs should therefore develop a new 'profile' for the CIO, in terms of the CIOs:

1. Behaviours: by being '…*loyal to the business and is open*'
2. Motivations: whether they should be goal, ideas, or systems orientated
3. Competencies in performing as consultant or facilitator: by being a good communicator with IT knowledge; and
4. Experience: i.e., having an IS functional analyst role

To develop this profile, CIOs would need to secure support from their TMTs in developing a shared understanding about the role of IT. To do this, CIOs should

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43 Citing (Huber, 1993) and (Lacity and Willcocks, 1998)

44 Additionally, the researchers found that there were increasing tendencies for organisations to either 'offshore' (moving core services outside of the first world) or even reverse their outsourcing initiatives through (what the researchers referred to as) 'back-sourcing'

educate the TMT about IT's potential through increased interaction (Preston et al., 2006)[45].

As such the relationship and interaction between the CIO and the TMT began to change as CIOs were expected to work even closer with the TMT to develop a shared understanding about the increasing effectiveness of the IT department (Ranganathan and Kannabiran, 2004). However, to secure a more supportive TMT CIOs were expected to improve their communication skills to ensure TMT members would be able to develop shared perceptions about IT's achievements (Mirchandani and Lederer, 2012); key amongst these, was an emerging expectation for CIOs and their IT departments to start to improve business performance.

2.3.1.1.2 Business Performance

Conclusions drawn from a study of 1300 US firms over a five year per period summarised a fundamental issue often overlooked by CIO researchers aiming to establish direct correlation between an individual CIO and expectations for business performance:

> *'Computerization does not automatically increase productivity, but it is an essential component of a broader system of organizational changes which does increase productivity. As the impact of computers becomes greater and more pervasive, it is increasingly important to consider these organizational changes as an integral part of the computerization process,' (p.55) (Brynjolfsson and Hitt, 1998)*

The implication of this is that IT systems by themselves cannot fulfil preconceived expectations for IT and CIO performance.

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[45] Preston claims that shared understanding is mediated by the power-distance continuum between the CIO and the TMT, which in itself is shaped by the relevance of the CIOs knowledge when attempting to interact and educate the TMT about the role of IT

A large part of the body of CIO research therefore considers the relationship between various CIO attributes and the potential for revenue growth, improved compliance, financial performance, IT assimilation, IT enabled innovation and business 'value'; and, that CIOs who can achieve all this will be perceived to be directly impacting an organizations overall competitive position.

2.3.1.1.1 Financial Performance

Early examinations of CIO stakeholder expectations revealed little correlation between IT investment and firm performance (Mahmood and Mann, 1993); however such findings were soon called into question as researchers identified potential relationships between IT investment, increased business productivity (such as lower average production costs, lower average total costs) and higher average overhead costs (Mitra and Chaya, 1996)), business output (Brynjolfsson and Hitt, 1996)), and even market value (e.g., in terms of excess returns (Dos Santos et al., 1993)).

With IT developing into a strategic resource, CIOs with increasing levels of exposure to the TMT are expected to exercise their newly acquired 'decision making authority' to garner support for IT; this is expected to enable them to utilise IT to make process improvements and increase Customer satisfaction; the consequence of this is an increased expectation for the CIO and IT to contribute to firm performance (i.e., a mix of standard financial metrics (ROI, Sales Revenue, Cost Savings) (Preston et al., 2008). Similarly, CIOs who can take advantage of their various attributes (i.e., CIO structural positioning, demographics and competencies) are expected to ensure an increase in IT's contribution to firm performance (i.e., productivity, cost reduction, profitability, product/service differentiation, customer satisfaction, and overall business success) (Cohen and Dennis, 2010). And CIOs who can enact the staging of their CIO demand-side/ supply-side leadership behaviours[46] are expected to ensure that IT contributes to firm efficiency (i.e., cost savings, efficiency, etc.) and

[46] cf. (Broadbent and Kitzis, 2005) and dependent on the CIOs level of human capita, their structural power, and the level of broader organizational support for IT

strategic growth (i.e., ROI, increases in sales revenues, market share, etc.) (Chen et al., 2010b).

Similar studies also make claims that organizations should expect increased annual revenues, market share and ROI as a result of CIOs performing more effective planning when working closely with the CEO to improve levels of business-IT integration (Gottschalk, 1999), or when CIOs develop higher levels of mutual understanding with the CEO (Johnson and Lederer, 2007)[47]. Organizations should also expect improved profitability when CIOs develop 'closer ties' with their CEO (Li and Ye, 1999)[48], an improvement in 'efficiency'[49] when CIOs, cognizant of the expectations amongst their peers in the TMT, involve them in business-IT planning and resource allocation (Kearns and Sabherwal, 2007) and an improvement in firm performance (i.e., RoA, RoE and CFM) having developed social capital with their TMT (Karahanna and Preston, 2013). More recently, organizations seeking to exploit digital tools to increase figures, through enhanced marketing should consider that, inclusion of a 'powerful technology leader' in the TMT predicts more sustained increases in firm output (combined measures from sales figures and market position) than inclusion of a powerful marketing leader (Taylor and Vithayathil, 2018).

2.3.1.1.1 IT Assimilation

The effect of IT and the CIO on business performance has also been examined in terms of how successful the business has been in 'assimilating IT'.

Organizations articulating a transformational IT vision, expect their CIOs to improve the level of IT assimilation[50] into the business through more effective

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47 The researchers note that whilst convergence on ITs current role and ITs future role (for enhancing the business and enabling differentiation) is dependent on CIO-CEO communication frequency and communication channel 'richness', convergence on the role of IT to provide managerial support in the future remains questionable

48 The researchers find that organizations with an externally orientated strategy, that enjoy closer CIO/ CEO 'ties' appear more proactive in responding to dynamic environments and (as such), prioritise IT investments that improve profitability

49 I.e., improvements in operational efficiency, customer satisfaction, return on investment (ROI), market share, and sales

50 Executive perspectives of the effects of IT uptake on activities in logistics and marketing and business strategies

CIO-TMT interactions. However, three key factors moderate IT assimilation; a CIOs level of IT and business knowledge, the maturity of the TMTs 'systems of knowing' (i.e., the CIOs membership of and interaction with the TMT) and the 'sophistication' of existing IT infrastructures (Armstrong and Sambamurthy, 1999). Conversely, the level of IT assimilation[51] by the firm is not only contingent on the level of technology and managerial competency across the business but is also contingent on the effectiveness of the CIO in empowering their IT resources to maintain a high level of business technology management (BTM)[52] (Wu et al., 2008).

Whilst the lack of objective measures for IT assimilation hasn't deterred some researchers from claiming the relevance of the CIOs knowledge and their reporting level, other researchers have attempted to assess the CIOs relationship between IT assimilation and more tangible measures of firm performance. For example, effective enterprise level IT assimilation[53] is also expected when the CIO leverages their structural power to yield strategic (business and IT) knowledge, that results in increases in revenues and productivity and decreases in operational costs (Shao et al., 2016)[54].

2.3.1.1.1 IT Enabled Innovation

Expectations for more effective IT assimilation appears grounded in assumptions that IT assimilation fuels advances in innovation.

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51 '*…the effective application of IT in supporting, shaping, and enabling firms' business strategies and value-chain activities*', (p.3).

52 Who define BTM in terms of IT capabilities in Strategy and Planning, Governance and Organization, Technology Investment Management and Management of Strategic Enterprise Architectures.

53 Who, adopt a definition of IT assimilation as '..*the extent to which the use of technology diffuses across the organizational projects or work processes and becomes routinized in the activities of those projects and processes*', (p. 121) (Purvis et al., 2001)

54 The researchers adopt the same definition for IT assimilation from their 2016 study in a later study on the effects of business-IT alignment and CIO leadership behaviours (described in terms of 'idealized influence' and 'inspirational motivation') on the level of IT assimilation (Shao, 2019). Finding that successful assimilation is likely because of improved business IT alignment if the CIO allows their leadership behaviours to be moderated by organizational cultural orientations (i.e., if organizational cultures are either orientated towards flexibility and/ or control)

According to (Philip, 2007), organizations seeking to maintain an effective IT department that enables their businesses to make best use of the latest, most innovative technologies expect their CIOs to initially enact the role of 'technology interpreter' and then become a 'technology scout'. Analysing data from two UK based case studies, the author claims that CIOs acting as a technology interpreter should focus more 'exploitation' strategies in their IT departments. Alternatively, businesses seeking to improve their competitive position through the adoption of more innovative IT resources, expect that CIOs enacting the technology scout role should focus more on 'exploration' strategies; in either role, CIOs are expected to employ the most effective communication skills.

CIOs expected to deliver the latest innovative technologies are also expected to increase their exposure to business customers. For example, in their study of a firm's propensity towards IT-enabled business innovation[55], (Saldanha and Krirshnan, 2011a) analyse data from 257 public US firms. Finding that CIOs who report to the CEO are more involved in new product development, have higher levels of customer interaction and work in firms that have high levels of IT-innovation. The researchers claim that their findings support the '*open innovation paradigm*,' (p.12)[56], in that customers are a source for ideas and that when interacting with them, CIOs can have a positive impact on IT-enabled innovation. Similarly, CIOs enacting the roles of IS strategist and Information strategist are expected to increase the innovative use of IT; where innovative use includes the creation and improvement of products and services, enhancement of internal processes, the redesign of work flows and roles, improving decision-making, and improving relationships with business partners) (Li et al., 2012).

2.3.1.1.1 Business Value

CIO researchers have also attempted to define expectations for the CIO in terms of business value. CIOs can be deemed to have added value if they have a demonstrable track record of IT delivery, have determined the relevance of

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55 Which the researchers define as '…*new products, processes or services developed by a firm through the application of IT*', (p.2)

56 After (Chesbrough, 2003)

success stories from elsewhere or have built informed relationships. Value (such as this) can be realised as a product of certain 'CIO qualities' and through the support of the CEO so that CIOs can inspire '*…a receptive and constructive climate for IT across the organization*,' (p.19) (Earl and Feeny, 1994).

Alternatively, as business value is a product of the effective use of a critical business resource, such as information, CIOs are expected to make every effort to ensure that businesses are able to fully exploit their information (Peppard et al., 2000). One-way CIOs are expected to achieve this is by enacting one of four leadership roles[57] (Kettinger et al., 2011). Enacting these roles enables the CIO to move out of their '…*comfort zone of running IT as a utility*,' and become '…*in-house experts on how information is used across their company's business processes*'. This enables them to reach the '…*lofty goal*,' (p.171) of becoming an 'information steward'.

To ensure cost sensitive organizations don't also miss out on the business value they expected from IT investments, CIOs are expected to communicate performance using a 'portfolio' of IT and Business metrics that demonstrate performance in Operations, Projects, and Innovation (Mitra et al., 2011). And firms that determine IT is '*critical...to competitive advantage*', will need to plan the strategic application of IT and information to generate 'value.' In doing so, they must consider the relevance of the CIOs role (e.g., in term of 'types') against the 'maturity' of the information leadership 'capabilities' of their CEOs and CxOs if they are to succeed (Peppard et al., 2011).

Alternatively, organizations seeking 'customer value'[58], expect their CIOs to apply 'strong leadership' to enforce an 'innovative IS Strategy (Chen et al., 2015), whereas organizations seeking to attain 'corporate value' expect their CIOs to orchestrate their skills, knowledge, and capabilities to participate in strategic

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[57] Either as a stakeholder leader, a transformational leader, a servant leader or as a participative leader

[58] Defined as the '…*extent to which the firm's customers are satisfied with the quality, functionality, and variety of its products*,' (p.15)

planning and improve alignment of the IT function to the business strategy (La Paz, 2017).

To improve the chances of meeting business-based stakeholder expectations, CIO researchers have also considered the benefits a CIO is expected to deliver. For example, CIOs are expected to adopt an IS leadership role (as both an IS strategist and as a Business strategist), to utilise their abilities to impact organisational benefits (i.e., 'strategic benefits' and the effectiveness of managerial controls); however, CIOs should note that their ability to achieve these maybe moderated by the overall level of IS 'Quality'[59] (Ding et al., 2014).

2.3.1.1.1 Compliance

Alternative (market facing) indicators of expected CIO impact include how a CIO enables organisations to achieve and maintain compliance with changing regulatory standards; CIOs appear well compensated when developing IT controls that help their organisations meet the requirements laid down by the Sarbanes-Oxley Act (Sutton and Arnold, 2005), (Li et al., 2007) or the International Financial Reporting Standards (IFRS) (Liu et al., 2018)

However researchers question the ongoing applicability and maintenance of certain CIO 'attributes' when responding to changing legislative environments; for example, (Sutton and Arnold, 2005) suggest that more work is needed to understand '…*if the characteristics of CIOs hired by organisations change in this new era,*'(p.9), and, according to (Liu et al., 2018), such characteristics would need to include '…*sufficient business knowledge and skills beyond the IT discipline*,' (p.88), if CIOs are to remain effective helping maintain compliance.

2.3.1.1.1 Competitive Standing & Firm Potential

CIOs are also expected to impact a firms competitive standing. For example, to facilitate current and long-term support for IT resources, CIOs are expected to

[59] Defined in terms of System Quality, Information Quality and Service Quality

develop effective relationships with their CEOs; this enables innovative usage of IT which influences competitive positioning (Bassellier et al., 2008)[60].

Markets expecting an upturn in firm performance look favourably on those that exhibit a propensity towards IT investment by maintaining a higher ranked CIO. However, investors need to be cognizant of the effects of changes in the CIOs position as the perceived benefits of appointing a higher ranked CIO may soon evaporate should the same CIO decide to move elsewhere. To understand this better, researchers have investigated relationships between perceptions of future performance, CIO compensation and incentivisation. Whilst the CIO is perceived by (compensation) boards as a *'…long-term intangible value creation asset that drives firm capital market valuation,'* (p.2) (Hu et al., 2010)[61], the percentage of longer term CIO compensation levels will also be affected by the boards level of IT awareness (Yayla and Hu, 2014)[62]. As such boards should *'…structure equity incentives to align CIOs efforts with the firm's objective of developing and sustaining an IT competitive advantage,'* (p.53) (Richardson et al., 2018)[63]

Whilst research suggests that the mere appointment of a CIO indicates an acknowledgement of the strategic importance of IT, which can be well received by investors, e.g. in terms of stock market returns (Chatterjee et al., 2001), researchers have persevered with assessing the effects of CIO positioning with relatively more 'tangible' assessments of the effects of IT investment, CIO positioning and reward as assessed in the market.

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60 Whilst the CEO-CIO relationship appears moderated by heterogeneity in 'demographics', 'functional backgrounds' and 'experience,' the researchers note their findings are limited to their sampled organizational contexts

61 In firms that have IT investment opportunities

62 Who claim that boards that have a higher awareness of IT (especially in IT intensive industries), tend to have higher Tobin q scores which explains the reduction in the percentage of long-term CIO compensation. Conversely, the researchers claim that '…*when a board lacks IT awareness, it increases the percentage of long-term compensation for its CIO in order to achieve effective control in high IT intensity*,' (p.425)

63 Who find that firm performance, when mediated by organizational and environmental factors, and measured in terms of operational (RoA and RoS) and future performance (Tobin's q) metrics improves when a CIOs objectives and incentives are aligned to a firm's objectives

Tobin's q[64], an indicator of value and (hence) longer term market performance (being the ratio between a physical asset's market value and its replacement value) (Tobin and Brainard, 1977) has provided many researchers with a means to investigate relationships between firm performance, IT investment and the role of the CIO. Taking Tobin q as measure of firm performance, (Bharadwaj et al., 1999) have shown a strong positive association between IT expenditure variables and values for Tobin q, supporting their hypotheses that IT contributes to the firms longer term future performance potential. Building on this claim, (Ranganathan and Jha, 2008) examine 2002 data from the EDGAR SEC filing database to understand relationships between CIO reporting level, measures of financial performance and performance potential (using Tobin q). For companies that had a CIO in their TMT (compared to those that didn't), the researchers find an increase in financial performance (using seven accounting ratios), but little evidence for increase in future market values. Conversely, (Hu et al., 2014) found that, when taking Tobin's q as a primary measure of future performance, its value increases significantly (up to 23.6% over a three-year period), when a CIO, bringing more IT knowledge to the group, is included in one of the 'top-5' executive positions.

Whilst these studies appear to lend considerable weight to arguments surrounding the impact a CIO may uniquely be expected to have on a company, they can appear tenuous and subjective as: (i) whilst Tobin q has been associated with increases in IT investment and (hence firm performance), asset values (a key component in calculating Tobin q) change on a near (daily) basis and, (ii) there are likely to be other, multiple factors affecting firm performance, and (iii) researchers have adopted inconsistent definitions when defining organizational factors, which makes direct comparisons between similar circumstances difficult and highly subjective.

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64 Derived from the original concept described by (Kaldor, 1966)

The second category of CIO expectation for outcomes considers what stakeholders expect CIOs to do to achieve and maintain 'alignment' between various dimensions of the business and IT.

2.3.1.2 Business-IT Alignment

As IT grew in strategic importance, researchers started to offer cautionary notes about the continued perception of 'IT' and the 'business' existing independently as two separate entities. Noting that organizations should avoid treating each entity in isolation as '...*IT strategies cannot be developed independently of the business strategy, nor should they follow the business strategy. Successful IT strategies must be developed at the same time as the business strategy,'* (p.67) (Goldsmith, 1991).

Failure to address to address the relationship between business-IT can yield a strategic 'gap' that CIOs are expected to address if competitive advantage (through IT) is to be achieved. For example, (Henderson and Venkatraman, 1993) propose four perspectives on the 'drivers' for alignment between business strategy, IT strategy and (organizational and IT) infrastructures. Alternatively, (Reich and Benbasat, 1996) claim that the 'linkage' between business and IT should be described in two dimensions[65], i.e., an intellectual dimension and a social dimension; alternatively, researchers have also investigated the effects of 'mis-alignment' in terms of planning (Jones et al., 1995)[66] or even 'culture' (Peppard and Ward, 1999)[67].

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65 Derived from earlier work by Horovitz in 1984, who claimed that alignment requires two steps (strategy formulation followed by strategy implementation) and two processes (an intellectual process that entails thinking through the best way to formulate a strategy and then a socialisation process, using a planning process enabling people to participate in the formulation of the strategy) cf.(Horovitz, 1984)

66 Who suggest that whilst CEOs may feel satisfied with the contribution of their IT departments, CIOs remain frustrated as they rarely find themselves actively engaged in using their IT and emerging business knowledge to influence corporate planning and strategy

67 Who explain that an alignment process is needed to address the gap between the two separate entities (IT and Business); this gap, referred to in terms of a 'cultural gap' can be modelled in terms of four dimensions i.e., leadership, structure and process, service quality, and values and beliefs

Similarly, business-IT alignment has also been contextualised in terms of a meta-model (Leonard and Seddon, 2012)[68] or classified in terms of both 'strategic' dimensions and 'social' dimensions (Martinho et al., 2016)[69]. Researchers have also considered the effects of alignment in the contexts of differing business strategies[70] and IT strategy 'types' on perceived business performance (Sabherwal and Chan, 2001). However, the development of a strategic alignment model (SAM) comprising of 'four fundamental domains'(Henderson and Venkatraman, 1993), enabled (Chan and Reich, 2007) to reconceptualise business-IT alignment in terms of either an '…*ongoing process*,' or '…*as an end state*,' (p.310).

For the CIO, expectations for addressing each concept appear to centre on: (i) ensuring that IT is working efficiently and effectively or (ii) by enacting leadership to influence stakeholders outside of IT to support alignment activities.

For example, CIOs expected to ensure effective IT can create effective governance structures. Surveying 32 CIOs, (Lee et al., 2007) suggest that Strategic Alignment, one of five 'dimensions' demonstrating effective IT governance[71] is an important factor for CIOs to consider. However, whilst finding that CIOs considered strategic alignment an important factor of effective IT governance, the results suggested that (in practice at least) the CIOs role in influencing strategic alignment was somewhat restricted. To address this, the researchers conclude that CIOs should develop IT objectives and effective governance practices that align '… *business and IT by using resources*

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68 Who adopts theoretical contexts (i.e., the resource-based view and dynamic alignment theories) to describe a model combining strategy definition, strategic activities, and approaches to resourcing

69 The researchers contrast the 'strategic dimension' of alignment (i.e., '…*the degree to which business and IT strategies are integrated and complement each other*,' with the social dimension, which the researchers claim refers to '…*the mutual understanding and commitment between business executives and IT executives, and it includes the state in which they share a common vision about the contribution of IT to the success of the business*,' (p.1090). Whilst the researchers cite (Johnson and Lederer, 2005) and (Reich and Benbasat, 1996) this work is clearly derived from earlier work by (Horovitz, 1984)

70 After (Miles and Snow, 1978)

71 i.e., Strategic Alignment, Value Delivery, Resource Management, Risk Management, (IT) Performance Management

effectively, reducing IT-related risks and maximizing operational efficiency' (p.1349).

Alternatively, to ensure that the IS organization positively impacts business performance., CIOs are expected to develop and apply leadership 'characteristics' to match requirements arising from different business strategies in order to align the IS strategy. For example, surveying 81 CIOs, (Li and Tan, 2009) find that if CIOs ensure that the IS strategy caters for 'flexible and 'efficient' operations, then they can support either Prospector or Defender strategies[72] to improve business performance[73]. However, the researchers note that the impact of IS on business performance is 'significantly better' in organisations where strategic alignment between business-IT already exists.

Whilst these two studies suggest that CIOs are expected to enact effective governance and leadership to improve the IT 'side' of the business-IT gap, CIOs attempting to address this still face multiple obstacles across both sides of the business-IT divide (Teo and Ang, 1999); efforts to improve alignment must also address additional 'sub-domains' of functions (or activities) in both IT and the business.

For example, in summarising the applicability of a strategic alignment model (SAM)[74], through literature review, (Silva et al., 2006) claim that many investigations into alignment have largely focused on '…*the strategic integration and operational integration in the bottom level*,' of the'…*functional integration topic*,' (p.6). In other words, alignment research has largely focused on (integrated) planning at the functional level, without due consideration to various other layers of (integration and) alignment. To address this, the researchers develop a conceptual model that identifies multiple levels of alignment, i.e., alignment between: (i) strategic functional objectives, (ii) functional objectives,

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72 Where 'Prospector' strategies rely on an IS strategy that enables flexibility, whereas 'Defender' strategies rely more on cost-efficient IT capabilities

73 Measured in terms of financial and operational measures such as revenue, profit, market share, operational costs, customer satisfaction, etc.

74 After the strategic alignment model (SAM) proposed by (Venkatraman et al., 1993)

(iii) investment plans, and (iv) business requirements and functional/ non-functional capabilities of any given system. The researchers claim that executives seeking alignment accept that alignment can occur 'top-down (requiring commitment and sponsorship from the top management team) and/ or 'bottom-up' (requiring detailed working knowledge, cross-domain of resources operating at the operational or managerial level). To achieve this, alignment requires effective, sustained participation from multiple stakeholders at all levels of the business. Whilst this conceptual model lacks empirical support, the proposal does highlight the scale of the challenge in maintaining alignment between business and IT, placing renewed emphasis of the importance of the need for CIOs to involve multiple (cross functional) stakeholders.

Successful alignment can therefore be expected when the CIO takes a more deliberate approach to engaging multiple stakeholders. For example, following a literature review of alignment research, (Chan and Reich, 2007) noted that many disputes stem from two conceptualisations of alignment: (i) alignment as an ongoing process or, (ii) alignment as 'an end date'[75], recommend that:

1. Executives should take shared responsibility for alignment
2. IT and business knowledge should be shared across functions
3. Executives should build the right (collaborative) culture by developing shared values and common goals
4. Executives should focus on the 'essentials' (suggesting that CIOs spend more time with business colleagues)
5. That CIOs should educate their management about IT performance and their competitors use of IT
6. IT executives should take a more strategic (longer term) view of managing their IT budgets; and
7. IT management should embrace change

[75] Research conceptualising alignment as an end state focuses on antecedents, measures and outcomes to this status

Accepting of both conceptualisations of business-IT alignment, the researchers surmise that in achieving alignment, '*People are not going to listen to what the CIO says as much as they are going to watch what the CIO does, and what the CIO's business partners do*.' As such, to make alignment a 'cultural phenomenon,' it is vital that organizations secure '*Top management buy-in, proactive CIOs, and socially adept IT professionals*,' (p.301).

Strategic alignment can also be achieved when executives are more supportive in their allocation of resources for technological innovation. Support is garnered when the CIO can influence a wide stakeholder group effectively by adopting new relational behaviours (or practices) (Enns and McDonagh, 2012)

Similarly, IS strategic alignment[76] is achieved when the CIO develops a shared understanding of the role of IT[77] with members of the TMT. To facilitate this, organizations need to consider CIO 'educational mechanisms', 'systems of knowing'[78] and relational similarities between the TMT and the CIO (Preston and Karahanna, 2009).

However, perceptions on the role of IT are unlikely to be consistent across all members of the TMT. For example, considering the CFO, IS strategic alignment, the '…*degree to which the IT mission, objectives and plans support/ are supported by the business mission, objectives and plans*,' (p.5074)[79] is dependent on the 'effectiveness' of the CFO-CIO relationship (Denford and Schobel, 2011)[80].

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76 Who select definitions for strategic alignment in terms of both intellectual alignment (i.e., alignment of plans, infrastructure, and processes) and social alignment (i.e., shared knowledge, or understanding of how IT contributes to business success, etc.) (Reich and Benbasat, 1996)

77 Shared understanding defined as '…the degree of shared cognition between the CIO and the TMT on the role of IS in the organization,' (p.162).

78 Defined as organizational arrangements that '…allow for knowledge exchange, the transfer of business knowledge and strategic IS knowledge between TMT and CIO, and the development of shared language and understanding of the role of IS within the organization,' (p.164)

79 Generalised from (Reich and Benbasat, 2000)

80 Where effectiveness is described in terms of the perceptions that each other have of each other's strategic role in the business, and that they are '…*a key differentiator that can lead to effective or adversarial relationships with individual and firm-level outcomes*…' (p.5072)

Similarly, for the CEO. Whilst CIOs can extend their involvement in strategic planning to influence their CEOs more effectively (Jones et al., 1995)[81], CEOs who collaborate effectively with their CIOs in maintaining alignment between business and IT plans can expect to develop an IT based competitive advantage (Kearns and Lederer, 2003). The researchers claim that strategic alignment comprises of two groups of factors, an alignment process and alignment outcomes; both of which serve to improve knowledge sharing between IT and the business. Kearns goes on to say that, as a unique management process, alignment is 'inimitable', and therefore represents a unique resource that contributes to competitive advantage. Acknowledging the importance of the CEOs involvement in IT planning, and the CIOs involvement in business planning, the Kearns concludes that the CIO is primarily responsible for aligning IT strategies with business strategies and as such is expected to '…*participate in business planning, developing formal relationships with the CEO and other executives, and educate management about the competitors use of IT*,' (p.23).

Collaborative planning with the CEO alone may not be enough. Researchers have claimed that CIOs are expected to develop ever deeper relationships at a more fundamental level. For example, CIOs who develop a mutual understanding about the role of IT with the CEO can expect to maintain business-IT strategic alignment (defined using multiple constructs[82]); such alignment results in an increase in IS' contribution to firm performance (i.e., customer satisfaction, market share, sales revenue, return on investment, and operating efficiency) (Johnson and Lederer, 2010).

Failure to develop agreement on the role of IT and the CIO in maintaining alignment (and hence business performance) can be risky.

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81 Analysing survey responses from 39 matched CEO-CIO pairs from truck-load motor carriers in the US, conclude that '…*the more satisfied CEOs are with CIOs, the greater the influence IS has on top-level decisions*,' (p.123).

82 Combining dimensions previously developed in the STROBE (Venkatraman, 1989) and STROEPIS (Chan et al., 1997) instruments

Whilst CIO turnover degrades alignment in the long term, it appears to positively improve alignment in the short-term (potentially as an outgoing CIO will leave due to poor performance and the incoming CIO will start anew '…*with a large stock of goodwill*'. However, in all cases a good CEO-CIO relationship is 'critical' to IS alignment as, in the longer term, '…*the rate of decline in IS alignment in companies experiencing CIO change is faster than that experienced in companies with no CIO change*,' (p.5) (Chowa, 2010).

CIOs confident in the capabilities of IT (to run efficiently and effectively) and who have developed effective relationships in the TMT to address multiple layers of alignment throughout the enterprise are still expected to enact an effective leadership role. For example, increases in leadership, both business and IT leadership, has a significantly positive effect on strategic alignment and (hence) SCA (Al-majali and Dahlin, 2011). However, this isn't as straight forward as it first seems. For example, work by (Berepiki, 2017)[83], reveals '…*no statistically significant evidence*,' that '…*supported the CIO's leadership style suited for defender and prospector business strategies*,' (p.i.) However, Berepiki doesn't find that business – IS strategic alignment, moderated by an 'analyser' business strategy can be greatly improved when the CIO applies transformational leadership. Based on his findings Berepiki concludes '…*the leadership behaviors adopted by CIOs have profound consequences on the contribution of IS/IT to the business outcomes through strategic alignment*,' (p.145) (Berepiki, 2017).

Analysis of our first two categories of expectations for CIO outcomes (Performance and Business-IT Alignment) reveals that CIOs are exposed to many (pre-conceived) expectations that manifest in some aspect of objective and/ or subjective outcomes (e.g., business performance). However, the third category of expectation, role enactment, adopts an alternative perspective on the expectations that stakeholders hold for their CIOs. Unlike the first two categories of expectation, expectations for CIO role enactment manifest in the perceptions

[83] Analysis of results from a survey of one hundred and forty-five US IT managers on their perspectives of their CIOs

of the CIOs stakeholders rather than in terms of changes in IT performance, business performance or alignment.

2.3.1.3 Role Enactment

Complicating the research on expectations for CIO outcomes, is the fact that definitions for the CIOs role have evolved over time; the author considers that this evolution in role expectations is best illustrated by research that has investigated perceptions of expected CIO outcomes in predefined roles such that of 'manager' or 'leader'; however, for the CIO, researchers have also developed additional (unique) CIO roles that either straddle both manager and leader roles, or in some cases, sit in a category of their own i.e., 'salient' roles (described in section 2.3.1.3.3). A misleading aspect of the IS leadership literature are the assumptions and implications that arise when comparing managerial and leadership roles. As these roles are often compared, stark differences between the two suggest that CIOs migrate from one to another. For example, as declared by Kotter, the transition from manager to leader is not just a matter of changing job titles. '*Leadership and Management are two distinctive and complementary systems of action*,' (p.3). Leaders '...*don't make plans; they don't solve problems; they don't even organize people. What leaders really do is prepare organizations for change and help them cope as they struggle through it,'* whilst management is '...*about coping with complexity*,' '*Leadership, by contrast, is about coping with change*,' (p.4) (Kotter, 2001)[84]. As suggested by IS literature, this transition suggests that CIOs maybe expected to cease being managers to become leaders.

2.3.1.3.1 CIO as Manager

Initial research into the CIO as Manager, centred on the use of established managerial frameworks.

2.3.1.3.1.1 Mintzberg's Roles

As managerial roles are defined by an "...*organized set of behaviours belonging to an identifiable office or position*,' (p.54), Mintzbergs definition of Managerial

[84] Kotter's work draws attention to many of the *activities* associated with managers and leaders, which (as we will see) are well represented in the IS leadership literature

Roles (Mintzberg, 1973) has provided researchers with a framework for investigating the CIOs role as manager.

Central to Henri Fayol's Scientific Management Theory (based largely on a functional perspective for managerial work) was the premise that managers laid down instructions for work. However, subsequent development of management theory became fraught with limitations, as a singular, unifying definition of the 'managerial job', that is '…*independent of its structural location*...' remained elusive (Hales, 1999). To address this, subsequent work to overcome the sometimes-conflicting definitions of a mangers role eventually led to the development of managerial roles derived from structured observations. This work, by Henry Mintzberg yielded ten managerial roles[85] that describe what managers actually did (Mintzberg, 1971).

Since their inception, these managerial roles have been widely studied across many academic disciplines, confirming that they are '…*exhibited across functional areas and hierarchical levels,*' (p.110) (Grover et al., 1993).

In drawing distinctions between the relevancy of certain roles in the context of the CIOs environment and their underlying attributes, early CIO researchers made several attempts to describe the changing role of the CIO using Minztbergs roles.

For example, based on historical observations of six managers and acknowledging that the job had evolved from being a technician towards being a classical manager, *(Ives and Olson, 1981)* concluded that the information systems manager role is best described as a:

> *'…coordinator, motivator and planner with a cadre of experts, both internal and external, who provide technical expertise.'*
> *(p.49) (Ives and Olson, 1981)*

[85] Mintzberg identified and grouped ten specific roles for describing the work of senior executives: interpersonal (figure- head, leader, and liaison), informational (monitor, disseminator, and spokesperson), and decisional (disturbance handler, entrepreneur, negotiator, and resource allocator.

In 1993, in an attempt to draw further distinction between the CIOs role and other executives, (Grover et al., 1993) confirmed that Mintzbergs model enabled researchers to assess the CIOs role in relation to their environments. Following an empirical study with seventy surveyed IS managers in the US, Grover, noted that:

1. The more centralised the IS resource, then the more the CIO acted as spokesman, environmental monitor, and resource allocator; whilst,
2. As IS matured, the 'strategic responsibilities entitled in the monitor and entrepreneur roles' did not become more important[86]

Confirming that the newly evolving CIO role did indeed contrast with the more traditional MIS managerial role, an observational study of 5 CIOs in 1992 concluded that the CIO spent most of their time in decisional roles (and less time in informational and/ or interpersonal roles) (Stephens et al., 1992).

Building on this, a study surveying 101 Norwegian IS executives in 2000 compared the relevance of Mintzbergs roles (decisional, informational, and interpersonal) with newly developed IS/IT leadership roles as identified by the consultancy, CSC.

Results confirmed that whilst CIOs did hold decisional roles, they appeared to spend more time on interpersonal and informational roles (than had previously been suggested by Stephens, with the most prominent role being that of spokesperson (part of the informational role). Additionally, Gottschalk also concluded that in the case of newly appointed IS Leaders, operational responsibilities were decreasing among IS/IT leaders, and that '…*they spend much of their time as change leaders*,' (p.38) (Gottschalk, 2000).

To understand the significance of Mintzbergs roles in relation to the growth in CIO activities outside of the IT department (Gottschalk and Terje Karlsen, 2005) found

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[86] Additionally, the researchers showed that personnel leader and resource allocator were deemed to be internal to the IT function, whilst the entrepreneur absorbs ideas from the intra-organisational environment and the spokesman influences the intra-organisational environment; further, the researchers also showed that liaison informs the external environment whilst monitor absorbs from the external environment

that CIOs focusing on internal IT projects assumed the role of personnel leader, '…*supervising, hiring, training, organizing, coordinating, and motivating a cadre of personnel to achieve the goals of the organization*,' (p.1139), whereas those same CIOs focusing on outsourced IT projects adopted the role of spokesman i.e., by extending their '…*organizational contacts to areas outside his or her own jurisdiction*,' and '…*promoting acceptance of the IT department or the IT project within the organization of which they are part*,' (p.1139).

Researchers have also attempted to demonstrate how CIO 'characteristics', as antecedents to role enactment, may be used to explain how the new 'strategist' role may be derived from the more traditional (operational) CIO roles. For example, in a field study of 45 C-level IS executives[87], (Carter et al., 2011) investigate the relevance of two CIO characteristics (formal power derived from reporting level, and technical background) to '..*three traditional IT management roles—informational, decisional, and interpersonal*'[88] in relation to the emerging '..*business technology strategist*'[89] role. Finding that IS executives who participate in strategic action are not reliant on their roles managing IT or implementing IT projects (in decisional or interpersonal roles), but rather adopt informational roles to scan the external environment for information for new technologies (as monitor) and disseminating this information (and their ideas) to resources outside of their IT function (as spokesperson). The researchers also find that there is a moderate relationship between CIOs who initiative and design change (in the decisional role as entrepreneur) and those that monitor the external environment (suggesting that CIOs initiate change, perhaps because of seeking (and sharing) new ideas from outside the organization). Further, the researchers also show that CIOs who report directly to the CEO (or CxO) take an 'outside-in' approach (relying more on their business knowledge) as opposed to

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87 The researchers interchange the description of their sample through their article (i.e., referring to CIOs, IS executives and IS managers)

88 After (Mintzberg, 1973) and refined for the CIO by (Grover et al., 1993)

89 The researchers derive this label from (Ross and Feeny, 1999) , who use the term 'business visionary,' where the CIO is '…*one of the main drivers of strategy by recognizing the emerging capabilities and applications of information technology, and arguing their significance to the business*,' (p.16)

CIOs who don't report directly to the CEO taking an 'inside-out' approach to influencing through the application of their '…*strong technical expertise and effective management of IT resources*'.

Proposing guidelines for CIOs, the researchers recommend that: (i) CIOs invest in business relationships, (ii) their approach to shaping IT strategy should match their reporting level (i.e., a lower reporting level requires reliance on a technical background and (hence) an inside-out approach to influencing as opposed to CIOs with a higher reporting level who should leverage their senior relationships using an outside-in (or market led) approach to influencing) and (iii) accepting that some organizations (with a low level of IT maturity) may not require a business technology strategist at all. The researchers conclude that CIOs should adapt their roles to align with their firms '*overall orientation*,' (p.27) towards the IT department and that CIOs who fail to develop a deep understanding of their organizations will not be able to develop the knowledge needed to understand '…*when and how to employ different (CIOs) roles and skills to enhance the firm's performance*,' (p.27)

Whilst Mintzbergs roles have provided a measure of consistency in defining managerial roles for the CIO, IS leadership researchers have noted several criticisms in its use:

1. Four of the roles i.e., figurehead, disseminator, disturbance handler, and negotiator overlap with some of the *activities* in the remaining six roles (McCall and Segrist, 1980); if correct, then CIO researchers are likely to encounter differing expectations for inconsistently defined and enacted managerial roles
2. The increase in role contingency suggests that researchers adopting Mintzbergs role should attempt to establish '…*more realistic expectations*', in '…*varying organizational contexts*,' (p.124) (Grover et al., 1993); and that
3. Mintzbergs model fails to reveal why managerial behaviour is the way that it is, and that Mintzberg '… *merely categorizes that behaviour*,' (p.337), proposing that what's missing from management research is an answer

to the question '…why do managers do what they do?' (p.339) (Hales, 1999)[90].

However, Minztbergs model does appear to have been useful in describing the CIOs role. It has helped:

1. Distinguish the CIOs role from that of other executives
2. Describe the transition of an operational role into a more strategic one; and has
3. Reveal that CIOs are being called upon to enact multiple (managerial) roles, each of which appears to be contingent on environmental factors.

2.3.1.3.2 Leadership

As CIO leadership literature is derived from (and indeed has evolved in tandem with) organizational leadership literature, it is useful to compare the two domains.

Researchers have voiced multiple perspectives on leadership and perspectives on leadership success:

In 1958, Tannenbaum claimed that the successful leader is one who:

> *'…is keenly aware of those forces which are most relevant to his behaviour at any given time. He accurately understands himself, the individuals and the group his is dealing with, and the company and broader social environment he is operating in,' and '…is able to behave appropriately in the light of these perceptions,' (p.101) (Tannenbaum, 1958)*

Tannenbaum goes on to say that individuals cannot be characterized as either strong or weak leaders, but success is derived if they are able to assess the required behaviours required at any given time, and in response, behave most appropriately.

Similarly, to be effective,

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[90] In his paper of 1994, Mintzberg acknowledges the need to integrate behaviours into his roles (Mintzberg, 1994)

'…leaders must be able to motivate and direct followers towards group or organizational goals, mission, or vision, and be able to maintain stability and group harmony even when acting as agents of change,' (p.244) (Knippenberg and Hogg, 2003)[91]*.*

Whereas,

'The essence of leadership in organizations is influencing and facilitating individual and collective efforts to accomplish shared objectives,' (Yukl, 2012).

Given such statements, it is not surprising to find that the literature on leadership is voluminous[92]. However, despite the volume of work, many researchers have remained sceptical about the applicability of such research.

In 1995, (Bennis and Nanus, 1985) commented that '…*never have so many labored so long to say so little*,' (p.5). Additional concerns were also raised in 1994, in terms of the applicability of leadership research on leadership practice. Suggesting the presence of a 'gap' between what psychologists know and '…*what leadership decision makers want to know*,' (p.1) (Hogan et al., 1994) cites Mintzbergs view that such a gap would be addressed if researchers and leaders focused more on the application of leadership rather than conducting research for research sake (Mintzberg, 1982)[93].

Irrespective of such concerns, IS researchers have recognised that in order to ensure the applicability of leadership research, more work would be needed to not only understand the relevance of a leaders 'characteristics' when developing

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91 Referencing (Yukl, 2001) and (Chemers, 2001)

92 (Hogan et al., 1994) and (Weese, 1994) both comment that there are over 7500 citations in the book 'Bass and Stogdill's Handbook of Leadership,' (Bass and Stogdill, 1990), and that this provides a strong indicator of the volume of work on leadership

93 Who suggests that we shouldn't attempt to define or measure leadership, as '…*there are some things we know formally, or analytically – by definitions and measurement. And there are those things we know informally, intuitively – deep in our brain, although we do not know why*,' (p.252). Mintzberg goes onto to suggest that '…*leaders know far better than researchers what leadership is all about., but the researchers don't know how to ask them, and the leaders don't know what to tell the researchers*,' (p.253)

influential relationships with their followers, but that their proposals should also consider the potential effects of ever more complicated environments in which leaders and followers operate. As such, CIO leadership researchers have adopted (and contextualized) evolving leadership theories when investigating relationships between leaders, followers, and their changing organizational situations.

Before exploring the subject of CIO leadership, it is useful to briefly explain[94] the leadership[95] domains that have been most relevant to CIO leadership studies.

1. The Great-Man Theory and Traits Theory. The great man theory supposes that great leaders are born and not made. Such individuals are 'heroes' that provide a pattern for others to imitate and act as 'creator' to move history forwards (and not backwards) (Carlyle, 1841). Traits theory (developed from the proposals of (Weber, 1947)) represents an evolution in great man theory in that it ignores the source of leadership traits (i.e., whether inherent or learned) to demonstrate that, in some circumstances, some traits maybe more relevant than others. However, studies by (Hampton et al., 1978) call the examination of traits into question on finding that some leaders (without certain leadership traits) could still be perceived as being effective
2. Behavioural Theories: encompasses autocratic and democratic behaviours I.e., the centralisation of authority over subordinates and followers, versus the delegation of authority to encourage follower participation (Lewin, 1939). Leadership behavioural researchers consider the attitudes of leaders towards either 'people' or 'tasks' and consider that such leaders should integrate both task orientated, and people orientated behaviours in order to be most effective

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94 This summary is taken from literature review conducted by (Zaker et al., 2016) and (Dinibutun, 2020)

95 Leadership theories are also said to fall into two domains i.e., 'Emergent' e.g., personality related 'factors' associated with someone who is perceived as a leader (usually in the absence of tangible performance metrics) or 'Implicit' e.g., applied to people perceived as a leader when certain 'characteristics' match pre-conceived expectations for what leaders should be like. cf. (Hogan et al., 1994) (pp. 10-12)

3. Contingency Theories: consider the potential effects of the environment (or the situation) on the relationships between leaders and followers and (hence) the style of leadership that might be most effective. Central tenets to contingency theory are:
    a. Contingency model of leadership: the model developed by (Fiedler, 1967) reveals that, the effectiveness of either task orientated leaders or relationship-oriented leaders depended on the 'favourability' of the immediate environment or situation
    b. Institutional Leadership theory (Hersey and Blanchard, 1969) proposes four stages of follower (or subordinate) 'readiness' in relation to four leadership styles (i.e., 'Telling', 'Selling,' Participating' or 'Delegating') style in response to the abilities, or level of willingness of followers
    c. Path-goal Theory (House, 1971), where leaders focus on removing problems for followers who are attempting to attain pre-defined goals[96] in terms of four classifications of leadership styles, i.e., 'Supportive,' Directive,' Participative,' or 'Achievement -orientated'
    d. Decision Making: which describes the effects of 'decision-making' to improve the level of acceptance of the decision by followers (Vroom and Yetton, 1973)
4. Contemporary Theories: in response to a rapidly changing world, born out of increased globalization, researchers also developed 'contemporary' leadership theories, namely Charismatic Leadership, Transformational Leadership and Transactional Leadership:
    a. Charismatic Leadership: concerning influence, derived from follower perceptions of a leader's level of power or qualities forms the core idea of charismatic leadership (Weber, 1947)
    b. Transformational Leadership: whilst previous leadership theories focus heavily on the relationship between leaders, followers, or

[96] And has been used to show how leadership behaviour influences the satisfaction and performance of subordinates (Yukl, 1989)

subordinates, Transformational leadership (Burns, 1978) emphasises the importance of achieving a new vision for the company by changing or transforming both individuals and the organisation; the articulation and communication of this vision is seen as paramount in overcoming resistance to change by developing 'buy-in' to the new vision and the activities required to achieve it. Transformational leaders therefore inspire and model the required behaviours in order to influence. Research subsequent to Burns work provides insight into the characteristics of transformational leaders. E.g., leaders can be charismatic and inspirational to increase the awareness of the need to change in their followers and motivate them (Bass M, 1985), or they can create a perception of being a change agent (Eisenbach et al., 1999)

c. Transactional Leadership: in contrast to transformational leadership, transactional leadership (Burns, 1978) has been refined by various researchers throughout the mid-1990s and early 2000s. It concerns leadership 'characteristics' relating to authoritative behaviour (i.e., using positional power and organizational bureaucracy). Transactional leadership concerns a maintenance in the status quo, emphasising increased productivity to achieve pre-defined goals (Avolio et al., 1991); it therefore focuses on tasks and compliance through the use of organisational rewards, compensation (and punishment) to influence employees (Bass and Stogdill, 1990). Once tasks are finished, the transaction is deemed completed (unless a new transaction is entered into; as such relationship between leader-follower is perceived as being finite and short-term (Lussier and Achua, 2001)

2.3.1.3.2.1 CIO Leadership

IS leadership literature review highlights two widespread issues. Firstly, researchers exhibit significant inconsistencies in the use of the terms manager, leader, or leadership.

In the case of CIO leadership, part of this problem seems to arise from inconsistencies in the job titles of the individuals that form the population, or the sample being analysed. Researchers invariably refer to Senior IT Managers, IT Executives, Senior IT Leaders, IT Directors, etc. Inconsistencies also appear to arise in definitions for the scope of the CIOs leadership role, whether it is someone focused on leading IT, or leading change, leading the business, or acting in a 'strategic role.' Researchers are also inconsistent when describing underlying attributes relating to CIO leadership.

A second consideration in CIO leadership literature is lack of direct reference to established leadership theories; whilst a close examination of literature has revealed examples of the application of the above leadership theories, many researchers rarely acknowledge this, or claim a theoretical contribution. An example of this is represented by the highly respected CIO researchers (Earl and Feeny, 1994); CEOs wising to realise 'value' from IT should promote their CIOs to the board so that they can build influential relationships with business executives; however, having analysed data from psychometric tests[97] for CIOs in this leadership position, the researchers claim that 'integrity' is a pre-cursor to behaviour, that CIOs are motivated by goals, are systems orientated, they develop 'win-win' scenarios by working through their peers and should be positioned as agents of change. The researchers make a strong, evidenced based argument for what CEOs need to consider when elevating their CIOs into leadership positions; however, when these claims are compared to established leadership theories, the picture becomes highly confused as they appear to transcend several leadership theories (Traits Theory, Behavioural Theory, Contingency Theory and Transformational Leadership theory).

However, whilst references to established theories are vague, it is still possible to critique such works in the context of some accepted leadership theories.

2.3.1.3.2.2 Traits Theory

[97] Myers-Briggs Psychological Preference Tests and Belbin Team-role Self-perception Inventory

For example, the context of trait theory is clearly visible in a study by (Willcoxson and Chatham, 2006) as they compare personality traits (using data from psychometric tests) between senior IT managers and senior business managers. Finding that whilst senior IT managers have a strong preference for task-oriented leadership behaviours, the researchers find that senior IT managers prefer to avoid decision making whilst holding positions of authority; conversely, senior business managers prefer relationship (or people) orientated behaviours and are inclined towards making decisions and assuming responsibility.

Similarly, (Li et al., 2006) introduce personality traits[98] into their investigations into the relevance of demographic characteristics with the level of organizational innovative usage of IT. Analysing survey data from 95 senior IT executives[99]. Li finds that whilst demographic characteristics maybe relevant, '…*psychological behavioral processes may be far more important than demographic characteristics in determining innovative usage of IT in organizations*,' and that, amongst the three personality traits examined, that the IS executives, '…*degree of openness and extraversion appear to play a significant role in influencing the level of organizational innovative usage of IT*,' (p.185)[100]. Building on these findings, (Li and Tan, 2009)[101] investigate how the same demographic and personality traits may relate to business-IS strategy[102] alignment and (hence) organizational business performance[103]. The researchers find that, in comparison to companies practicing defender strategies, companies with well aligned business-IT strategies and inclined towards 'prospector' business strategies tended to have younger CIOs with higher levels of openness and extraversion. The researchers therefore conclude that '…*psychological, behavioural processes*

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98 i.e., Openness, Extraversion and Conscientiousness after (Digman, 1990)

99 With job titles IS/IT manager, IT Director, CIO, and Chief Technical Officer

100 This view is also supported by Smaltz, who also claims that '…*demographic factors are proxies for the individual capabilities and traits of the CIO. Therefore, we focus on CIO capabilities as more immediate antecedents of CIO role effectiveness*,' (p.211) (Smaltz et al., 2006a)

101 This paper was republished as a journal article in 2013, See: (Li and Tan, 2013)

102 In terms of Prospector and Defender (cf. (Miles and Snow, 1978)business strategies, and IS strategies of either 'flexibility' or 'efficiency' (cf. (Sabherwal and Chan, 2001)

103 Eight measures encompassing employee productivity, operational efficiency, operational costs, customer satisfaction, partner relations, revenue, profit, and market share

maybe far more important that demographic characteristics when describing a CIO,' (p.8), and offer the advantage of being fixed and permanent, whereas demographic traits are likely to change and/ or continuously evolve.

2.3.1.3.2.3 Behavioural Theories

Leadership behaviour theories, especially investigations examining CIO relationships with their peers in the TMT, appear more abundant than those considering trait theories. A reason for this may stem from the fact that CIOs leaving their managerial responsibilities behind and transitioning to the board room have had to adopt new behaviours to become effective leaders.

As summarised eloquently by Tannenbaum:

> *' …the successful manager of men,' is one who '…maintains a high batting average in accurately assessing the forces that determine his most appropriate behaviour at any given time should be and in actually being able to behave accordingly,' (p.101)* (Tannenbaum, 1958)

Similarly, the term leadership may refer to '*…an attribute of personality…a characteristic of certain positions, and sometime as an attribute of behaviour*,' a focus on leadership behaviours offers '…*distinct conceptual advantages*,' enabling leadership to be defined as '… .*any act of influence on a matter of organizational relevance*,' (p.574) (Katz and Kahn, 1978).

Its unsurprising then that many CIO leadership investigations have focused on the relevance of CIO influencing behaviours, particularly in relation to their newly acquainted peers in the TMT.

This approach has however come with some challenges. For example, adapting a leadership model (from (Yukl, 1989)) to articulate relationships between CIO 'traits and skills,' their 'leadership behaviours' and role effectiveness, (Brown,

1993) summarise multiple challenges[104] that require CIOs to forge partnerships with senior managers as they have to '…*exert influence without direct authority*.' The researchers conclude that whilst there is '…*scant literature on the traits and skills of the CIO*,' the '…*general manager attributes and CIO attributes of a technology generalist appear to be important factors for determining the CIO's level of influence and behaviors,*' (p.404).

In the transition from management to executive, CIOs have had to learn to amend their behaviours. In their investigation into CIO behaviours, (Enns et al., 2003b) draw a distinction between authoritative behaviours and influential behaviours. Enns contrasts a perspective on authority (Simon, 1953) as a '..*legitimate exercise of decision making that affects the behaviour of individuals...that subordinates agree without question to the decisions of a superior*,' (p.157) with the view from (Tannenbaum, 1958) that influence is demonstrated '..*by offering information, providing advice, persuading and the like,*' (p.157).

Having made this distinction, (Enns et al., 2003b) adopt definitions for lateral influential behaviour[105] from the field of Psychology and influential leadership behaviours (originally developed in 1994 by (Yukl, 1994)) to investigate the relevance of leadership behaviours when influencing their peers in the TMT to support new IT projects.

Analysing data from a mixture of interviews and surveys (of 69 CIOs), the researchers model correlations between seven types of influencing[106] behaviours and the success of securing an (influenced) outcome. The researchers claim that CIOs using:

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104 Summarised as a need to increase control and responsiveness, whilst providing 'oversight' of increasingly dispersed IT capabilities. Suggesting that control is improved by constructing centralised services, whilst responsiveness is achieved by decentralising services

105 In referencing prior research of CIOs having to 'influence upward' (before they became members of the TMT), the researchers claim that whilst prior research indicates how good working relationships with peers are necessary, that has been '…*little systematic research on top executive's lateral influence behaviors,*' (p.157)

106 Rational persuasion (using logical arguments and factual evidence), Consultation (seeking participation in decision making), Personal Appeal (emotional requests to arouse enthusiasm), Ingratiation (using praise or flattery to secure favour), Exchange (promising reward if one complies), Coalition (uses third party to help make persuade) and Pressure (demands or intimidation to gain support)

1. Rational Persuasion, and Personal Appeal to influence peers are more likely to secure positive outcomes; whereas
2. CIOs using Exchange, Consultation, Coalition and Pressure influencing behaviours attract poorer outcomes (or are met with increased levels of peer resistance)

Noting discrepancies between these findings and previous studies involving middle managers[107], the researchers suggest that whilst middle managers found Exchange type behaviours effective with their peers, CIOs adopting Exchange behaviours would encounter resistance from their peers. Similarly, the researchers express surprise that Consultative behaviours had a negative impact on outcomes. Suggesting that whilst this was inconsistent with previous studies, the cause of the finding may have stemmed from inappropriate survey questions or weaknesses in theoretical constructs.

In the same year, adopting socialisation theory, (Enns et al., 2003a) focus on the relevance between a CIOs technical background and their success in being able to positively influence other 'top executives.' Adopting the same definitions for influence behaviour from their previous study, their empirical study of CIOs challenged the views of the relevance of a CIOs technical background with any given influencing tactic. Finding that the technical background of a CIO did not impact the influence behaviours being applied to their peers, the researchers suggest that '...*only highly interpersonally skilled individuals, regardless of technical background, advance to the CIO position*.' (p.480).

Enns revisits CIO influencing behaviours again in 2012 to investigate how they may be used to influence their peers in the TMT to achieve business-IT strategic alignment. Adopting an exploratory approach, Enns interview 23 CIOs about how they work with their TMTs to achieve IT-business alignment (Enns and McDonagh, 2012). Describing CIO influencing in terms of a 'lateral influence process[108],' the researchers find that CIO behaviours at each stage of the

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107 Conducted by (Yukl and Falbe, 1990)

108 Defined as who to target, executive preparation (pre influence) and influence tactics (derived from work by (Pfeffer, 2009))

planned influencing intervention can be summarised in terms of 'relate' (i.e., maintaining good relationships with the executives CIO are likely to influence, using past successes or developing 'partnerships' with non-IT executives), 'prepare' (i.e., gather information and perhaps convince others to help influence) and 'communicate' (i.e., inform the target, whilst interpreting external IT developments). Proposing 'tactics' CIOs can use at each stage of influencing, the researchers conclude that CIOs who take time in their preparations to influence (i.e., by gathering information) and by soliciting others to help in their efforts to influence other executives to obtain '…*greater IT-business alignment*,' (p.8).

CIO leadership behaviours have also been expressed in terms of where they are focused. For example, analysing survey results from 620 CIOs, (Kitzis and Broadbent, 2003) suggest that CIOs should build on their 'supply-side'[109] leadership behaviours in order to adopt 'demand-side[110]' leadership behaviours. The researchers stress that in enacting these behaviours, CIOs should be reactive, proactive, or stimulating in their leadership behaviours to address six 'imperatives' (to lead, anticipate, strategize, organize, deliver and measure) for the CIO. The researchers conclude by drawing distinctions between these imperatives and behaviours and their application to each of three organizational contexts (i.e., whether the enterprise is 'fighting for survival,' 'staying competitive' or 'breaking away') to propose three CIO behavioural agendas[111] that require CIOs to '…*broaden their role and assume new responsibilities*,' (p.21)[112].

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109 Requiring a focus on delivering cost effective services and demand-side leadership

110 Requiring a focus on shaping and managing expectations

111 For example, CIOs working in a 'fighting for survival' context will focus on multi-year budgetary cuts, stop all development activities, and make multiple layoffs

112 The researchers revisit this work in their 2005 book ('The New CIO Leader') and investigate CIO authority and influence in more detail for each type (Supply/ Demand side) leadership, claiming that '…*on the demand side, CIOs must lead as peers, colleagues and even subordinates. This situation is truly leadership by persuasion and relationship. On the supply side, the CIO does have the formal authority that comes from the position held in the organization,*' (p.32) (Broadbent and Kitzis, 2005)

In a further examination of supply and demand-side leadership, (Chen et al., 2010b) investigate how such behaviours[113] relate to Its contribution to firm efficiency and to strategic growth. Investigating three antecedents of CIO leadership (human capital, structural power, and the level of organisational support they receive (for IT)), the researchers analyse data collated data from matched pairs (of CIOs and business executives) across 174 firms. Finding that a CIOs human capital and level of organizational support for IT are both significant predictors for supply-side leadership (noting that structural power didn't directly influence supply-side leadership), the researchers also show that whilst supply-side leadership was a significant predictor of demand-side leadership, a CIOs structural power was the only significant predictor of demand-side leadership. In discussing these findings, the researchers suggest that a CIOs ability to impact the contribution of IT to a firm's efficiency or strategic growth would be mediated by the stage of leadership maturity they had reached. For example, CIOs with strong supply-side leadership would have a direct influence on a firm's efficiency (but not on strategic growth), whilst CIOs with focus on demand-side leadership (if derived from supply-side leadership) would impact both firm efficiency and strategic growth. This may explain why '…*CIOs who effectively display demand-side leadership are highly sought after by today's organizations but is also consistent with the strategic leadership literature, which argues that organizational outcomes can be dictated by the actions of the firm's top executives'* (p.259). Reflecting on the limitations of the study the researchers claim that they have developed a staged leadership-maturity model and that supply-side leadership is a '…basic but necessary stage for the more advanced stage of demand-side leadership,' (p.260).

2.3.1.3.2.4 Contingency Theories

[113] Whilst no specific definition of behaviours is offered, the researchers provide a copy of their survey questions. Supply-side questions ask about CIOs who: (i) CIO maintain IT skills in IT department, (ii) direct efforts to build integrated IT systems and (iii) keeps IT systems operational. Demand-side questions ask whether the CIO is an effective: (i) strategic leader, (ii) strategic business planner, (iii) visionary within the organisation

In addition to applying traits and behavioural leadership theories to the CIOs leader role, researchers have investigated the effects of the environment in which the leader/ follower operates i.e., adopting contingency theories of leadership.

The effects of the changing nature of the environment are illustrated clearly in a study by Ross and Feeny.

In response to progress through three technological eras (i.e., the mainframe era, the distributed era, and the web-based era), the researchers track the emergence of new capabilities expected from IT and the new tasks expected from CIOs as they transgress three new roles (Ross and Feeny, 2000)[114]. As the CIOs role develops (along with an increase in credibility) towards the (current) web-based era, CIOs should enact the role of 'Business Visionary.' In this role, CIOs should drive strategy and focus on tasks that develop and leverage '…*new business models for the internet*,' (p.399). However, the researchers stress that not all organizations will transgress all three technological eras, that the changes in the CIO role should be perceived as role growth (as opposed to role substitution) and that (depending on circumstances) it is possible for the role to regress to those activities and tasks required from an earlier era as firms are '…*generally pushed into subsequent technological eras, whereas changes in the role and attitudes of management can evolve more slowly*,' (p.400)

The effects of the environment on expectations for the CIOs role has also been examined in terms of the effects of strategy, 'information orientation' and culture.

Returning to the theme of business-IT alignment and contemporary leadership theories, (Berepiki, 2017), investigated the mediating effects of business strategy

[114] Being: Operational Manager (tasked with on time delivery and reliable IT operations),Organizational Designer, Strategic Partner, Technical Architect, after (Rockart et al., 1996) and Informed Buyer after (Feeny and Willcocks, 1998), (tasked with: managing federal IT, developing staff, aligning IT, designing architectures, scanning technologies, stabilizing infrastructure, scanning the services market and developing key alliances)

on CIO leadership styles[115] (transactional, transformational or mixed)[116] and their impact on business-IT alignment. Analysing survey responses from 147 CIOs, the Berepiki finds:

1. For Analyser business strategies, CIOs adopting a transactional leadership style had significant (positive) impact on business-IT alignment
2. Whereas no significant correlation was found between CIO leadership style and business-IT alignment for organisations adopting either Defender or Prospector business strategy types

However, whilst the empirical data doesn't fully support evidence of a relationship between CIO leadership styles and Defender/ Prospector strategies, the Berepiki suggests that his findings demonstrate that CIO leadership styles do have '…*profound consequences on the contribution of IS/IT to…business outcomes through strategic alignment*,' (p.145), and that '…*senior executives of an organization must carefully select a CIO whose leadership style matches their strategic vision*,' (p.150).

Expectations for a CIOs behaviour are also contingent on attitudes towards information orientation. For example, in their investigation of CIO 'behaviours' intended to improve the level of their organizations level of information orientation, (Kettinger et al., 2011) examines the relevance of Participative Leadership[117], Transformational Leadership and Servant Leadership[118]. Conducting case studies of CIO behaviours in four firms firm seeking to improve their level of information orientation, or IO, (as a 'critical enabler of business strategy'), the researchers identify the behaviours of CIOs who (because of their environment) act either as a Participative Leader, a Transformational Leader or

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115 The use of the term 'style' is misleading as, in leadership literature, style has been referred to as a behaviour, or it has been referred to the enactment of one of the theories. For example, CIOs may exhibit 'a transformational leadership style'

116 (Alos-Simo et al., 2017), citing (Bass M, 1985), explains that Transactional Leadership focuses on rewards and consequences of not reaching goals whereas Transformational Leadership involves transformation of follower's aspirations, attitudes and values

117 Referencing this, the researchers cite (Lewin and Lippitt, 1938), implying (although not stating) that Participative Leadership is contextualised by behavioural theories

118 Also, see (Peppard et al., 2011), who develops five salient CIO roles in response to changing perspectives of information orientation (section: 2.3.1.3.3)

as a Servant (or Emergent) Leader. CIOs who are participative leaders, as business partners, deliver '…*reliable and cost-effective IT services*,' whilst providing '…*business insights to act as key leaders…through advocacy and dialogue*,' (p.161). Transformative CIOs who identify opportunities to change, clearly convey their vision for IO initiatives and '…*strive to establish an emotional commitment…amongst managers*,' (p.163). CIOs adopting servant leadership behaviours react to their business leaders who identify planned changes and (therefore) they must emerge as a leader by '…*eschewing all credit...for his/ her efforts for the good cause – the focus is on leadership by meeting the needs of others first*,' (p.165). Proving guidelines for 'sensemaking' of the various (organisational) needs and 'mobilising' the appropriate CIO leadership behaviours[119], the researchers conclude the CIOs must not only act as valued mangers of IT services, but they must also become perceived as '…*inhouse experts on how information is used*,' (p.171)

Organizational cultures are also thought to inform expectations for IT and CIO leadership behaviours. For example, to investigate the mediating effects of organizational cultures[120] and the level of ERP knowledge sharing on the effectiveness of CIO transformational leadership[121] to 'foster' ERP success, (Shao et al., 2012) analyse data surveyed from 115 IS executives and 413 ERP users in 115 Chinese companies. The researchers show that an innovative and creative (i.e., a development orientated) culture and knowledge sharing are both critical to ERP success; they also show that both rational and hierarchical cultures are related to knowledge sharing. Concluding that transformational leaders need to ensure that they consider the effects of culture and knowledge sharing when leading ERP implementation and operation, in order to be effective, they

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119 CIOs should assess the situation in their organisations, make the decision about whether they want to be the leader (or not), select their leadership approach, and mobilise their approaches accordingly. It is interesting to note that this appears to align well with some of the behaviours identified whilst CIOs progress their tenures. cf.(Gorgeon, 2010)

120 The researchers adopt the four cultural typologies (i.e., development culture, group culture, hierarchical culture and rational culture) proposed by (Quinn and Spreitzer, 1991)

121 The researchers adopt 'five dimensions' of transformational leadership (i.e., vision, inspirational communication, intellectual stimulation, supportive leadership, and personal recognition, after (Rafferty and Griffin, 2004)

recommend that top executives need to '*…conduct strategic and tactical actions…to facilitate the organizational culture changes in support of both ERP explicit knowledge sharing and tacit knowledge sharing*,' (p.2410).

Similarly, combining 'strategic leadership theory'[122], contingency theory and behavioural theories , (Shao, 2019) conducted an empirical study to investigate how strategic leadership behaviours (idealised influence vs inspirational motivation) *and* organisational cultures (flexibility orientated culture vs control orientated culture) may impact business-IT alignment and hence successful assimilation of enterprise systems. Surveying 160 CIOs and 172 of their subordinates in 190 firms in China, the researchers found that both leadership behaviours were 'significant drivers' of IS-Business adoption and hence enterprise system adoption. Additionally, the research revealed that whereas a control orientated culture had a negative impact on how leadership behaviours moderated alignment, a flexible culture 'positively' moderated the relationship between leadership behaviours and IS-Business alignment.

In addition to the contingent effects of organizational culture on expectations for IT and the CIO, researchers have also sought to understand the effects of national cultures. For example, researchers have examined the relationship between transformational CIO leadership styles and successful digital transformation in Scandinavian cultures. In their longitudinal case study with the airline SAS, (Bygstad et al., 2017) investigated the relevance of four transformational leadership *characteristics* in their CIOs (idealised influence, inspirational motivation, intellectual stimulation and individual consideration[123]) and their digital transformation programme. Concluding that their CIOs level of 'deep participation' (not only with the management teams, but with the Trade Union) ensured the securing employee commitment and knowledge-sharing. Claiming that Scandinavians prefer leadership based on coaching, rather than on

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122 Which, suggests that '…*that top manager's demographics and leadership play a significant role in strategy formulation, and effective strategy implementation requires specific knowledge, skills and leadership styles of the key decision makers*,' (p.96)

123 Which, also referred to as 'qualities,' combine to secure employee motivation and enhance their self-confidence (Bass M, 1985)

direction, the researchers suggest that the successful attainment of digital transformation was largely due to the CIO who embedded a '…*leadership culture that leverages employee knowledge*,' (p.13)

Whilst many investigations suggest that CIOs enact either managerial or leadership roles (embracing the underlying assumption that CIOs are expected to either represent either an authoritative figure or an influential figure), CIO researchers have also attempted to combine aspects of both roles. The development of (what the author refers to as) more salient roles acknowledges a complex relationship between the CIOs role and any given environment they may find themselves in. Key findings from investigations into these roles are examined in the next section.

2.3.1.3.3 Salient CIO Roles

(Welbourne et al., 1998), citing (Thoits, 1991) and (Burke, 1991), suggests that an individual's behaviours are affected by the saliency of their role. (Smaltz et al., 2006a) proposes that expectations for the CIO should therefore be investigated in terms of their salient roles. As requirements for increasing levels of role adaptiveness appears to be blurring the lines between perceiving the CIOs in terms of either manager or leader, the author adopts the term Salient CIO Roles.

Researchers seeking additional insight into emerging roles for the CIO, and in an attempt to define them, have looked to the demands of the CIOs environment on the CIOs role and to a CIOs input competence.

For example, Peppard interviews 26 CIOs, sixteen TMT members, recruiters and industry analysts, (Peppard et al., 2011) to examine perspectives on the criticality of information and technology[124] to their organizations in shaping expectations for the CIOs role and the issues and the challenges CIOs face. Collating perspectives on five factors that characterize CIO roles (i.e., role scope, issues

[124] A similar concept, the relevance between CIO effectiveness in either a strategic role or an operational role and the 'Innovative Usage of Information Systems' in investigated by (Li et al., 2012). Whilst this study provides some insight into effective role enactment, the work does not include the relevance of any underlying or antecedent CIOs attributes on role effectiveness

citied as critical to success, performance metrics for assessment, challenges, and the nature of the relationship with CxO colleagues and the CEO), the researchers identify five new CIO roles:

1. Utility IT Director – having a strong technical bias and an 'IT-supply' focus, reports into the CFO and is orientated towards operational staff
2. Evangelist CIO – changes mindsets about information and provokes more demand for IT services from the business and 'fights' for time with CxOs
3. Innovator CIO – actively exploits information to enhance organizational capabilities and to improve competitive standing; has regular formal and informal meetings with the CxOs
4. Facilitator CIO – to help develop new (information centric) capabilities more widely outside of IT and across the business, focuses on leveraging IT assets and is perceived as a 'trusted partner' by the CxO
5. Agility IT Director/CIO – with capabilities divested throughout the company, this role develops an agile IT infrastructure and coordinates requirements; acts as an 'Advisor' to the CxO on policy, risk, and technical capabilities

Proposing that different circumstances require a different CIO role, the researchers compare these roles with five states of information criticality[125]. Reflecting on their findings, the researchers highlight where CIOs had adopted the most appropriate roles for their environment (in one case referred to as a change in style); however, the researchers also note that CIOs experience 'role ambiguity.' Role ambiguity occurs where the expectations of the '*rights, duties and responsibilities*,' of their role, along with their behaviours and the consequences of these behaviours, are '…*non-existent or inadequately communicated*,' (p.41). The consequence of ongoing ambiguity is poor performance, demotivation, and higher levels of turnover[126]. To address (the

[125] The states ranging from the lowest level of criticality for differentiation (where information is not used for differentiation) to the highest level (where '…*information is at the heart of the industry and treated as such*,' (p.39)

[126] The researchers cite previous studies by (Tubre and Collins, 2000) who conclude that '…*that efforts to reduce role ambiguity could have a meaningful impact on job performance*,' (p.165)

consequences of) ambiguity, the researchers propose that: (i) CIOs should have a clear and unambiguous statement of their role, (ii) the CIO role meets the expectations of the both the CIO and their TMT, (iii) CIOs should align role expectations with organizational requirements, (iv) incumbent CIOs should actively manage their role evolution and (v) members of the TMT should improve their digital literacy levels. Concluding that organizations will eventually create an environment where '…*information is so intimately and fundamentally bound to every aspect of the business and the actions*,' (p.43), they will greatly reduce their reliance on the CIO and that decision making responsibilities for all aspects of IT will 'migrate' to CEOs and CxOs (i.e., members of the TMT)

Investigations focusing on the CIOs input competence, have developed new roles based on a CIOs 'capabilities', 'competencies', 'responsibilities' or 'activities,'.

For example, despite a '…*wealth of normative and prescriptive writings about what roles CIOs should play*,' (p.207) (Smaltz et al., 2006a) argue that questions surrounding the assessment of CIO role effectiveness and its primary antecedents remain unanswered. To investigate this concern, the researchers combine three streams of research (i.e., the application of Mintzbergs Managerial roles to the CIO, Upper Echelon Theory[127] and Role-Based Performance Theory[128]) to develop and validate constructs between CIO capabilities[129], CIO-TMT engagements and CIO role effectiveness. Applying factor analysis to the results of 106 surveys from CIO-TMT dyads in the US healthcare sector, the researchers identify six salient CIO roles (p.216):

1. Strategist: similar to Mintzbergs entrepreneur role, the researchers define the role in terms of an organizational desire for CIOs be effective business

[127] The nature of interactions between the CIO and the TMT, after (Hambrick, Donald and Mason, Phyllis, 1984)

[128] That role performance evaluation should be linked with salient role expectations in firms, implying that role effectiveness should be assessed through performance in salient roles, after (Welbourne et al., 1998)

[129] Described as business and strategic IT knowledge (after (Armstrong and Sambamurthy, 1999), interpersonal communication skills, and political savviness

partners, helping to leverage '…*valuable opportunities for IT-based innovation and process redesign*,'

2. Relationship Architect: like Mintzbergs liaison role, the researchers define this role in terms of the CIOs building relationships internally (across the organization) and externally (e.g., with service providers)[130]
3. Integrator: a combination of Mintzbergs leader, monitor and resource allocator roles, the researchers describe the CIOs integrator role as the CIOs focus on leading the integration of '…*processes, information,'* and to enable *'decision-support*'
4. IT Educator: similar to Mintzbergs liaison role, this role requires the CIO to assist the TMT in developing their understanding and appreciation of IT
5. Utility provider: analogous to Mintzbergs monitor and resource allocator roles, the researchers suggest that CIOs should lead the development and sustainment of '…*solid, dependable, and responsive IT infrastructure services*.'
6. Information Steward: characterised by Mintzbergs leader tole, the researchers claim that CIOs adopting the information steward role strive for '…*high quality data and operationally reliable systems*,' that could (for example) involve establishing compliant practices with regulatory standards

Finding that CIO capabilities were significantly related to CIO effectiveness in the roles of strategist, relationship architect and integrator, the researchers also showed that CIO/TMT engagements alone would not significantly impact effectiveness in either of these three roles but would impact effectiveness when related to CIO capability i.e., CIOs should be perceived as being capable in order for the CIO/ TMT engagement to impact role effectiveness. Surmising that CIOs who were members of the TMT had been able to develop trusting relationships with TMT members, the researchers conclude that CIOs were also able to develop higher *capabilities* that enabled them to be effective in these three roles.

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[130] Note, the researchers do not include customers as part of their description

Researchers have also examined the relevance of CIO attributes grouped as competencies to CIO role enactment. For example, (Wu et al., 2008) analysed data surveyed from 97 CIO-TMT paired responses to investigate the relevance of antecedents to the effectiveness of CIOs in eight salient roles[131] (i.e., attributes grouped as business technology and business management competencies[132]) and the firms level of Business Technology Management (BTM) Capabilities[133] to levels of IT assimilation. Finding that CIO effectiveness (across all eight roles) and the firm's level of BTM capability both influenced higher levels of IT assimilation, the researchers also concluded that the CIO skills and knowledge attributes (grouped under the business technology and business management competencies) were 'essential' to the CIOs effectiveness for each of the roles.

Further, researchers have also attempted to define CIO roles in terms of their responsibilities. For example, (Chun and Mooney, 2009), reflect on prior literature and data collected from CIO job adverts and captured from interviews with seventeen CIOs. Mapping their data against nine core IS capabilities[134], the researchers were able to further categorise (or codify) their findings into CIO responsibilities and attributes. From their analyse, the researchers claimed that the five most significant attributes of a CIO are, '*i) an ability to contribute to corporate strategy; ii) competence in business process innovation and design and the ability to anticipate business needs; (iii) expertise in managing and demonstrating IT costs and their impact; (iv.) effectiveness in publicizing and*

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131 Defined as: business visionary/strategist, business system thinker, value configurer, entrepreneur, infrastructure builder, organizational designer, relationship builder, and informed buyer, after (Feeny and Willcocks, 1998), (Grover et al., 1993), (Ross and Feeny, 2000), (Smaltz et al., 2006a) and (Willcocks et al., 2006)

132 Business technology competency defined in terms of skills and knowledge in IT Infrastructure, Business Applications and Business Technology Integration; and Business management competency defined in terms of Business Domain Knowledge, Interpersonal Skills and Knowledge and Management Practice skills/ knowledge

133 Defined as a '…firms' ability achieved by applying well-defined processes, appropriate organizational structures, information, and supporting technologies in one or more functional areas,' (p.3). The researchers' group seventeen capabilities into four groups, namely Governance and Organization, managing technology investments, strategy and planning and strategic enterprise architecture.

134 As developed by (Feeny et al., 1992)

raising IT's profile and position within the company; and (v) strong communication, negotiation, and facilitation skills,' (p. 328)

Having identified and grouped responsibilities and attributes into'…*four natural categories*,'[135] (p.330), the researchers propose that the CIOs role had already split into two CIO role types i.e., 'Chief Innovation Officer' and ''Director of IT'.

The Director of IT role focuses on '…*invigorating the firm's IT infrastructure to achieve an ROI on the company's IT investments,'* and as such manages '…*the firm's existing legacy IS infrastructure and cost-cutting initiatives,*' being *'…responsible for both the demand and supply side of IS management*,' (pp. 330-331).

Alternatively, the Chief Innovation Officer being tasked with '…*increasing revenue generation and the visioning and implementation of new IS throughout the corporation for business innovation*', works '…*with other C-level executives inside and outside of the firm to change the firm's strategy and processes,'* (pp. 330-331).

However, whilst their investigation suggested the existence of these roles, the researchers warned that various contingency factors would impact on the CIOs roles, as the degree to which '…*a firm's strategy and processes are IT-enabled*', *and '...a firm's IS architecture infrastructure was standardized*', would have '…*a profound influence on the CIO's ability to change and evolve in his/her roles and responsibilities*,' (p.331)

Researchers have also focused on the activities CIOs are expected to perform in a given role. For example, charting the development of IS capabilities in a case study in a (latecomer) US based, global oil and gas producer, (Kohli and Johnson, 2011) investigate the 'orchestration' activities of a CIO focusing on digitization[136].

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135 'Landscape Cultivator' (focused on technical improvement), 'Innovator and Creator' (focused on new revenue generation from innovative IT), 'Triage Nurse and Firefighter' (focused on 'keeping the lights on') and 'Opportunity Seeker' (focused on looking for pockets of opportunity to aid strategy)

136 In this case study, the company sought to reduce operational costs through the use of digital technologies

Suggesting that in the role of orchestrator, digitization activities should encompass both supply-side and demand-side leadership, the researchers make a distinction between the CIOs primary and corporate IS roles as they transfer from 'tool smith' to 'business technologist' roles. As tool smith the CIO is focused on activities that lower IT operational costs whereas in the Business Technologist role, the CIO focuses on orchestrating organizational (wide) resources to meet business goals. Whilst enactment of all the overall digitization activities appeared successful the researchers noted some of the challenges arising from the CIOs approach. As tool smith, the CIO decentralised many of I.T.'s operational capabilities either into the business or through outsourced operations to 3rd parties. Decentralisation risks a growing 'myopia' amongst the IS managers who have the potential to 'go-native' in their various business units, tackling highly localised operational issues having lost sight of cross business requirements; this not only risks ad hoc development of duplicated IT infrastructures (or 'shadow infrastructures'), but results in poor innovation as each business unit makes the case for localised investment based on the size of their business unit. Concluding that CIOs can address an 'expectation gap' (between IS and the business), the researchers propose that CIOs should (i) focus on fundamentals of efficient IT operations, (ii) demonstrate their knowledge of the business (and its needs), and (iii) influence business leaders who are 'IT-savvy,' (p.156).

Designing an experiment from an IS manager activity competency model[137], role theory and empowerment theory, (Chen and Wu, 2011) investigate the relationship between a CIOs ability to enact one of eight 'salient role types[138] (referred to as CIO performance) and the effectiveness of their IT 'Management Activities'[139]. Analysing data from 152 respondents (representing CIOs and

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137 After (Wu et al., 2004)

138 Derived from (Karlsen et al., 2002) (Willcocks et al., 2006)(L. Willcocks, P. Reynolds, 2007) and (Chun and Mooney, 2009), the researchers propose adopt: Business Visionary, Business Systems Thinker, Value Configurer, Entrepreneur, Infrastructure Builder, Organisational Designer, Relationship Builder, and Informed Buyer as CIO role types

139 Described in terms of effectiveness in IT Competency (abilities in IT Infrastructure, Business Applications and Business-Technology Integrations) and Management Competency (abilities in Business Domain Knowledge, Interpersonal Skills, and Business Management Practice)

members of TMTs across China and Taiwan), the researchers find that the CIOs level of IT competency and Management competency both positively impacted the CIOs IT management activity effectiveness, which in turn positively related to the CIOs performance for each of the given role types. The researchers conclude that CIOs must therefore possess the 'skills' to enable them to '…*make the right decisions about appropriate IT and business investments*,' to '…*match new market opportunities with technology, and support innovation for growth*,' (p.153). However, the researchers offer a note of caution in their findings as their variables only explain 24.6% of the variance in CIO role performance, suggesting that other variables are significantly impacting IT management capabilities of the CIO.

(Ding et al., 2014) continued investigations into the CIO strategist role by proposing that the role may comprise of two 'dimensions', i.e., the IS Strategist role[140] and the Business Strategist role[141]. Adopting these definitions, the researchers develop activities[142] for each role type and analyse data surveyed from 110 matched pairs of CIOs and business executives in Chinese firms to investigate the mediating effects of the level of IS Quality[143] and the presence of an IS Vision on the CIOs ability to enact these roles when attempting to impact organizational benefits[144]. For the IS Strategist role, the researchers found that: (i) the level of IS Quality did mediate the relationship between CIOs performing IS strategic leadership roles to positively impact organizational benefits. For the combined IS strategist/ Business strategist role (i.e., the CIO Strategist role), the

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140 Where the IS strategist role leadership '…*considers the CIO to be responsible for developing and implementing technology centric IS strategies via the innovative usage of new emerging technology, data, information, and outsourcing services aimed at improving organizational benefit*,' (p.867)

141 Where the CIO is '…*responsible for developing and implementing business centric IS strategies through the CIO's involvement in the business aspects of the organization that aim at improving organizational benefit*,' (p.867)

142 Activities for the CIO as an IS strategist comprise of the CIOs participation in organizational strategic planning, creating the IS vision and formulating/ implementing the IS strategy (in line with organizational strategy). Activities associated with the CIO as Business strategist include CIO participation in strategic planning of the business units, developing IS-enabled business goals, guiding IS-enabled business process reconstruction and business goals and standardising measures of IS 'value'

143 Using 20 items, grouped into '…*three dimensions, including system quality, information quality, and service quality,' (p.871),* after (DeLone and McLean, 2003)

144 Using 11 items, grouped into '…*two dimensions: managerial/controlling effectiveness and strategic benefits*,' (p.871), after (DeLone and McLean, 2003)

researchers found that whilst the presence of an IS Vision also mediated the effectiveness of the CIOs role on IS Quality, the presence of an IS Vision did not mediate the effects of the role on organisational benefits.

The researchers suggest that whilst CIOs should effectively perform both strategic roles to generate organizational benefits, they also have the option to take one of three 'paths' to achieving organizational benefits. CIOs can lead the development of higher level of IS quality; alternatively, they can adopt a more business focused IS strategic leadership role by becoming more '…*involved in organizational strategic planning and decision-making processes*,' (p.876) to impact organizational benefits directly. They also have a third option where (remaining in the IS Strategic Leadership Role) they can ensure close collaboration with the TMT to develop the IS Vision. In all cases the researchers conclude that, '…*organizations must cultivate the strategic roles of the CIO to derive value from IS*,' (p.876).

Interviewing twelve CIOs, (La Paz, 2017) investigates the activities CIOs perform as they transcend roles (from Technologist, to Enabler, to Innovator and Strategist)[145]. Focusing on the strategist role, La Paz suggests (pp. 52-53) that strategist CIOs should:

1. Acquire soft skills – to communicate and negotiate with various stakeholders by building consensus, persuasion, leading projects, publicising success (using business language and empathising with users.
2. Influence Key People – by being constructive and collaborative (and not critical)
3. Align resources – recognising and responding to demands for operational continuity and strategy formulation and adapting the team's structure (and agenda) accordingly
4. Plan resource usage and actions – planning budgets and operations, CIOs must understand budget consecution, execution, and reporting in order to anticipate and respond to business needs

[145] Developed from (Chun and Mooney, 2009)

5. Organize their agendas – around ‘high-value activities’ such as managing contracts, supervising alignment of IT infrastructure with business requirements, IT portfolio management and technological vigilance
6. Lead and strengthen their teams – more than just monitoring and incentivising, CIOS should build and maintain autonomous teams, with a customer and end user centric culture of service

La Paz concludes that to become a strategist CIO, CIOs should acquire and develop ‘…*skills that must be applied to many dimensions simultaneously*,’ (p.54); however successful role attainment is dependent on the business regarding IT as a strategic asset.

Whilst the list of CIO salient roles appears long, investigations have, in general, made progress in encapsulating:

1. The shift in focus for expectations of the CIO transgressing managerial and leadership roles
2. The potential relevance of the CIOs environment in relation to role expectation; and
3. An improved understanding about some of the expectations for a CIOs competencies

2.3.1.4 Role Effectiveness

In making a judgement about how well CIOs are able to enact their roles (to meet various expectations for performance and alignment), researchers have referred to a CIOs effectiveness. However, in IS leadership literature, variation in descriptions of CIO effectiveness have depended on evolving definitions for the CIOs role i.e., as the role has evolved from its initial focus on operational and managerial activities within IT, towards one that focuses more and more on business impact and (eventually) strategic competitive advantage, the variety in role definitions has expanded. CIO roles have not only been referred to in terms of CIOs as managers or leaders, but also using more salient terms, such as ‘types’ (e.g., such ‘strategist,’ ‘operational,’ ‘technical,’ ‘architect,’ ‘integrator,’ etc.).

Researchers have sought to identify combinations of circumstance and role type to then clarify the relevance of certain attributes antecedent (or logical predecessors) to role expectations and hence perceptions of role effectiveness.

For example, having investigated CIO competencies[146] that may enable a CIO to be *effective* at managing six IS sub-functions[147], researchers found that absence of any one of these competences corresponds to low performance for IS sub-functions and (hence) company performance[148]. Concluding that organizations requiring effective management of the IS function (and hence improved firm performance) should maintain CIOs with a '…*heterogeneous set of competencies*,' comprising both technical abilities and managerial competencies. (Tagliavini et al., 2003) (p.1892).

As an alternative to effective management of IT sub-functions, researchers attempted investigations the effectiveness of CIOs managing alternative descriptions for IT performance. For example, combining CIO role types from previous studies[149] (Wu et al., 2008) surveyed 97 CIO/ TMT member matched pairs to test consensus on the effects of business technology management (BTM) capabilities[150] and CIO role effectiveness on the level of successful IT Assimilation (i.e., the effective application of IT in supporting, shaping, and enabling firms' business strategies and value-chain activities). The researchers found that a CIOs skills and knowledge (grouped into two categories, i.e., competency in business technology and business management) were important in '*…nurturing higher levels of CIO effectiveness,*' and that CIO effectiveness

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146 Three competency sets, categorised as 'know how to be', 'know what', and 'know how'

147 Whilst 'effective management is not clearly defined, the researchers refer to the sub-functions: Human Resource Management, Strategy Management, Information Systems Management, Relationship Management, IS Management and 'Other' activities

148 Company performance comprising of twelve (previously applied) measures including Rate of sales growth, Market-share, Operational results, Return on Sales (ROS), Cash flow of the operative management, Return on Investments (ROI), Development of new products, Development of new markets, Research & Development, Program of cost reduction, Personnel development, Public/political relationships

149 (Feeny and Willcocks, 1998), (Grover et al., 1993) , (Ross and Feeny, 2000) , (Smaltz et al., 2006a) and (Willcocks et al., 2006)

150 BTM is '…achieved by applying well-defined processes, appropriate organizational structures, information, and supporting technologies in one or more functional areas.' (p.3)

was'*…critical in encouraging the IT assimilation and BTM capability.*' (p.11). As such the researchers conclude that '…with *higher levels of business technology and business management competencies, CIOs also have higher effectiveness in acting multiple salient roles to facilitate firms' success use of IT*.' (p.12)

As the CIOs role evolved, researchers began to consider additional aspects of effectiveness from stakeholders outside of the IT function; acknowledging this, researchers therefore started to focus on how CIOs would now need to embrace an increasing variety in role perceptions from business partners and managers.

For example, suggesting that CIOs are required to meet the dual objectives of '…*increased control and increased responsiveness*,' with increasingly '…*dispersed IS managers and functions*,' (p.400) (Brown, 1993) proposed a conceptual CIO leadership effectiveness model that referred to CIO effectiveness in terms of partnership relations (having suggested that a CIO needs to influence widely and successfully if they are to be deemed effective). The author argues that CIO leadership effectiveness therefore represents a measure of the level of commitment secured and maintained with line-managers across IT and business functions in achieving certain (undefined) functional criteria. In meeting such criteria, Brown suggests that CIO leadership effectiveness is moderated by 'intervening variables' (including CIO subordinate effort and CIO role clarity), personal power, situational variables (e.g., role requirements and IS organizational design) and the 'traits and skills' that shape the CIOs leadership behaviours. Claiming that no prior research into the CIO partnership role had been found, Brown suggests that more work is needed to integrate organizational and individual perspectives.

With a similar focus on the need to develop '*effective relationships with line management,*' (p.11), an alternative perspective on CIO role effectiveness is presented in another conceptual model in 1996. To address various imperatives for IT, (Rockart et al., 1996) refer to five attributes[151] of effective CIOs. However,

[151] Being: (i) an increase in the level of business knowledge, (ii) the development of IS/ Business Executive relationships, (iii) a focus on business imperatives, (iv) a concentrated effort on IS development, and (v) developing a strong IT performance track record

whilst these attributes include an early indication of some of personal attributes of the CIO (i.e., to have business knowledge), they largely focus on what CIOs need to do (i.e., concentrate on IS development) rather than identifying those attributes that inform CIOs on how to fulfil role expectations. Perhaps in acknowledgment of this, the researchers refer to a move (in IT organizations) towards developing more effective relationships by including components of interpersonal skills (such as active listening, negotiation skills and team building) into their IT education programmes (p.13).

A more recent study examining the relevance of effective relationships to the development of an innovative IS strategy[152] suggests that, irrespective of the CIOs structural position in the organization, innovative strategies can be achieved when the CIO is effective at 'issue selling'[153] to the TMT (Chen et al., 2017). The CIOs decision making authority, the trust they have developed in the TMT, their level of strategic IT knowledge and their 'political savvy' are all claimed to be antecedent to the effectiveness of CIO issue selling.

One of the first major empirical studies into the relationship between CIO attributes antecedent to CIOs being effective in managerial roles was conducted by (Smaltz et al., 2006a)[154]. Surveying CIOs and their TMTs across North American Healthcare companies, the researchers investigated six attributes (grouped in terms of Capabilities[155] and TMT engagements) antecedent to the effectiveness of CIOs in the ten managerial roles defined by (Mintzberg, 1973)[156]. Defining effectiveness as the '…*assessed performance of the CIO in the context of specific roles, behaviors, and responsibilities that are regarded as salient in firms*,' (p.209), TMT members were asked to rate their CIOs performance (using

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152 Where an organization continuously seeks to be innovative through new IS initiatives

153 Defined as the '…extent to which the CIO has been successful in selling issues in the organization,' (p.5), to shape an innovative IS strategy.

154 Note, whilst previous studies, such as those by (Wu et al., 2004) and (Wu et al., 2007) had investigated relationships between attributes and CIO effectiveness in performing managerial *activities*, these studies had not made a direct link between attributes and perceptions of stakeholder role effectiveness

155 Listed as Communications Skills, being Politically Savvy, their level of IT knowledge and Business Knowledge

156 The CIOs effectiveness at enacting Mintzbergs managerial roles is examined in more detail in section 2.3.1.3.1.1

a Likert scale ranging from 'not meeting expectations' through to 'outstanding') against each of the ten roles. The researchers concluded that CIOs were perceived most effective as business strategists, relationship architects and integrators. However, to be effective in these roles, CIOs needed to be formal members of the TMT and had developed trusting relationships with them.

Building on Smaltz's 2006 work, (Chen and Wu, 2011) assessed the relationship between managerial competency (e.g., interpersonal skills), information technology competency (e.g., business technology integration) and IT management activity effectiveness in respect of CIO role performance. Drawing on descriptors for IT managerial activities from (Karlsen et al., 2002), (Willcocks et al., 2006), (L. Willcocks, P. Reynolds, 2007) and (Chun and Mooney, 2009), the researchers analyse data surveyed from 152 CIO/ TMT matched pairs. Having drawn a distinction between CIO IT managerial activity effectiveness and perceptions of CIO performance (where performance was operationalised as the CIOs ability to perform one of eight roles[157] 'salient' to today's business environment[158], (p.149)), the researchers found that all their constructs for IT management activity effectiveness (i.e., competency in management and in information technology) were positively associated with perceptions of CIO role 'performance'.

As an alternative to examining perceptions of CIO effectiveness in fulfilling a managerial (or operational) role, researchers have also examined perceived effectiveness of the CIO acting in more 'strategic' roles[159] .

For example, CIO role effectiveness has been investigated from the perspective of how the CIOs role relates to IT and the (subsequent) impact of this on the

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157 Business Visionary, Business System Thinker, Value Configurer, Entrepreneur, Infrastructure Builder, Organisational Builder, Relationship Builder, and Informed Buyer

158 Adopting Role Performance Theory, the researchers explain that the '…*more salient the role identity, the more meaning, purpose, and behavioural guidance the individual derives from its enactment. It is not the existence of roles, but their saliency that affects behavior*,' (p.148)

159 For many studies, the term strategy implies CIO attainment of more influential roles over business activities

innovative usage of information systems (Li et al., 2012)[160]. Advocating the view that the '…*only way for an organisation to develop a competitive advantage via innovative usage of IS is through the development of CIO effectiveness*,' (p.4)[161] the researchers investigate the relevance of five CIO role types under two categorises of effectiveness[162] i.e., 'Strategic Role Effectiveness[163]' (enacting the role of IS strategist or information strategist) or 'Operational Role Effectiveness[164]' (acting as an IT manager, an integrator, or someone with IS contract oversight). Analysing data from 129 matched pairs of CIOs and business executives in Chinese companies, the researchers found significant correlation between high measures of IT innovative usage in firms with CIOs who are effective in the strategic role (and low levels where CIOs are more effective in an operational role). Whilst the researchers concluded that the CIO is (therefore) likely to be much more influential to innovative usage of IT than the CEO or any other senior business executive, the researchers acknowledge that the relationship between their variables (strategic role effectiveness, operational role effectiveness, organizational innovative usage of IS, and strategic IS vision) may have potentially unfolded '…*through mutual causation links,*' (p.11).

CIOs attempting to enact managerial, leadership and/or any one of several salient roles clearly face challenging times. This has already been commented on by researchers, who note that this expansion in the CIOs repertoire of roles has resulted in an ongoing '…*confusion about what the CIO is expected to achieve*,' (p.31) (Peppard et al., 2011).

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160 Who had previously defined Innovative usage in terms of levels of IT Outsourcing, IT Budget relative to revenue, IT managers age, etc. (Li et al., 2006)

161 cf. (Broadbent and Kitzis, 2005)

162 Adapting variables for "strategic role effectiveness" and "operational role effectiveness" from (McLean and Smits, 2003) and (Smaltz et al., 2006a)

163 Defined as '…*the top business executives' assessments of the extent to which the CIO leads the entire firm in exploring IT-enabled innovations and new strategic opportunities*.' (p.3)

164 Defined as the '…*extent to which the CIO leads the IT function to exploit existing IT resources to meet ongoing known business needs,*'(p.3)

Research attempting to address these questions is discussed in the next section of this review, CIO competency and attributes[165].

2.3.2 CIO Competency & Attributes

Researchers suggest that there are two (sometimes conflicting) perspectives on an individual's competence; competence as an 'output' and competence as an 'input'. (Hoffmann, 1999)[166] suggested that competence as an output (or a measure of learning) is derived from the 'English' perspective, based on the research by (Boam and Sparrow, 1992)). This view is supported by the work of (Klink and Boon, 2002) who claim that in the UK, competency is perceived as '*...the generally accepted standards within a profession', (p.143)*'[167].

According to Hoffman, the alternative view on competency, considered as the '…predominantly American…' perspective[168] could be viewed as 'input based,' (p.284). Hoffman suggests that the input-based perspectives had been developed to help construct training programmes, or 'instructions' to '…*define the input needed to demonstrate competent performance*,' (p.284), similarly described as:

> *'…an underlying characteristic of an individual which is causally related to effective or superior performance in a job' (Boyatzis, 1982) (p.21)*

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165 The author views antecedents representing any factor impacting effectiveness i.e., organizational, environmental, etc. whereas attributes are intended to represent human factors specific to the individual CIO

166 Competency can be either be: (i) An 'observable performance' (Boam and Sparrow, 1992) and (Bowden and Masters, 1993) (an alternative to this is the ability of a person to '…*perform activities within an occupation to a prescribed standard,*' (Fletcher, 1991), or (ii) The standard or quality of the outcome of the persons performance (Rutherford, 1995) and (Hager et al., 1994), or (iii) The underlying attributes of an individual (Boyatzis, 1982) and (Sternberg and Kolliigian Jr, 1990).

167 Cf. (Fletcher, 1992). The researchers also refer to the UKs National Council for Vocational Qualifications in Great Britain as an example of this

168 Cf. (Boyatzis, 1982)

Klink and Boon agree, also suggesting that the input-based perspective can be considered in terms of the characteristics of an individual employee that are '…*held responsible for their performance*,' (p.413)[169].

Researchers tending towards the output-based approached (also referred to in terms of a 'behaviouralist view' (Strebler et al., 1997)), have aimed to observe (and record) a CIOs performance in delivering the tasks and activities required of them. Conversely, researchers considering the input-based perspective have focused on (what Strebler refers to as) attributes.

In all cases, CIO researchers assume that output-based competency (i.e., manifesting as outcomes described in terms of performance, alignment, and enactment) are partly determined by the CIOs environment and that the CIOs input-based competencies can be described in terms of:

> *'…the skills, knowledge, experience, attributes and behaviours that an individual needs to perform a job effectively,' (Strebler et al., 1997)(p.2)*

Noting an increase in job insecurity, Klink and Boon go on to suggest that, in taking more responsibility for their careers, individuals should therefore develop a '…*clear insight into their competencies, and into the possibilities of maintaining or improving their professional competencies*,' (p.411).

Despite such calls, (Le Deist and Winterton, 2005) claim there is still a great deal of confusion about the term competency due to a '…*conflation of distinct concepts and inconsistent usage as much as differences in systems, structures and cultures*', and as such, the '…*few attempts to establish coherent terminology… have had little impact*.' Acknowledging that the term is a 'fuzzy concept', the researcher's still claim that competency remains a '…*useful term, bridging the gap between education and job requirements*,' (pp. 28-29)[170].

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169 Citing the work of (McClelland, 1973) , (Spencer and Spencer, 1993) and (Mcclelland, 1998), Klink explains that the UK approach is predominantly 'functional' whereas the US approach is predominantly behavioural

170 Cf. (Boon and van der Klink, 2002)

Many of the competency models developed for assessing the relevance of an individual's characteristics to their expected performance have been derived from the work of (Bloom et al., 1956), which is described as the '…*first and most influential study of Knowledge, Skills and Competencies (KSCs)*,' (p.18) (Winterton et al., 2005). Blooms taxonomy, developed to assess learning outcomes following training, is based on three domains of educational activities: (i) the cognitive domain (mental skills such as knowledge acquisition), (ii) the skills domain (a psychomotor domain concerned with manual or physical skills) and (iii) an affective domain (charting a growth in feelings). Growing in popularity because of a 'renaissance' in the development of competency assessment models throughout the 1990s[171], the conception of competency has now broadened to include '…*knowledge and skills alongside the behavioural or psycho-social characteristics in the McClelland tradition*,' (p.20)[172].

Similarly, a comparison between 'traditional' job analysis, (comprising of dimensions for Knowledge, Skills, Abilities and 'other characteristics' (or KSAOs) with competency modelling in 2009 revealed that '…*a critical determinant of strategic leadership is not how brilliant the strategy is, but how much employees understand and share organizational norms concerning strategically-aligned behavior*,' (p.54) (Sanchez and Levine, 2009).

Whilst research into the emerging trend for a behaviouralist view of competency assessment is '…*much in evidence*' in the US, this '…*broader conception*', one that includes '…*job-related functional skills and underpinning knowledge*,' (p.20) (Winterton et al., 2005) and which enables employees to '…*understand the type of on-brand behavior expected from them*,' (p.61) (Sanchez and Levine, 2009), is still very much in its infancy.

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171 The researchers note that the typology KSC, has been highly influential in the training world, where trainers refer to them as KSAs (or Knowledge, Skills and Attitudes) (p.18), attributing the acronym to (Sandberg, 2000)

172 Referring to his 1973 study, in 1998 McClelland had claimed that '*Coding competencies from behavioral-event interviews according to the principles of a new approach to assessment …produces assessments that are reliable and validly associated with success as an executive*,' (p.331) (Mcclelland, 1998)

Although organizations are becoming increasingly reliant on IT to maintain competitive advantage, experiencing '…*an evolving set of KSA requirements and role enlargements*,' (p.3) (Mclean and Smits, 2014) for the CIO, behavioural based role competency assessment has, as far as the author is aware yet to be applied to the CIO.

Further, research examining antecedents of expected outcomes for the CIO have not been restricted to a CIOs Knowledge and/ or Skills; CIO studies on effectiveness involve various other factors which the author, after Strebler, terms as CIO attributes. For the purpose of this research, the author categorises CIO attributes as:

- Demographics: i.e., the CIOs age, experience, education, etc., sometimes referred to as human capital
- Social Capital: i.e., their Structural Power, Cognitive Capital, and Relational Capital
- Competence: combinations of 'other' attributes that CIOs are expected to have to do their job effectively[173]
- Knowledge: what CIOs are expected to know; and
- Skills: whilst there are various perceptions of CIO skills, the author considers these as the attributes needed to apply knowledge

The following sections discuss the key findings of each of these attributes and how they are claimed to relate to CIO expectations for effectiveness.

2.3.2.1 Demographics

CIO researchers have developed and applied two 'lenses' for describing the first group of attributes; these are demographic characteristics' (age, education, and tenure) and social capital.

[173] As the following sections will reveal, the term competency is used inconsistently by many CIO researchers

Research investigating the relevance of CIO demographic characteristics[174] to expectations has largely focused on a combination CIO length of tenure and education as proxies for a CIOs level of overall experience.

In 1992, to understand the relevance of the length of a CIOs tenure on expectations for strategic business-IT alignment, (Applegate and Elam, 1992) compared the views of sixty-four IS executives with less than five years' experience with those of seventeen established executives with more than five years' experience. As the IS executives attempted to build networks, and apply the power accorded them (by virtue of their position), Applegate found that executives with longer tenure, the more established executives, had little experience outside of their own IS departments, whereas those with shorter tenures tended to report into the CEO and influence more widely to develop the relationship between business-IT strategies. Reflecting on the findings, Applegate concluded that increasing demands on IT, a consequence of globalisation, meant that IS executives would need to ensure that they operate more outside of their own IS departments.

According to (Gorgeon, 2010), CIOs who remain in post for a long period of time undergo three phases of tenure. Analysing data from interviews with ten CIOs in US based universities, Gorgeon finds, throughout their tenures, a CIOs: (i) commitment to their paradigm remains high, (ii) task knowledge rapidly increases and remains high, (iii) information diversity remains high for most of the time (diminishing toward the end of their tenure), (iv) task interest wanes and, (v) power and influence rise steadily. Mapping these results onto three stages of a 'change agentry model' (comprising three behaviours, 'advocate,' 'facilitator' and 'traditionalist') [175], Gorgeon claims that CIOs undergo three phases of tenure ('conquest', 'exploration', and 'settlement')[176]. In 'conquest', CIOs adopt a traditionalist approach when tackling low-risk and highly visible projects (that may have been initiated before their time); however, this opportunistic approach, has

[174] Sometimes also referred to as 'demography' (Cohen and Dennis, 2010)
[175] Cf. (Hambrick and Fukutomi, 1991)
[176] Cf. (Markus and Benjamin, 1996)

a relatively short shelf-life and CIOs are expected to progress quickly to the 'exploration' stage. Having developed legitimacy and gained credibility, and acquired enough power and influence, CIOs listen to (and educate) their stakeholders to sell their vision for change. This phase also has a shelf-life and CIOs expected to avoid complacency, will progress to 'settlement'. Ensuring that whilst their organizations remain abreast of latest technologies, CIOs don't over-play their advocate role and rock the boat too much, as they progress towards the end of their tenure.

Alternatively, (Chen et al., 2015) show that tenure may not relate to role effectiveness. Analysing data from 56 US CIOs and 109 US CIOs, Chen finds no significance between CIO tenure[177] , levels of business innovation and (hence) Customer Value

Whilst tenure is likely to influence expectations for the CIO, especially if it is equated to experience, a CIOs education is also likely to relate to stakeholder expectation.

According to (Gottschalk, 1999), Education '*…seems to be a less important factor because of the amount of time that has passed since obtaining the degree*,' (p.394)[178]. However, this may depend on the subject. If '*Graduate and executive programs*,' can be '…*designed to prepare future IS managers and leaders*,' and '…*provide a broad business and IT perspective throughout the curriculum*,' (p.488) (Applegate and Elam, 1992), then stakeholders may perceive the CIOs education as being more relevant to their expectations. But, if degree programmes are perceived to have past their 'sell by date', then CIOs will need to depend on their knowledge of business and IT must become committed to life-

[177] Out of the six control variables (which didn't include age or education), the only significant factor with business innovation was the level of TMT understanding of '*IT impact on products, processes and competitive action for innovative business orientation*,' (p.17)

[178] This sentiment is also somewhat supported in the work of (Cohen and Dennis, 2010) who find a significant relationship between CIO experience and perceptions of IT's contribution to the business; conversely the researchers did not find any significance between CIO age or level of education on perceptions of IT's contribution to the business

long learning (Feeny et al., 1992). As such, (Harris, 2011) suggests that CIOs should combine their educational qualifications with their career experiences[179].

However, this requires '*creative organizations*,' (p.61), to be proactive in the continuous development of their CIOs. However, whilst researchers expect that CIOs to combine technical and business acumen (gained through experience and/ or education), and (in the case of evolving technologies), that organizations should continuously develop this acumen, critics cite broader issues regarding the CIOs profession, claiming that there is no '…*coherent academia behind the CIO profession*,' (p.37) (Hogberg and Sjoman, 2018).

A CIOs level of education does seem to be important though; (Li et al., 2006) claim that, whilst the CIOs age and tenure are not significantly related to innovative usage of IT, their level of education level is '…*significantly positively associated*,' with innovative usage of IT (p.184). And, education may factor into CIO motivation; for example, (Liu et al., 2018) find that CIOs with higher levels of education (particularly those with business orientated degrees), and with longer tenures tend to receive higher levels of compensation post IFRS adoption; as when CIOs have '*…a deep under- standing of knowledge from the business discipline,*' they are then able to *'…leverage IT more effectively when processing complex business activities*,' (Liu et al., 2018) (p.879)

2.3.2.2 Social Capital

The term 'social capital' originally referred to the development of networks of resource relationships needed to create and sustain city neighbourhoods (Jacobs, 1965) has been to developed to describe creation of intellectual capital, for organizational settings.

(Nahapiet and Ghoshal, 1998) argue that if social capital is concerned about the '…*resources located within structures and processes of social exchange*,' then organizations '…*as institutional settings are conducive to the development of high levels of social capital relative to markets,*' (pp. 256-257).

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[179] Having analysed sixty CIO profiles in InformationWeek (2008-2011)

Proposing that three dimensions of social capital, (structural, cognitive, and relational capital) are prerequisite to the exchange of intellectual capital between resources in organizations, the researchers claim that new intellectual capital is created through a process of combination and exchange.

Applying this context to the CIO, the author proposes that:

- Structural Power: i.e., describes how CIOs can use their hierarchical position in the organisational structure to exert their authority, or to influence
- Cognitive Capital: i.e., how CIOs use of shared language and experiences to develop 'systems of meaning' with their colleagues; and
- Relational Capital: i.e., the 'assets' that CIOs develop when creating relationships (e.g., trust)

2.3.2.2.1 Structural Power

If structural power explains '…*the overall pattern of connections between actors—that is, who you reach and how you reach them*,' (p.244) , (Nahapiet and Ghoshal, 1998)[180], then for CIOs, structural power[181] can be described in terms of situational variables such as reporting line and/ or 'rank' and 'status' in relation to the CEO and/ or their peers in the TMT.

As the executive in charge of IT (Shao et al., 2016)[182], claim that '…*the structural power of the CIO is especially essential for him/her to contribute his/her skills and abilities to the organization*,' failure to do so means that the CIO will remain a '*… peripheral player*,' (p.46); as such, structural power is indicted by a CIOs 'rank'[183]. However, rank is sometimes confused with status[184]. Claiming that the CIOs role

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180 Referring to (Burt, 1992)

181 Acknowledging various forms of power in TMTs, structural power is 'based on formal organizational structure and hierarchical authority,' e.g., '*Managers who have a legislative right to exert influence are influential*,' (pp. 508-509) (Finkelstein, 1992)

182 Citing, amongst others, (Chun and Mooney, 2009)

183 Who summarise Power as the '…*the capacity of a leader to exert his/her will*', that enables top managers to '…*gain the authority, to make strategic decisions for the organization and to manage uncertainty by monitoring and controlling the behaviors of their subordinates*', (p.45). cf. (Finkelstein, 1992) and (Yukl, 1989)

184 A confusion endemic in the CIO job advert investigation detailed in section 4

varies considerably when 'rank' and 'status'[185] are combined, (Karimi et al., 1996) suggest that IT leaders who '*aspire*' to increase their rank but haven't yet attained or consolidated their '...*knowledge, skills and experiences in business operations, strategy and management*,' (p.81) i.e. their status (p. 81) should '...*immediately embark on personal career development programmes to acquire these insights,'* (p.83).

The CIOs structural power also refers to the CIOs proximity to their peers in the TMT and the CEO, this is also referred to a hierarchical positioning or reporting structure. (Banker et al., 2011) show that CIO-CFO reporting structure is influenced by the firm's strategy (i.e., as a differentiator or cost leader) and when CIO positioning and strategy align, firms expect enhanced performance (abnormal stock returns and future cash flows); and that this is '…*independent of whether IT plays a key strategic role in the firm,'* (p.1).

Similarly, firms who have a CIO in their TMT, should expect to improve the realisation of IT plans, which leads to increased revenues (Gottschalk, 1999), they should expect an increase in financial performance (Ranganathan and Jha, 2008) and firms will 'impress' investors by demonstrating that they are well placed to effectively coordinate IT resources when responding to organizational demands for increased integration (Larson and Adams, 2014).

When CIOs reside in the TMT, organizations should also expect to see an improvement in business performance, as the level of IT assimilation increases (Armstrong and Sambamurthy, 1999) or as ERP assimilation improves (Shao et al., 2016), or as IS's contribution to innovation improves (Song et al., 2010) and, when the CIO reports directly into the CEO, IT-enabled business innovation increases as CIOs have more direct interactions with the firms customers (Saldanha and Krirshnan, 2011a).

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[185] Status is defined in terms of 'hiring status' i.e., whether the CIO is an internal or external hire (p.72) and that external hires tended to hold a higher level of rank, after (Applegate and Elam, 1992)

CIO hierarchical positioning also improves strategic-IT alignment, especially when CIOs can use 'knowledge systems'[186] to develop a shared mental model about the role of IT with their colleagues in the TMT (Reinhard and Bigueti, 2013) and have the opportunity to educate the TMT, to improve their level of IT knowledge and improve firm performance (Hu et al., 2014).

CIOs in the TMT are also expected to improve firm performance as they *'…obtain a comprehensive understanding of the goals and strategies of the organization*,' (p.613), enabling them to understand the strategic domains and hence increase their 'decision making latitude' to build relationships with other strategic decisions makers (Preston et al., 2008).

However, the effects of having a CIO in the TMT shouldn't be taken for granted. (Chen et al., 2010b) warns that firms with a CIO in the TMT shouldn't automatically expect efficiency improvements or improved growth, as it's the CIOs human capital[187], and not their structural power that is most relevant for garnering support as they enact supply-side leadership roles. Similarly, whilst the CIOs structural power improves strategic business-IT alignment (with CIOs educating their TMT about strategic IT), (Wunderlich, 2018) claim it doesn't relate to the development of the subsequent digital business strategy, which, Wunderlich claims is more heavily influenced by business leaders.

In sum, it seems that the CIOs structural power is perceived to be relevant to the expectations stakeholders have for their position, in most (but not all) circumstances. However, whilst CIO membership in the TMT seems unquestionable, CIOs should remember that, in some circumstances, combinations of technical credibility, decisional and interpersonal traits can often override positional power (Carter et al., 2011).

2.3.2.2.2 Cognitive Capital

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[186] Defined as formal interactions permitted by organisational structure (i.e., a structural knowledge system) and CIO proximity to TMT (i.e., a physical knowledge system) and informal interactions between the CIO and the TMT (i.e., social knowledge systems)

[187] Operationalised in terms of organizational tenure, educational level, and IT experience

According to (Nahapiet and Ghoshal, 1998), the cognitive dimension of social capital represents '…*shared representations, interpretations, and systems of meaning among parties*,'[188] (p.244).

In developing systems of meaning with their stakeholders, CIO researchers claim that CIOs are expected to share their experiences and knowledge to develop more effective relationships with their colleagues.

CIOs are expected to share their experiences as an IS function analyst with their CEOs in order to add 'value' (Earl and Feeny, 1994), alternatively they can share their 'technical experiences' of ICT with members of the TMT in order to influence them to provide support implementing IT systems (Enns et al., 2003a).

Similarly, CIOs expected to operate their IS subfunctions effectively to improve firm performance are expected to either share their theoretical knowledge or their technical expertise of traditional technologies with their subordinates (Tagliavini et al., 2003), and organisations which have CIOs with longer tenures and greater technical experience are expected to maintain materially 'stronger' levels of (auditable) IT governance (Li et al., 2007).

Whilst organizations with less mature IS functions, expect their CIOs to demonstrate a strong technical credibility[189] to leverage decisional and interpersonal roles to manage IT resources, firms seeking competitive advantage from IT expect CIOs to use their formal power, to leverage an informational role to absorb and disseminate information (Carter et al., 2011). Alternatively, CIOs are expected to apply their 'professional experiences' (i.e. their experiences in other industries or from other business functions) to enact a variety of roles effectively and to help realise strategically important IT imperatives (Sojer et al., 2006).

CIOs can also develop a shared heterogeneity (based on their demographics, experiences, and functional backgrounds) with their CEOs to improve IT usage

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188 Referring to (Cicourel, 1973)

189 The researchers adopt this term to '…*denote both competence in and an orientation toward technical issues*,' (p.20)

and hence their companies competitive positioning in differing business environments (Bassellier et al., 2008) [190].

However, CIOs with the requisite experience, knowledge and credibility will still need to yield it effectively if they are to establish (and exploit) 'systems of meaning' between themselves and their stakeholders.

CIO researchers have therefore examined the relevance of 'knowledge exchange mechanisms' and 'relational similarities' when attempting to establish a shared understanding[191] between the CIO and (in particular) members of their TMT.

For example, to exploit relational similarities to reach a shared understanding about IT (Preston et al., 2006) claims that knowledge exchange mechanisms for CIOs comprise of systems of knowing[192], CIO educational mechanisms[193] and an appreciation of the '…*similarity of background characteristics (demographic and experiential) between the CIO and TMT*,' (p.193).

CIO knowledge exchange mechanisms can also be considered in terms of 'shared mental models' (SMM), which according to (Reinhard and Bigueti, 2013) should comprise of both a shared language and a shared understanding if CIOs and their CEO are to improve levels of business-IT strategic alignment[194]. Finding that: (i) business-IT strategic alignment is influenced by developing a shared understanding about the role of IT, (ii) shared understanding is influenced by structural knowledge systems and CIO education mechanisms but, (iii) that

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190 Whilst the CEO-CIO relationship appears moderated by heterogeneity in 'demographics', 'functional backgrounds', and 'experience', the researchers note their findings are limited to their sampled organizational contexts

191 Noting that '*Shared understanding is not the same as shared knowledge. In fact, shared understanding is facilitated by the mechanisms of knowledge exchange*,' (p.506) (Reinhard and Bigueti, 2013)

192 Where (citing (Nahapiet and Ghoshal, 1998) CIOs '…must have access to those with whom they wish to exchange and integrate knowledge,' (p.192) and comprising of both structural and social systems

193 Where CIOs should create formal education opportunities for the TMT that provides '…*an additional forum for the transfer of IS specific knowledge to the TMT, and consequently the development of a shared understanding*,' (p.193)

194 The researchers reference (Reich and Benbasat, 2000), who adopt the definition for strategic alignment from (Venkatraman et al., 1993) as four basic strategic domains of choice being, '…*business strategy, information technology strategy; organization infrastructure and processes, and information technology infrastructure and processes*,' (p.139)

organizational proximity and similarity of past experiences did not relate to the development shared language between the CIO and the TMT, Whilst Reinhard concludes that the combination of structural knowledge systems and CIO educating mechanisms were both significant antecedents to their SMM[195], he recommends additional research, that considers '…*the continuously changing of the IT organization and its management*,' (p.518)

Knowledge can also be exchanged through a process of *sense-making* (Tallon, 2014). Suggesting that sense-making is more about plausibility than accuracy, the researchers refer to sense-making as '…*the reciprocal interaction of information seeking, meaning, ascription, and action*' (p.240) (Thomas et al., 1993) and as a process, consisting of seven properties[196] (Weick, 1995). The sense-giving process in organizations comprises of actors who '…*routinely filter out sense-givers who lack legitimacy, expertise, resources, or social standing within the organization. In the context of perceptions of IT, undue pressure from CIOs to support a certain view of IT impacts can backfire causing business executives to become more critical and demanding of IT*,' (p.311). Supporting the view that '…*the true role of CIO leadership is one of educating, informing, and sensegiving with the ultimate aim of establishing a shared set of perspectives for what IT can achieve*,' (p.55) (Keen, 1991), the researchers survey 133 executives across 13 fortune 500 firms. Examining executive perceptions of IT business value, the researchers investigate the relevance of contingencies to sense-making i.e., 'predictors' (i.e., CIO leadership, IT promotion, IS function engagement and IS business communications) and 'controls' (IS function effectiveness, supplier relations, customer relations, production, and operations, etc.). Acknowledging the need for IT to communicate with business partners and engage with users to address IT issues and to educate them about IT usage[197], the researchers find that CIO leadership is '…*especially important*,' in the

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195 Similar to findings from (Armstrong and Sambamurthy, 1999), who suggest that '…*formal organizational structures provide greater leverage than informal interactions in promoting TMT strategic IS knowledge and a shared understanding*,' (p.171)

196 Identity, social, ongoing, cues, plausible, sensible, and retrospective

197 i.e., contingency factors

'…*search for greater consensus around IT impacts*,' (p.319). Concluding that IS effectiveness has no '…*discernible effect on consensus*,' (about the value of IT), CIOs would need to '…*reach out to their constituents (or customers) to educate them as to the value of IT*,' (pp. 320-321)

Knowledge exchange mechanisms have also been defined in terms of the development of shared beliefs. For example, (Lee et al., 2014) claim that if CIOs and their TMTs develop a shared believe about IT innovation, TMT participation increases, providing CIOs with more opportunities to better explain how additional value will be created if IT innovations are more aligned to organisational strategy, (p.7)[198].

Whilst these studies are based on the CIOs formal membership of the TMT, opportunities for the CIOs to apply their cognitive capital could run into obstacles. For example, in her dissertation examining CIO stereotyping and the impact of peer group bias towards the CIO, it's worth noting that (Gonzalez, 2014) found that '...*functional background bias that can cause inequality perceptions at strategic levels of the organizations; specifically, the perception of CIOs as unequal members of the C-suite can limit their potential contribution to corporate decision-making and strategic involvement*,' (p.101).

2.3.2.2.3 Relational Capital

If relational embeddedness describes '…*the kind of personal relationships people have developed with each other through a history of interactions*,'[199], then relational capital can refer to '…*those assets created and leveraged through relationships*,'[200] (p.244) (Nahapiet and Ghoshal, 1998). Such assets[201] comprise:

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198 The researchers also refer to a previous study(by (Preston and Karahanna, 2009)), and suggest that having adopted upper echelons theory '…*TMT beliefs and strategic choices reflect the cognitive basis of TMT members*,' and that '…*shared cognition between TMT and CIOs has the propensity to influence TMT belief in MCS innovation*,' (p.7)

199 Referring to (Granovetter, 1992)

200 Referring to (Cicourel, 1973)

201 (Tsai and Ghoshal, 1998) suggest relational capital refers to assets that are '…*rooted in relationships within the social network, such as trust and trustworthiness*,' (p.465), whereas

1. Norms: which exist when '…*the socially defined right to control an action is held not by the actor but by others. Thus, it represents a degree of consensus in the social system*,' (p.255)[202]
2. Identification: a process '…*whereby individuals see themselves as one with another person or group of people*,' (p.256)
3. Obligations and expectations: which are '…a commitment or duty to undertake some activity in the future,' different to norms as obligations can be though to as a 'credit slip' to be redeemed (p.255); and
4. Trust: which '…*lubricates cooperation, and cooperation itself breeds trust. This may lead to the development, over time, of generalized norms of cooperation, which increase yet further the willingness to engage in social exchange*,' (p.255)[203]

CIO researchers have applied all these dimensions to the study of the CIO. Norms represent the expectations that others have for CIOs to enact managerial, leadership and salient roles; these are discussed in more detail in section 2.3.1.3.

Considering the process of creating identities, a study by (Gupta, 1991), of how CEOs and CIOs perceive each other in the context of their organization reveals that CEOs have overblown expectations of the CIO. CEOs expect CIOs will '*…immediately 'take charge' and pull the company out of an existing IT crisis*,' and that the projects the CIO has recommended should '…*reflect positively on the 'bottom line' within a somewhat short period*,' (p.132). CEOs also perceive CIOs as 'empire builders', primarily concerned with acquiring '…*as much IT as possible to control company information and those who need access to this information*,' (p.133). However, as the strategic importance of IT increases, CEOs expect the CIOs role to become more strategic, requiring CIOs to provide '…*top executive vision and effective leadership*,' (p.135). To address these issues and expectations, Gupta suggests that the CIO and the CEO should take to develop an 'ideal partnership' which requires both the '…*technically orientated*

202 After (Coleman, 1990)
203 After (Putnam, 1993)

knowledge, skills and perspectives of the CIO and the broader managerial and operational knowledge, skills, and perspective of the CEO,' (p.138).

Similarity, CIOs, and CEOs, in trying to process each other's identities, are expected to work at developing a mutual understanding of each other's role to maintain business-IT alignment. For example, investigating the relevance of the level CIO-CEO 'mutual understanding'[204] about effective business-IT strategic alignment, (Benlian and Haffke, 2016) find a high level of mutual understanding from both parties (i.e., actual agreement (on business and IT topics) was significantly greater than perceived), in other words 'CEOs' and CIOs' opinions were actually more similar than both perceived them to be,'(p.114) . The researchers also found that the '…*CIO's understanding of the CEO plays a more important role in the CEO–CIO partnership than the CEO's understanding of the CIO*,' and that 'On IT topics, the CEOs were better able to correctly perceive their CIO's opinions, whereas on business topics, the CIOs were better able to predict their CEO's responses' (p.115). Concluding that their sample had revealed a high level of professionalism in the CIO-CEO relationship, the researchers make some 'pragmatic' speculations, that: (i) '*CEOs want to be understood while CIOs need to understand their counterpart*,', (ii) '…business leaders tend to listen to their CIO's judgment of IT-related problems more than to the CIO's opinion on business strategy,' and (iii) CIOs '…pay closer attention to their CEO's business direction than to the CEO's opinion on IT-related questions,' (p.114-115).

Unfortunately, according to (Martinho et al., 2016), the same can't be said as CIOs and CFOs reconcile each other's identities, as their diverging perceptions (about the utilization of intangible IT resources) remains a serious obstacle to '…*achieving competitiveness in the global market*,' (p.1100)

Expectations and obligations created between the CIO and their stakeholders include developing a shared view about the role of IT to, provide enhanced managerial support as CIO-CEO communicate more frequently to converge[205]

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[204] Mutual understanding, or bidirectional understanding addresses the question of '...*who needs to understand whom in the CEO–CIO partnership*,' (p.105)

[205] Defining convergence as the '…*degree of mutual understanding…between an organization's CEO and CIO about the role of IT*,' (p.231), after (Lind and Zmud, 2008)

their understanding about the current and future role of IT[206] (Johnson and Lederer, 2005), or by interacting effectively with the TMT to develop IT as a 'competitive weapon', to increase productivity and improve the prioritisation of IS investments (Preston et al., 2006).

Similarly, CIOs are expected to develop a shared perception of IT's achievements with the TMT, using their communication skills, to develop a shared vision for future (IT) objectives (Mirchandani and Lederer, 2012), to develop a 'transformational vision for IT' by interacting effectively with the TMT (Armstrong and Sambamurthy, 1999)[207] and (Preston and Karahanna, 2009)[208]; or by creating a shared vision with the CEO for IT to act as an agent of change to improve firm performance (Feeny et al., 1992)[209].

CIOs also are also obliged to ensure that their stakeholders develop a consensual view of how well IT is contributing to the firm; the achievement of this may well depend on the CIOs relationship with their CEO. However, one of the few studies to suggest that CIO-CEO interaction had a relatively 'weak' impact on a CIOs organizational position (and hence little direct impact on IT's contribution to the business) was completed by (Cohen and Dennis, 2010).

According to (Nahapiet and Ghoshal, 1998), one of aims in developing relational capital (i.e., by identifying with the group, establishing and following group norms and in meeting obligations and expectations) with a group is to engender a sense

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206 Where IT's current role represents '*…the organization's reliance on IT at the present time*,' and the future role considers how organizations plan to develop IT capabilities (in terms of three factors: managerial support, differentiation, and enhancement, after (Raghunathan et al., 1999))

207 Who find that find that the development of a 'transformational IT vision' impacts the level of IT assimilation if there are effective interactions between the CIO-TMT

208 Who find that if CIOs can develop effective relationships with their TMT, then they can hope to take advantage of various 'visioning mechanisms' to produce a shared vision for IT

209 However, the researchers note that for the CIO to have a successful relationship with the CEO[209], they should have an '*…extensive IT background...are accepted into the top management team and are seen to contribute beyond their functional responsibilities*,' (p.435)

of trust[210]; for CIOs, researchers have therefore continued to focus on the development of trust between CIOs, members of the TMT and their CEOs.

Proposing that the development of trusting relationships, a construct of CIO-TMT 'engagement', may either directly impact perceptions of the effectiveness of the CIOs role or maybe mediated by certain CIO 'capabilities'[211], (Smaltz et al., 2006a) analyse data surveyed from 100 CIO-TMT dyads across North American Healthcare companies.

The researchers define CIO-TMT engagement in terms of: (i) the CIOs hierarchical level i.e., the number of levels between them and the CEO and whether they were members of the TMT, (ii) the extent of their networking activities i.e., '…*the frequency of CIO's formal and informal interactions with the CEO and the other members of the TMT*,' and, (iii) the 'extent' of their trusting relationships[212]

Investigating the relevance of the relationships between CIO-TMT engagements and CIO Capabilities with the level of CIO effectiveness in the ten managerial roles defined by (Mintzberg, 1973)[213], the researchers found that whilst CIO-TMT engagements did not have a significant direct relationship with CIO role effectiveness, CIO-TMT engagements were moderated by capabilities for CIOs to be effective in three of the roles: business strategist, integrator, and relationship architect. Reflecting on their findings, that for CIOs to be effective in these three roles, they needed to be formal members of the TMT and had developed trusting relationships with the TMT in order to improve their capabilities in being effective, the researchers conclude that:

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210 In his model for developing new intellectual capital through application/ development of the three dimensions, the author proposes that 'trust' is needed to: (i) access parties to combine/ exchange intellectual capital, (ii) create a sense of anticipation about the creation of value, and (iii) motivate (group members) to combine and exchange intellectual capital, (p.251)

211 Listed as Communications Skills, being Politically Savvy, their level of IT knowledge and Business Knowledge

212 The researchers operationalised this by asking respondents in the TMT: (i) How much they trusted the CIO to act in the TMT members' best interest, (ii) The level of positive affect toward the CIO, and (iii) The dependability of the CIO in critical situations, after an instrument developed by (McKnight, 1997)

213 The CIOs effectiveness at enacting Mintzbergs managerial roles is examined in more detail in section 2.3.1.3.1.1

'…membership in the TMT is more important than who the CIO reports to. Today, fewer CIOs are reporting to the CEO; our study suggests that such changes in reporting relationships should be of less concern than whether the CIO has a "seat at the table" in the form of TMT membership,' (p.221)

Researchers have also investigated the relevance of trust to the CIO-CFO relationship. For example, higher levels of 'personal congruence' and 'structural engagement', may relate to CIO-CFO relationship effectiveness[214] (and hence individual role effectiveness and/ or strategic alignment[215]).

Defining structural engagement in terms of: (i) hierarchical distance, (ii) TMT membership and (iii) levels of communication, and personal congruence in terms of: (i) shared domain knowledge, (ii) experiential similarity and (iii) soft skills[216], (Denford and Schobel, 2011) analyse date from six interviews with CIOs and CFOs, in three public sector organisations.

The researchers found that whilst high levels of trust and understanding had a 'positive effect' on individual role effectiveness, low levels had the opposite effect. Antecedents to CIO-CFO effective relationships were shown to be: (i) high levels of trust and shared understanding, (ii) good communication (enabled by proximity) and (iii) shared knowledge (particularly about their organizations mission). Conversely, (i) similarity of experiences and (ii) soft skills contributed less to an effective CIO-CFO relationship. Suggesting that as both roles had risen from the 'back-office', the CIO-CFO relationship would likely experience '...*tension between cost-efficiency and strategic enablement*', (p.5079) the researchers conclude that '…*it is not just the hierarchy that is important but the perceptions of the two executives and their mutual understanding and acceptance*,' of their respective roles. Given this, to develop mutual

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214 Defined in terms of trust, influence, and shared understanding

215 Defined as the degree to which IT's mission, objectives and plans supports and/ or are supported by the business mission, objectives, and plans

216 Defined as political savviness and interpersonal skills

understanding, the CIO and the CFO should clarity their roles by discussing '…*expectations of their roles to avoid misperceptions*,' (p.5080)

The body of work on CIO social capital suggests that CIOs ought to be mindful of all three of these dimensions (structural, cognitive, and relational) if they are to be perceived as having been effective in meeting expectations.

One of the few studies that considers all three dimensions together is presented by (Karahanna and Preston, 2013). Suggesting the presence of significant relationships between structural, cognitive, and relational social capital between the CIO and the TMT, the researchers investigate how, in terms of more effective knowledge exchange, these may relate to improvements in 'IS strategic alignment' and (hence) firm performance.

The researchers defined CIO-TMT:

1. Structural capital in terms of the structural position between the CIO and TMT member, and the level of informal interaction
2. Cognitive capital in terms of shared language and 'shared cognition' about the role of IT; and
3. Relational capital in terms of each person's perception of trust (i.e., 'TMT's trust in the CIO and the CIO's trust in the TMT,' (p.27))

and proposed that both CIO structural capital and cognitive capital were antecedent to relational capital.

Analysing data from 81 matched pairs of CIOs and members of the TMT (including CIOs) in US hospitals, the researchers find that CIO-TMT relational capital significantly impacted IS strategic alignment and that whilst cognitive capital impacted relational capital, structural capital did not. Also, the researchers found that structural relational capital influences cognitive social capital, which in turn did influence relational capital.

However, when investigating the direct effect of each of the three dimensions on IS strategic alignment, the researchers found that '…*cognitive social capital has the strongest total effect on IS strategic alignment (and consequently on firm*

performance), structural social capital has the lowest, and relational social capital lies in between,' (p.35)[217].

Suggesting that whilst interactions influence the development of shared cognitions between the CIO and the TMT, the relationship still required trust to develop in order for CIOs to be deemed effective (i.e., in achieving alignment between the IS and business strategies), in other words '…*shared language and shared cognitions about the role of IS in the organization are associated with higher levels of trust between the CIO and the TMT*,' (p.38).

2.3.2.3 Competencies

As an attribute, the literature on CIO competence reveals that researchers have:

1. Adopted a variety of approaches when grouping knowledge and skills into competencies; for example, researchers have combined descriptions of knowledge and skills to describe 'managerial competencies', 'business competencies', 'technical competencies', etc. Researchers have also described competencies in terms of knowledge and skills separately e.g., combinations of 'technical skills', 'soft skills' and 'business knowledge'; and
2. Have also been inconsistent in their use of descriptors for CIO competencies, referring to competencies in terms of activities (e.g., managing change), outputs (e.g., reducing costs), relational capital (e.g., managing supplier relationships), or behaviours (e.g., leadership), etc.

Whilst having adopted different approaches to grouping and defining competencies makes comparison of CIO competency studies somewhat difficult and (in some cases) inconclusive, many CIO competency studies do seem agree that a CIOs competency, as an attribute, is a product of their knowledge and their

[217] These findings support the claims made by (Wunderlich, 2018)

skills[218]. This suggests that these two attributes play an important part in forming perceptions of (or expectations for) a CIOs competency.

In this and the next two sections) the author therefore presents a review of knowledge and skills to identify empirical evidence for their applicability to CIO stakeholder expectations for performance.

CIO competency studies appear to fall into three broad categories: (i) straight forward 'rankings', where CIOs are asked to rank the importance of competencies from a predefined list, (ii) investigations into how various IT/ business orientated competencies (comprising skills and knowledge) relate to some predefined expectation, or (iii) investigations into how alternative descriptions for competency may relate to some predefined expectation. Additionally, and as with many CIO studies, CIO competency research also encapsulates evolving views of what stakeholders expect from their CIO e.g., CIOs have been expected to build on their 'technical' competencies to embrace 'business' and 'change' competencies as their role has evolved from tactician (i.e., operational manager) to strategist (i.e., business leader).

An early study of CIO competencies personifies the changing expectations for CIO competencies clearly. Investigating changes in advertised IS job 'skills', over a twenty-year period, (Todd et al., 1995) investigated changes in (combined) knowledge/skills[219] phrase counts for three categories (technical, business and systems)[220] of job requirement. Noting a significant increase in demand for

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218 Whilst many CIO (non-competency) studies encompass knowledge and skills as antecedent to CIO expectations, it is useful to note three CIO competency studies (adopting an 'activity-based competency model', or ACM), investigating managerial knowledge and skills as underpinning: (i) managerial activities, which in turn relates to IS managers role function (Wu et al., 2004), (ii) professional activities and hence managerial (structural levels) (Wu et al., 2007) and, (iii) IT management activity effectiveness, underpinning CIO role performance (Chen and Wu, 2011)

219 The researchers argue that IS professionals need to have a '…knowledge of information technology, a knowledge of business and how to operate in a business environment,' (p.3)

220 Technical knowledge/skills relating to hardware and software, business knowledge/ skills include knowledge of industries and functional areas, management and organizational skills, and interpersonal/communication skills and problem-solving skills, including analytical and modelling skills as well as knowledge of development methodologies and systems analysis/design tools and techniques

knowledge and skills (i.e., what the researchers claim to represent 'competence') that address advertised technical requirements the researchers conclude that whilst research and practitioner literature strongly emphasise a need for business skills, job ads '…*are increasingly emphasising technical skills*,' (p.19)

At this time, researchers had already started to make claims about the relevance of CIO attributes in helping CIOs manage expanding expectations for their changing roles:

> *'…managers frequently acquire their managerial positions because of technical knowledge and competencies rather than managerial knowledge and competencies,' (p.1297)*
>
> (O'Peterson and Van Fleet, 2004)

However, it wasn't long before CIO researchers started to take note of this expectation for CIOs to develop more business orientated competencies, such as change management.

Interviewing 94 IT executives and CIOs from Fortune 500 companies, (Weiss and Anderson, 2004) determined that '.'.*CIOs increasingly assume change and risk management roles*,' (p.13) and that, whilst communicating more widely (to gain stakeholder trust for new projects), they should demonstrate '...*political, cultural and business savvy competencies*,' (p.18)

Similarly, adopting dimensions of critical CIO capabilities and competencies from literature[221], (Lane and Koronios, 2007) analyse data surveyed from 46 CIOs to investigate what were the 'critical competencies of the modern CIO'. Ranking sixteen critical competencies[222] in order of significance, the researchers find that

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221 As proposed by (Ravarini et al., 2001) and (Tagliavini et al., 2003)

222 Leadership in CIO Role (soft skill), Strategic Planning of ICT (soft skill), Business Alignment & Innovation with ICT (soft skill), ICT Human Resource Management (soft skill), Managing business relationships with ICT (soft skill), ICT Budgeting and Control (hard skill), Corporate governance of ICT (soft skill), Vendor/supplier relationship management (soft skill), Information security/business continuity (hard skill), Business process management (hard skill), Project management (hard skill), ICT architecture management (hard skill), Knowledge/Intellectual Capital Management (hard skill), Measuring business value of ICT (soft skill), Managing ICT globally outsourcing off shoring (hard skill), Supply chain

'Leadership in CIO Role', Strategic planning of ICT' and 'Business alignment and innovation with ICT,' ranked in their top three competencies. Reclassifying their ranked list into three 'knowledge types' (i.e., ' know how to be', 'know what' and 'know how'), the researchers also highlight that CIOs had drawn particular attention to additional competencies (not in their questionnaire), claiming that '…*notable competencies for the CIO should be Change Management and Change Leadership*…'. Reflecting on their findings, the researchers suggest that whilst '…*the role of the CIO has become more business focused and strategic*', and that '*…soft skills dominate the critical competency set for the CIO*', CIOs would also need to have '…*capable technology and management expertise in their direct reports*,' (pp. 1105-1106).

Re-assessing this claim, whilst re-emphasizing the need for CIOs to combine business and technology competencies, (Wu et al., 2008) investigate how these CIO competencies and IT capabilities (or business technology management (BTM) capabilities) may relate to CIO effectiveness for a variety of CIO roles and (hence) levels of IT assimilation.

Suggesting that a CIOs:

1. Business Technology Competency comprises of the skills/knowledge that enable the CIO to configure, implement, apply, and evaluate IT to establish enterprise-wide IT infrastructure, initiate business applications and integrate IT functions with critical business processes to deliver a business capability or automate a business operation; and that
2. Business Management Competency comprises of the skills/knowledge that enable the CIO to understand business domain-specific knowledge, speak the language of business, and interact with their business partners in other business divisions

management (hard skill), Succession planning for the CIO role (soft skill), Political Savvy (soft skill), Communication skills – particularly board level (soft skill), Business Acumen (soft skill), Change leadership (hard skill), Change management (hard skill) and Ability to adapt to constant change (soft skill)

Wu proposes that higher levels of CIO business management competency and technical management competency will enhance CIO role effectiveness. Analysing responses surveyed from 97 CIO-TMT pairs, the researchers find that, whilst both sets of competencies were significant to CIO role effectiveness and higher levels of IT assimilation, they were also significant to higher levels of BTM capabilities and (hence) higher levels of IT assimilation. As such, the researchers conclude that their findings '…*testify to the importance of BTM capability and top IT leaders' effectiveness together as portfolios in enhancing IT assimilation*,' (p.11).

Taking a more traditional approach, to linking CIO competencies with aspects of firm level performance, (Cohen and Dennis, 2010) adopt an alternative definition for CIO competence i.e., in terms of Business Management, Technology Management, and Interpersonal/ Political Skills. Surveying 111 CIOs to investigate how these CIO competences relate to the CIOs organisational positioning and (hence) the level of IT's contribution to the business, the researchers find that all categories of competence have direct effects on the contribution made by IT (whilst also having a mediating effect on CIO positioning and their interactions with the TMT). The researchers conclude that: (i) a CIOs competence has a more significant effect than a CIOs background, experience, or cognitions, and (ii) that CIOs entering the role from the business domains may find it difficult to develop a technical competence, whereas CIOs entering the role from the technical domain may be able to develop the business knowledge necessary as they progress.

Examining previous proposals for critical CIO competencies[223], (Joia and Vreuls, 2010) propose 25 competencies critical to Brazilian CIOs.

Analysing data surveyed from 111 CIOs the researchers sought to rank those competencies most important for CIOs to achieve 'professional performance'[224]. Using factor analysis, the researchers identify seven competencies (i.e.,

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223 From (Earl, 1996), (Ravarini et al., 2001), (Tagliavini et al., 2003), (Broadbent and Kitzis, 2005) and (Lane and Koronios, 2007)

224 Undefined

Knowledge of the business, understanding of organizational context, an ability to influence the organization, technical expertise, external networking, management of IT operations and the capacity to innovate using new information technologies), that form their 'meta-model' of critical competencies. To develop this model, (Correia and Joia, 2014) analyse data surveyed from 243 IT professionals. Using a word evocation technique, the researchers find that CIOs and IT professionals agree that CIOs should have competency in influencing the organization[225] and in having 'technical expertise'[226] (both featuring as 'mandatory/ central kernels' to CIO social representation). The researchers also proposed that whilst ethical behaviour[227] and external networking were perceived 'peripheral' to a CIOs social representation, CIOs should still pay them special attention. As a result, in the increases in audit, control, and compliance CIOs will need increased competence in ethical behaviours, and to address the 'trend' for increased divestment of resources to 3rd parties (i.e., suppliers), CIOs would need to increase their level of external networking competencies. Warning that, CIOs who don't develop competencies in ethical behaviours will spark a '…*crisis in confidence of the organizations in their CIOs*,' (p.10). The researchers conclude that the lack of attention on external networking may stem from the changing nature of supplier relationships i.e., the move away from systems vendors towards integration consultants.

CIO researchers have also attempted CIO competency investigations by developing alternative definitions for CIO competences and by examining the effects of the TMT on a CIOs competence in delivering firm level outcomes

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225 This competency '…*brings together both leadership and financial aspects, characterized by the ability that the CIO must have to influence the organization by means of basing advice on sound financial principles*,' (p.4)

226 A competency that ensures '…*the delivery of effective IT services, therefore boosting their own credibility and that of IT vis-à-vis the organization*', and '…*enables the CIOs to implement technological solutions within their organizations*,' (p.4)

227 See: (Joia and Vreuls, 2010). Whilst the researchers substitute 'knowledge of the business' with 'vision for the business' – without any explanation, they extend definitions for 'External Networking' to include phrases such as knowledge of the market and suppliers, up to date with trends in the market and being well informed. Ethical Behavior included expressions such as: honesty, transparency, justice, integrity, ethics, and credibility (p.9)

For example, an alternative perspective to defining CIOs competencies was proposed by (Ravarini et al., 2001) and subsequently investigated by (Tagliavini et al., 2003). Adopting an existing theoretical competency framework[228], Ravarini proposed defining CIO competencies in terms of three grouped 'dimensions' that may affect firm performance[229], i.e.:

- Know how to be: Interpersonal skills, holistic vision, long-term vision, effective leadership, and propensity to innovation
- Know what: Managerial knowledge, Internal business knowledge, external business knowledge, theoretical knowledge
- Know how: Technical expertise, planning capabilities and organizational impact assessment capabilities

To validate these dimensions, Tagliavini interviewed 111 CIOs across northern Italy to explore how 'modern features' of the CIO impact IS 'sub' (or ISS) functions, and in turn overall business performance. The researchers found that interpersonal skills, holistic vision, managerial knowledge, theoretical knowledge (of ICT), technical expertise of ICT and planning capabilities all had a higher impact on the quality of ISS and (consequently) overall company performance. Additionally, they showed that for 'Internet based technologies', theoretical knowledge and technical expertise had a high impact on ISS performance, but not company performance, concluding that their analysis:

> *'…shows a strong relationship between the correct management of IS subfunctions and the overall company performance. Thus, IS management shows to be a strategic weapon, able to make the company more competitive as long as companies are able to manage the CIO recruiting and*

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228 The sources for this framework later clarified by (Tagliavini et al., 2003) who cites works by (Boyatzis, 1982) and (Spencer and Spencer, 1993)

229 In terms of Organizational changes, Process changes, Product/service changes, financial metrics, and CAPITA

professional development by investing in the enhancement of the identified competencies,' (p.1893)[230]

Perhaps flying in the face of previous thinking of links between a CIOs capabilities (or competencies)[231] and firm performance, (Peppard, 2010) claims that[232] that CIO performance is influenced more by the IT-savviness' of the CEO and the TMT, than by the CIO's individual attributes. Peppard substantiates his claim that there is no direct link between hiring a competent CIO and firm performance by suggesting that his data indicates that '*…the environment within which the CIO operates plays a crucial role in the success of the organization in optimizing IT value*,' (p.75), as opposed to individual attributes of the CIO.

Peppard goes on to say:

'What the research also indicates is that focusing solely on personal competencies for the CIO role is likely to be a fruitless endeavour. While possessing these competencies is obviously important for a CIO, it is unlikely these are any different from those required for other leadership roles. This also suggests that focusing solely on the role (i.e., of the CIO) is unlikely to result in much progress; much of the contemporary research explores the evolving role of the CIO' (p.90)

2.3.2.4 Knowledge

'…the CIO is expected to provide thought leadership to other CxOs, making them aware of the potential of IT/IS to support or drive business operations,' (p.4) (Chen et al., 2017)

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230 Whilst these conclusions seem to lend support to the later claims of (Lane and Koronios, 2007) and (Wu et al., 2008), (Shao et al., 2010) criticize studies using these dimensions as they fail to '…*provide the specific measurements of each competence, thereby reducing ways of conducting future empirical studies*', and that meanwhile '…*there is still a lack of theoretical proof for their categorization of CIO's competence*,' (p.1115)

231 Comprising a mixed of Skills and Behaviours: Leadership, Visionary, Strategic Thinker, Relationship Builder, Diplomat, Deliverer, Able to Read the Market.

232 Peppard also highlights a competency not previously highlighted in research as being '…*the ability to read and use the external market for potentially sourcing IT services and to understand risk*,' (p.80)

Whilst CIO knowledge is implicit in the development of social capital, it also forms one of the dimensions of CIO competency. In developing cognitive capital, CIOs are sharing their experiences using a shared language, derived from their knowledge, whereas CIOs skilled in applying their knowledge are said to have competence.

However, CIO researchers preoccupied with understanding either the interplay between the three dimensions of social capital, or the various factors relating to competence often miss the opportunity to develop more detailed definitions for a CIOs knowledge; as such CIO competency researchers make generalisations about the relevance of a CIOs knowledge, largely in terms of 'business knowledge' and/ or 'technical knowledge'.

To clarify what knowledge a CIO is expected to apply to develop influential relationships, it is necessary to explore studies where researchers taken a more focused view on the relevance of a CIOs knowledge.

However, whilst such studies appear thin on the ground, a handful do provide more detail about CIO knowledge, and it relevance to measurable outcomes. These studies fall into two categories, those that call for, and recognise the need for CIOs to expand their technical knowledge with increased levels of business knowledge[233] and those that attempt to define and relate CIO (both types of) knowledge to measurable outcomes[234].

CIO researchers quickly recognised the importance of CIO knowledge; that CIOs should have, as one of their many qualities[235], 'IT knowledge' to ensure IT

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233 The importance of business knowledge for those aspiring to become CIOs were also starting to manifest in practice. For example, having analysed job adverts from Fortune 500 companies for systems analysts, (Lee, 2005) showed that whilst 83% of the job adverts referred to 'general business knowledge', 60% of those adverts expected applicants to have specific functional area business knowledge. Suggesting that his work '…confirms the significance of business knowledge to systems analysts', he concluded that systems analysts were moving '…away from purely technical experts towards being change agents who integrate IT into business processes,' (p.90)

234 In this latter category, the majority of studies interpretate and adopt definitions for knowledge from (Armstrong and Sambamurthy, 1999)

235 i.e., Behaviours (is loyal to the business and is open), Motivation (is goal-, ideas-, and systems orientated), Competencies (is a consultant/ facilitator, is a good communicator and has IT knowledge); and Experience (i.e., has an IS function analyst role)

delivered business 'value' (Earl and Feeny, 1994). However, soon after the launch of the role, in the mid-1980s, researchers agreed that CIOs should not only have the '...*responsibility of assuring that new opportunities presented by the technology are seized and that capital expenditures for information resources are ranked according to business needs*,' (p.5) (Rockart et al., 1982), but that they should also start to develop '...*an outward business-strategy perspective,*' (p.179) (Benjamin et al., 1985).

Having embraced the need to acquire both technical and business knowledge, CIOs were expected to apply that knowledge to exert authority (with their direct reports) and/ or to influence those outside of the IT department, to gain trust and lead change.

In dealing with their direct reports, CIOs are expected to have accumulated (and applied) 'managerial knowledge'. For example, in their analysis and ranking of responses from 350 CIOs across a variety of sectors, (Lane and Koronios, 2007) suggest that as a critical competence, CIOs need to have '…*a high level understanding of key technology and management knowledge*', in order to ensure that they have '…*capable technology and management expertise in their direct reports*'. In other words, CIOs should have relevant knowledge to ensure they, or their direct reports continue to '…*operate effectively and make informed decisions about technology*,' (p.1108).

Similarly, investigating the relevance of CIO business and managerial knowledge to secure support for IT initiatives from the TMT, (Stemberger et al., 2011) analysed data from interviews with fifty CIOs and CEOs from 152 Slovenian companies. Finding that CIOs '…*can acquire top management's support if they have an adequate role, knowledge, and skills*', the researchers conclude that to achieve this support '…*CIOs should be attentive to the fact that a company employs IT/IS personnel who already have business and managerial knowledge*,' (pp. 434-435).

Perhaps the most widely cited work for investigations into how CIO knowledge may relate to measurable outcomes was authored by (Armstrong and Sambamurthy, 1999).

Surveying, surveying 235 CIOs from Fortune 500 companies, Armstrong investigated the relationships between 'senior leadership knowledge' i.e., CIO strategic IT knowledge, CIO business knowledge and TMT IT knowledge and 'systems of knowing' (i.e., dimensions of social capital[236]) and how these maybe mediated by the presence of a strategic IT vision to improve levels of IT assimilation[237].

Referring to a CIOs 'objective knowledge', the researchers define CIOs knowledge[238] in terms of:

1. Strategic IT knowledge: distinct from knowledge of IT tactical activities, that strategic IT knowledge encompasses '…*the potential and limitations of an organization's IT infrastructure, strategic IT actions of its competitors, and the potential of emerging information technologies for an organization's business*,' (p.306); and
2. Business knowledge: being the CIOs knowledge of '…*business strategies, organizational work processes, firm's products and services, industry recipes for success, and competitor strengths, weaknesses, and potential actions*,' (p.307)

Finding that strategic IT knowledge and business knowledge were significant in enabling 'synergistic relationships' when participating with their TMT, the researchers also showed that both knowledge attributes enabled CIOs to influence their firm's ability to assimilate IT (more so in terms of transformation rather than 'informate-down' strategies). This assimilation, irrespective of firm size, was shown to be effective, irrespective of the TMTs IT level of IT knowledge; implying that IT assimilation would be improved not by raising the IT knowledge

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236 This study also exemplifies all three dimensions of social capital, see section 2.3.2.2

237 The researchers also proposed that IT assimilation may also be mediated by the level of IT Infrastructure sophistication

238 Citing the approach taken by (Boynton et al., 1994) in distinguishing between strategic IT and business knowledge

of the TMT, but rather by their CIOs having high levels of both business and IT knowledge, whilst being a formal member of the TMT[239].

CIO knowledge researchers have revisited Armstrong's definitions for CIO knowledge to investigate their relevance to CIO role effectiveness, IT-business alignment, ERP assimilation and the development if innovative IT strategies.

Referring to CIO knowledge in terms of 'capabilities', (Smaltz et al., 2006a) investigated the relationships between CIO capabilities[240], their engagements with members of their TMTs[241] and their overall role effectiveness when enacting managerial roles as defined by Mintzberg. Citing (Armstrong and Sambamurthy, 1999), the researchers operationalised a CIOs knowledge in terms of :

1. Business Knowledge: being '…*the CIO's personal knowledge of the organization's present and future products (services), markets and business processes, and on the organization's basis of competition*,' (p.214); and
2. Strategic IT knowledge: that encompasses '…*(i) how other organizations like their own are applying IT, (ii) how to utilize existing organizational IT assets to address current needs, (iii) how to identify relevant emerging technologies to support the organization, and (iv) how to guide the organizations IT acquisition decisions*,' (p.215)

Having surveyed 100 CIOs and TMT 'dyads' across North American Healthcare companies, the researchers found that business and strategic IT knowledge had a '…*significant positive effect*,' (p.218) on perceived effectiveness in the business strategist, relationship architect and integrator roles. However, the researchers stress that TMT/CIO engagements alone are insufficient for role effectiveness, emphasising that a CIOs capability (in having strategic business and IT knowledge) is instrumental to the mediation of such engagements and (hence) levels of perception of role effectiveness.

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239 This finding is somewhat at odds with a view developed later by (Peppard, 2010), who claims that TMT knowledge is more relevant than that of the individual CIO

240 In addition to knowledge, the researchers also proposed two other capabilities, the CIOs level of political savviness and their communicative ability

241 Defined in terms of all three dimensions of social capital

CIO knowledge also relates to IT-business alignment. For example, considering a CIOs structural power and cognitive capital, (Preston and Karahanna, 2009) examine how a CIOs level of business domain knowledge may relate to the development of a 'shared' language' and 'shared understanding' with the TMT in order to impact IS strategic alignment.

Differentiating between systems of knowing (i.e., knowledge exchange mechanisms) and objective knowledge (i.e., a CIOs knowledge about the business, and the TMTs knowledge of IS), the researchers (citing (Armstrong and Sambamurthy, 1999)), develop constructs proposing that a CIOs business knowledge comprises of knowledge of their: (i) firm's present and future products, markets, business strategies, and business, (ii) industry's practices, and their (iii) firm's competitors.

Finding that IT-business strategic alignment is influenced by shared CIO-TMT understanding (about the role of IS), the researchers also show that the CIOs level of business knowledge has a significant relationship with the development of a shared language as well as the development of shared understanding. The researchers also note that: (i) having a CIO in the TMT promotes the TMTs understanding of IS[242], and that neither (ii) structural systems or social systems influenced the level of a CIOs business knowledge. Recommending that organizations should make '…*conscious efforts to build the CIO's level of business knowledge*', the researchers conclude that to foster the development of a shared understanding between the CIO and the TMT, that CIOs '…*should focus on managing and shaping the TMT's expectations of the capabilities of IS'*, and they should therefore sponsor '…*formal events designed for the edification of the TMT*,' (p.175).

To enhance understanding about how the CIOs knowledge may relate to additional measurable outcomes, researchers also investigated how the CIOs knowledge may relate to levels of ERP assimilation.

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[242] This supports a similar, later finding by (Song et al., 2010), who find that the TMTs level of technical knowledge, as shaped and influenced by the presence of CIOs (in the TMT), bore correlation to their (TMT) risk appetite for IT investment and innovation

For example, adopting (Armstrong and Sambamurthy, 1999) definitions for a CIOs strategic knowledge, (Shao et al., 2010) develop a conceptual model relating the CIOs strategic business knowledge, their strategic IT knowledge and their structural power to the level of ERP assimilation (and hence firm performance). Returning to their conceptual model from 2010, (Shao et al., 2016) surveyed 24 CIO/TMT matched pairs to examine the relationship between a CIOs knowledge, their organisations level of IT (ERP) assimilation and the effects of this on subjective views of firm performance[243].

Finding that the relationship between a CIO's strategic information technology (IT) knowledge, their strategic business knowledge and their structural power has a significant influence on ERP assimilation, the researchers conclude however that an '... *imbalance (*between*) CIO's strategic business knowledge and strategic IT knowledge is negatively associated with ES (*i.e., enterprise system*) assimilation*,' (p.58). Interestingly the researchers also concluded that a CIOs structural power was more influential on successful ERP assimilation than either of these two knowledge attributes, suggesting that to yield this knowledge effectively, CIOs must have first attained structural power[244].

A CIOs knowledge can also relate to the development of an innovative IT strategy. For example, (Chen et al., 2017) surveyed 106 CIO-TMT matched pairs in Chinese companies, to investigate the relationship between the four personal assets of CIO issue selling effectiveness'[245] and the 'shaping' of an innovative IS strategy[246]. Of these four assets, the researchers describe the CIOs level of strategic IS Knowledge[247] as:

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243 i.e., Executive perceptions of revenue increase, operation cost reduction and productivity improvement

244 This contradicts previous findings from

245 Also referred to as four forces, the researchers define these personal assets as CIO strategic IS knowledge, CIO decision-making authority, the TMTs trust in the CIO and the CIOs level of 'Political Savviness'

246 Cited as '…*an organizational perspective to continuously seek to be innovative through new IS initiatives*,' (p.5), after (Chen et al., 2010a)

247 The researchers also refer to 'normative knowledge' antecedent to issue selling, as being '…*practical knowledge of prevailing organizational norms*,' (p.6), after (Dutton et al., 2001)

'The CIO's awareness and understanding about current and emerging information technologies, their relevance for the firm, and insights related to investment timing and acquisition of information technologies', (p.6)[248]

Finding that issue selling effectiveness was a significant antecedent to the development of an innovative IS strategy, and that a CIOs level strategic IS knowledge was positively associated with effective issue selling, the researchers conclude that '…*issue selling is a function of cumulating critical personal assets (authority, relationship, expertise, and normative knowledge) which increase a manager's capacity to overcome resistance and make sense of situated organizational contexts*,' (p.13). In terms of the CIOs knowledge, the researchers also conclude that CIOs should therefore be expected to '…*provide thought leadership to other CxOs, making them aware of the potential strategic value of IT/IS*,' (p.13)

2.3.2.5 Skills

In a similar fashion to CIO knowledge, skills have also formed part of the investigations into CIO social capital and competency; and in the same manner, CIO researchers preoccupied with the interrelationships between CIO attributes and measurable outcomes, have failed to agree on a single set of consistent definitions for skills.

Of those skills that have been investigated it is useful to reflect on how researchers have defined skills in fields such as social psychology.

According to (Katz, 1955), the selection and development of managerial administrators should not focus on what '…*good executives are (their innate traits and characteristics)*,' but that they should instead consider '…*what they do (the kinds of skills which they exhibit in carrying out their jobs effectively*,' (p.33). According to the researcher, this perspective suggests that skills are abilities that

[248] The researchers reference (Armstrong and Sambamurthy, 1999) and (Smaltz et al., 2006a) in their derivation of this description and adopt Armstrong's definition for strategic IT knowledge

'…*can be developed, not necessarily inborn*,' and which manifest in '…*performance, not merely in potential*,' (p.34).

Reflecting on Katz's proposals, (O'Peterson and Van Fleet, 2004) suggest that skills are the '…*ability either to perform some specific behavioral task or the ability to perform some specific cognitive process that is functionally related to some particular task*,' (p.1298). The researchers therefore suggest that skills comprise of three 'components': (i) a domain specific knowledge base, (ii) a 'method' for accessing this knowledge base and, (iii) the ability to enact a set of behaviours using that knowledge to perform the given tasks. This final component is (according to the researchers) that which '…*people observe and label as a skill*,' (p.1298).

In categorizing such skills, (Katz, 1955) proposes a three-category typology i.e., technical, human, and conceptual skills:

1. Technical skills imply '…*an understanding of, and proficiency in, a specific kind of activity, particularly one involving methods, processes, procedures, or techniques*.'
2. A human skill is the ability '…*to work effectively as a group member and to build cooperative effort within the team,'*; and
3. Conceptual skills enable the individual to '…to see the enterprise as a whole,' and to recognise '…*how the various functions of the organization depend on one another, and how changes in any one part affect all the others*,' (pp. 34-36)

And, in providing empirical support for Katz's proposals, (O'Peterson and Van Fleet, 2004) point out that subsequent research (by (Mann, 1965), had shown that '…*the three skills are interrelated and that all levels of management need some mix of the three skills*,' (p.1300).

Having reflected on the work of Katz and Mann, O' Peterson identifies seven additional categories for skills (see Table 3) that have been claimed as new, potential categories.

Suggesting that, with time these seven categories of skills may well become sub-categories for Katz's original three, the researchers conclude that '*Although the exact skill set managers need to perform their jobs is still being debated, clearly managers must possess a core set of skills to achieve the organization's goals effectively*,' (p.1303).

Skill	**Definition**
Technical	Ability to use methods, procedures, processes, tools, techniques, and specialized knowledge to perform specific tasks
Analytic	Ability to identify key variables, see how they are interrelated, and decide which ones should receive the most attention
Decision making	Ability to choose effective solutions from among alternatives
Human	Ability to work cooperatively with others, to communicate effectively, to motivate and train others, to resolve conflicts, and to be a team player
Communication	Ability to send and receive information, thoughts, and feelings, which create common understanding and meaning
Interpersonal	Ability to develop and maintain a trusting and open relationship with superiors, subordinates, and peers to facilitate the free exchange of information and provide a productive work setting
Conceptual	Ability to see the organization as a whole and to solve problems from a systemic point of view
Diagnostic	Ability to determine the probable cause of a problem from examining the symptoms which are observed by the manager

Skill	Definition
Flexible	Ability to deal with ambiguous and complex situations and rapidly changing demands
Administrative	Ability to follow policies and procedures, process paperwork in an orderly manner, and manage expenditures within the limits set by budgets

Table 3: Managerial Skills (cf. O' Peterson and Van Fleet 2004)

Two key issues surround the IS leadership literature on skills: (i) although skills categories such as these have been around for many years now, CIO researchers appear to have paid little attention to them, and (ii) as the CIOs role has expanded, expectations for CIO skills (as with other attributes) have shifted and changed. These two issues have resulted in definitions for skills that appear generalised or mixed and confusing.

For example, generalisations that CFOs appear to prefer CIOs with 'strong skills' (Blaskovich and Mintchik, 2011)[249] or perhaps to have 'soft 'skills' (Denford and Schobel, 2011)[250] do little to further our understanding for definitions and/ or relevance of such skills.

Similarly, a study comparing CIO and CEO perspectives on the importance of seven 'critical' CIO skills by (Sojer et al., 2006), found that CIOs and CEOs largely agreed on the importance of the top four most critical CIO skills i.e., Communication (or being effective at it), Strategic Thinking and Planning, Understanding Business Processes and Operations and Understanding Industry Trends, Markets and Business Strategy. The researchers also show that CIOs ranked negotiation skills higher than CEOs, whilst CEOs ranked 'Knowledge' of

[249] According to the other, a CIOs reputation reflects the skills important to IT outsourcing; as such, accounting executives (e.g., the CFO), are more likely to concur with CIO recommendations for outsourcing if they perceive the CIO as having 'strong skills' (although skills are not defined)

[250] i.e., political savviness and interpersonal skills as a factor of personal congruence, and communication as a factor of structural engagement to develop an effective relationship with the CFO

technology options and Technical Proficiency higher than CIOs. Whilst effective communication and strategic thinking and planning do appear high on the agenda for CIO skills, this study exemplifies some of the issues surrounding terminology; are these all really skills? Or a mix of knowledge and skills, or activities and tasks[251]?

The ongoing tendency for researchers to imply associations between skills, activities, tasks, etc. has resulted in an ever-growing list of the things that CIOs are expected to do; and this trend is not only enforced through widely circulated annual reports from large global studies[252], but also by studies which appear to have a semblance of academic credence. For example, Luftman and Kappelman both publish separate summaries and critiques of the annual SIM IT Issues and Trends Study each year in peer reviewed journals. E.g., (Kappelman et al., 2018) and (Luftman et al., 2015). In his 2015 review, Luftman compares survey results from 2252 IT executives (from around the world) against eleven years' worth of data to examine where CIOs spend most of their time and which skills are ranked highest. Analysis revealed that the top five 'skills' were in Leadership, Change Management, Business Analysis, Budgeting and Oral Communications[253]. The researchers conclude that, '…*IT organizations, with effective leaders, have an opportunity to position themselves at the heart of corporate strategy. The key to this positioning is the people having the appropriate balance of technical, business/management, industry, and interpersonal skills to meet the challenge that lie ahead*,' (p.304)

However, whilst a significant amount of attention appears to centre on CIO activities, and/ or relatively superficial distinctions between 'technical' and 'managerial' skills, a small number of studies do seem to have made some

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251 The researchers also interchange the word 'skills' with 'qualifications' and 'tasks' drawing no meaningful distinction between them

252 E.g., Harvey Nash Annual Report on Digital Leadership, or IDGs State of the CIO, etc.

253 Comprising (in ranked order) informal discussions and meetings, IT briefings, board meetings and governance meetings

progress investigating CIO communications skills[254] (a 'human' skill) and/ or combinations of human skills with technical and conceptual skills; such studies however, often combine these categories of skills by using (and interchanging) descriptors such as CIO capabilities, competencies, activities, tasks, etc.

To make things more complicated, it is also important to remember that as the CIOs role has evolved, CIO stakeholders and researchers have also undergone an evolution in expectations for CIO skills.

Prior to the CIOs advancement into the TMT, researchers examining IS executives had claimed that the '…*perceived usefulness of sets of generalist and specialist skills*,' (p.24) indicating that people and organisational skills were rated higher than technical skills (Benbasat et al., 1980). Soon afterwards, researchers also noted that individuals holding the post of 'IT executive' were now being called on to exhibit much broader sets of 'skills', such as Communications Management, Operational Experience, Technical Knowledge, Operational Management, Strategic IT Planning, Impact Awareness and Adaptation Management (Rockart et al., 1982).

CIOs paying less attention on day-to-day operations to focus on more strategic matters could now delegate more of their day-to-day activities to their subordinates; this would enable them to operate more as an '…*executive rather than a functional manager*,' (p.449) (Stephens et al., 1992). CIOs attempting this would need to rethink their current skills as the expansion in authoritative behaviours towards influential behaviours would require CIOs to amalgamate their technical skills and managerial skills (Brown, 1993). However, noting a lack of empirical data demonstrating relationships between amalgamated skills and successful performance, Brown claims that CIO's will need to develop '…*a staff*

[254] For example, the importance of 'communications' has been referenced multiple times, in terms of Social Capital and Competency and in terms of soft skills, managerial skills, business skills, etc. e.g., (Keen, 1991), (Todd et al., 1995), (Teo and King, 1996), (Armstrong and Sambamurthy, 1999), (Weiss and Anderson, 2004), (Johnson and Lederer, 2005), (Smaltz et al., 2006a), (Philip, 2007), (Mitra et al., 2011), (Peppard et al., 2011), (Denford and Schobel, 2011), (Mirchandani and Lederer, 2012), (Enns and McDonagh, 2012), (Haffke et al., 2016), (Benlian and Haffke, 2016) and (La Paz, 2017)

orientation, and will utilize communication, education, standards, and other indirect controls to perform integrator and gatekeeper roles for new technologies', (p.400).

Whilst the development of social capital provides a means to influence without power, researchers have investigated the relevance of communication skills to achieve this i.e., by considering the perspectives of the audience targeted with the communication and the medium, when shaping and delivering the appropriate (tailored) messages.

For example, in observing 5 CIOs for 215 hours over the course of a week (Stephens and Loughman, 1994) investigate how CIOs are able to '…*communicate clearly, without overusing technical jargon*,' (p.129). Analysing both the medium of the communication (i.e., face to face, telephone calls, etc) and the metaphors and analogies CIOs used, the researchers found that a prevalence in the use of rich media (i.e., face to face) and the use of '…*verbal and nonverbal cues'*, enabled CIOs to employ '…*lively metaphors*…*to persuade as well as to inform*,' (p.136). Commenting that CIOs '*distinguished themselves'*, by having an ability to '…*read ongoing situations from others' perspective*', and having '…*skilled use of metaphorical language*,' (p.132), the researchers conclude that networking and communication were '…*critical for the role charged with bridging two worlds – IT and the rest of the business'*. Further, the researchers observed that the ability to '…*bridge two ideas, and create a total meaning*', had a '…*far greater impact than logical, discursive explanations*,' (p.136).

This idea of being able to communicate effectively by being able to adopt the perspective of non-technical colleagues is also identified by (Earl and Feeny, 1994). Comparing the perspectives of CEOs and CIOs across sixty organisations about their perceptions of their IT departments, the researchers identify communication as a key 'quality' in CIOs who add value. Acknowledging that whilst many CIOs are great speech writers, the researchers stress that, communication in the more literal sense, is a key requirement for CIOs be able to '..*absorb and use the language of production or marketing and show*

understanding and sensitivity to their colleagues concerns,' this capability then allows them to '…*demystify any aspect of IT*,' (p.18)

The ability to adopt the perspectives of the other party also applies to members of the TMT as CIOs attempt to improve social alignment between IT and business. For example, (Reich and Benbasat, 2000) interviewed 45 executives in Canadian insurance companies to investigate the relevance of antecedents[255] to communication between IT and business executives and collaborative planning[256] to either short term or long term alignment[257]. For short term alignment, the researchers found evidence for clear relationships between communications based on shared domain knowledge which had been derived from '*Organizational stories, minutes from meetings, respondents' explanation*'. Conversely, for long term alignment, relationships between communication and shared knowledge domains were less clear. Noting that the reason for this was perhaps that researchers and subjects were unable to find the process of '…*how or when IT visions were created*,' (p.104). Finding that individuals who had a high level of shared domain knowledge communicated frequently to deal with issues, whereas those without the same level of shared domain knowledge often had lower levels of communication and experienced higher rates of failure, the researchers concluded that '…*the one construct that seemed to predict long-term alignment was shared domain knowledge*,' (p.104).

A central tenant to CIO studies examining the CIOs communication skills is the CIOs ability to communicate IT performance to demonstrate the 'value' that IT is adding to the business. For example, interviewing CIOs and Senior Managers in 23 organisations, researchers developed a new framework aimed at helping CIOs become more effective at '…*measuring, monitoring and communicating performance about the management and use of IT in their organisations*,' (Mitra et al., 2011) (p.47). Suggesting that CIOs can become more effective by focusing

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255 i.e., in terms of their level of shared domain knowledge

256 i.e., the presence of a 'successful IT history'

257 Short term alignment being '…*shared understanding of short-term goals*', whereas long term alignment refers to a '…*shared understanding of IT vision*,' (p.87)

on: (i) internal IT outcomes, (ii) project delivery, (iii) efficient and reliable business operations, (iv) improving business process performance and (v) enabling business innovation, the researchers stress the importance of CIOs: (i) being proactive in defining metrics in each of these domains, (ii) discussing IT performance in business terms, (iii) improving partnerships by helping others improve, (iv) exercising authority beyond their scope of authority, and (v) focusing on a small number of strategically important improvement areas when communicating with executives. Recognizing that business leaders are challenged with '…*many internal IT metrics that vary in their specificity and relevance*,' the researchers conclude that CIOs need to develop a '…*strategy for managing and communicating metrics for IT performance*', to enable them to '…*refocus their attention over time to areas of greater strategic potential*,' (p.58).

CIO communication skills have also been linked to additional technological and conceptual skills, in terms of the expectations for CIOs to enact new roles.

For example, CIOs are expected to formalise their intentions for securing successful business outcomes by increasing the level of collaborative planning with their IS managers (Lederer and Mendelow, 1989), or CIOs intending to demonstrate IS contribution to business performance are expected to be proactive in establishing and managing a reciprocated planning process with the business through greater levels of communication (Teo and King, 1996). Alternatively, CIOs who enhance their levels of communication with the TMT, are expected to improve the TMTs perception of IT and hence improve levels of alignment between strategic business-IT plans[258] (Kearns, 2006). And CIOs who can, '…*communicate clearly to all levels'*, to secure top management support are expected to enact two roles as either 'technology interpreter' or 'technology 'scout' to increase operational efficiency and '*… improve business performance*,' (p.252) (Philip, 2007).

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[258] Who conclude that '…*lack of CIO participation in business planning, lack of strategic alignment between the IS plan and the business plan, and the lack of use of IS for competitive advantage could result in lower returns on IS investments*,' (p.246)

Communication and planning skills alone don't provide CIOs with the complete repertoire of expected skills though; CIO researchers have also studied the relevance of other skills grouped under more generic headings such as capabilities, competencies, and activities.

For example, in their examination of case studies, (Feeny and Willcocks, 1998) explored the relevance of CIO 'capabilities' in relation to three key IT issues: IT/ business alignment, the challenge of IT service cost reduction and issues in managing IT infrastructure. Suggesting that IS executives would need to develop:

1. Technical Skills: not only in relation to '…*architecture planning and making technology work*', but across the spectrum of IS capabilities, best captured as '…*understanding IT capability*'
2. Business Skills: distinguishing between the '…*accumulation of business experience'*, and the '…*capacity for business understanding'*, the researchers suggest that to build relationships with the business, IS leaders don't need to depend on demonstrating expertise that 'rivals' the business executive, but instead just need to '…*convince those professionals that you understand their goals, concerns, language, and processes and are trying to help them achieve those goals'*. In addition to this IS executives should adopt a business systems thinking approach that '…*stimulates new ideas for managing the supply chain*', by '…*conceptualising and envisioning business processes'*; and
3. Interpersonal Skills: deemed a 'premium' for relationship building, contract facilitation, leadership, and informed buying. However, as these capabilities overlap many of the required IS capabilities, IS executives must show that they '…*understand and respect others concerns and values in facilitating problem solving*,' (pp. 16-17)

The researchers also refer to two other IS executive capabilities: (i) 'Time Horizons' i.e., being able to balance long-term interests with short-term imperatives, and (ii) 'Motivating Values' i.e., being able to adopt a broad perspective of many management processes i.e., Strategy, Structure, Individuals/ roles, and Technology.

Whilst the researchers refer to skills in the context of capabilities, it's clear that these expectations align well to Katz's three categories of skills; however, in their conclusions the researchers reflect on the '…*extent that a single person can deliver multiple core IS capabilities*', and that whilst CIOs maybe able to combine '…*relationship building with business systems thinking'*, combinations of individual capabilities will be '…*particularly problematic if they consist of capabilities with conflicting time horizons or motivating values*,'(p.20).

As an alternative to 'capabilities', (Tagliavini et al., 2003) reference CIO skills amongst three categories for 'competence' as a result of their interviews with 111 CIOs in Italy. In their category of 'know how to be'[259], the researchers, define:

1. Interpersonal skills i.e., the ability to '…*establish and maintain effective relationships and communication inside the company (with any staff member, regardless his/her organizational level) and towards possible external consultants*'
2. Technical expertise i.e., '…p*ractical expertise of ICT use and application*'; and
3. Planning capabilities i.e., 'The ability to plan the IS development to support the pursuit of main business objectives'

And claim that all are important for maintaining the quality of IS sub-functions (ISS) and (hence) overall firm performance. Whilst distinguishing the relevance of these skills (at the competency level), the researchers note that the combination of '…*interpersonal skills and holistic vision*' in particular have a high impact on ISS performance, which (the researchers claim) suggests that CIOs need to consider the organizational point of view when formulating a vision for IT, (p.1193).

Skills have also been interchanged with activities. For example, to investigate expectations for CIO skills in Portuguese companies, (Trigo et al., 2009) conduct

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[259] Confusingly, the researchers define two other categories of CIO competence, one other being 'know how,' which is described as '…*the technical knowledge and skills required to perform IT management activities*,' (p.1889), and refers to 'technical expertise' and 'organizational impact assessment capability'

a survey with 54 Portuguese CIOs. Investigating the activities in which CIOs spend most of their time the researchers claim that there are seven skills[260] critical to Portuguese CIOs. The researchers claim that these skills are needed to support CIOs who spend most of their time '…*managing crises, managing projects and application development and that the most pivotal skill they need for their profession is the ability to understand business processes and operations*,' (p.68)[261]. Whilst this pivotal skill materialises as an ability to learn, the researchers claim that CIOs must have the ability to communicate what they've learnt effectively, which is '…*crucial to assure the right planning, development, and management of information systems*,' (p.69).

Interviewing seventeen CIOs from a variety of businesses, (Chun and Mooney, 2009) also investigate CIO activities (derived from the nine IS capabilities proposed by (Feeny and Willcocks, 1998)) in order to identify a CIOs responsibilities and (hence) their current (and future) 'attributes'. Identifying 'strong support' for CIO activities in 'Relationship Building', 'Business Systems Thinking', and 'Leadership' and 'some support' for 'Informed Buying' and 'Contract Facilitation,' the researchers suggest that the five most significant attributes required of todays' CIO are: (i) an ability to contribute to corporate strategy, (ii) competence in business process innovation and design and the ability to anticipate business needs, (iii) expertise in managing and demonstrating IT costs and their impact, (iv) effectiveness in publicizing and raising IT's profile and position within the company, and (v) strong communication, negotiation, and facilitation skills. Attempting to categorise these attributes into four roles[262] the researchers conclude that there has been a split in the CIOs role, with CIOs either acting as a CTO (inwardly looking, focused on maintaining Infrastructure and cost cutting of operations) and the Chief Innovations Officer (outwardly looking (from

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260 In descending order of importance: understanding business processes, ability to communicate, strategic thinking and planning, ability to lead and motivate staff, an ability to follow technological innovations, technical proficiency, and negotiation skills

261 The researchers also claim that their list of skills are comparable to international counterparts

262 Landscape Cultivator, Innovator and Creator, Triage Nurse and Firefighter and Opportunity Seeker

IT) and to focus on working with other executives (inside and outside the firm) to change their firms strategy and processes.

Attempts to draw distinctions between the relevance of skills have also included the study of skills in terms of perceptions on managerial and leadership roles. This distinction is summarised well by (Algahtani, 2015), who suggested that:

> *'Management skills are used to plan, build, and direct organizational systems to accomplish missions and goals, while leadership skills are used to focus on a potential change by establishing direction, aligning people, and motivating and inspiring*,' (p.71)

To further contrast managerial and leadership skills, (La Paz et al., 2010) attempt to identify, rank and understand the source[263] of CIO skills for the 'ideal CIO'. Presenting Chilean CIOs with a pre-defined list of 'responsibilities' listed in 'The State of the CIO 2009 Survey', the researchers analyse data from interviews with six CIOs to rank fourteen 'key tasks'[264] on the CIOs agenda:

- Reduce Operating Costs, Implement Best Practices, Drive Innovation in Business Processes, Set Technology Investment Priorities, Manage Customer Relationships, Improve Security/ Risk Management, Select Vendor Offered Solutions, Improve Quality of Products and Services, Reengineer Core Business Processes, Configure Information Systems, Acquire and Retain Customers, Improve End-user Workforce Productivity, Support Globalization and Enable Regulatory Compliance

Noting that CIOs considered themselves to be technology operators that '…*keep transactional systems healthy*', the researchers suggest that CIOs tended to favour activities that '…*reduce operating costs, implement best practices, drive innovation in business processes, set technology investment priorities,*' (p.5).

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263 Suggesting that all CIO skills '…*must be acquired and developed by the CIO, during his/her university education, in professional careers and as graduates, as well as in the practical development of his/her own profession*,' (p.2)

264 The researchers interchange the word 'task' with 'skill' throughout their paper

The researchers conclude that this self-perception probably explains why CIOs fail to leverage performance from IT to impact business value and that they should therefore consider integrating technical skills with managerial abilities.

To draw even greater distinctions between managerial and leadership skills, (La Paz, 2017) charts skills associated with four CIO role 'types' i.e., from 'technologist', to 'enabler', to 'innovator', and finally to 'strategist'. Interviewing twelve CIOs, La Paz notes a transition (or expansion) in CIO skills that range from 'technical skills' towards 'managerial skills'. The combined set of skills, spanning all four roles in this evolutionary spectrum are claimed to be:

- Soft Skills (Communication, Negotiation, Leadership, Empathy) to '…*inspire and build a strong and coordinated IS/IT team*' and to '…*improve their influence in the C-suite*'
- Influencing Skills (TMT/ Functional Areas) to provide '…*advice regarding IT projects that improve their operations*,' and be '…*constructive and collaborative, and not just critical*,' in the C-suite
- Resource Management Skills (creating team structures and empowering and incentivising such team) to maintain '…*operational continuity*', whilst maintaining IT-business alignment with IT resources; and
- Planning (budgets and operations) to '…*demonstrate command of IT projects, the unit, and its resources*', and to anticipate business needs to provide '*robust services*,' (pp. 52-53)

The researchers claim that whilst technologists build and demonstrate value, effective managerial skills should enable '…*strategists to communicate value, manage IT departments as business units, and persuade stakeholders to become sponsors, and end-users to become allies of IS/IT projects*,' (p.51).

To develop these skills, CIOs should: complement their skills by choosing the '…*right combination of educational programmes'*, they should learn to communicate strategic value using 'business language', they should work with an 'informatics committee' to understand and then translate business requirements into projects, they should use best practice (IT) frameworks to provide business solutions (as opposed to technical solutions), and they should manage their

teams to deliver 'business value'. In conclusion the researchers recognise that whilst skills are important, CIO performance will ultimately depend on the '…*approach that the organization takes to IS/IT resources*,' (p.51).

Whilst definitions for CIO skills are mixed and inconsistent, IS leadership literature appears to have made some progress in articulating CIO skills in terms of human skills[265] and also (in terms of labels such as capabilities, activities, etc. used to describe somewhat obliquely) mixed combinations of human, technological and conceptual skills, researchers have recognised that more work is needed to understand how skills described in these domains interrelate (Boehm et al., 2013).

2.4 CIO Development

In keeping with research objective 1(d), understanding the 'barriers' that CIOs encounter when trying to develop and learn on how to meet changing stakeholder expectations, the author now examines the relevance of current educational, training, mentoring and professional development opportunities available to CIOs and how shortfalls in these interventions affect CIO motivation.

> *'Organizations would benefit from well-planned and extended development programs to identify and groom potential CIOs. While literature covering general executive development is extensive, there is a gap in the literature regarding what kind of program and to what extent executive development improves CIO performance', (p. 4)* (Leahy, 2012)

If we consider that capabilities can refer to combinations of attributes that affect an outcome, then CIOs intending to respond dynamic environments will need to continuously develop their capabilities as expectations for them evolve, change and diverge. They need to maintain their knowledge about constant changes in the marketplace, about changing (external and internal) customer demands (e.g.,

[265] In terms of applying and developing social capital and (more specifically) the relevance of communications

in terms of their requirements for new products and services), they need to understand the capabilities of various business resources (i.e., processes, people, data, etc.) and they also need to understand shortfalls in the capabilities of their own (and contracted) IT resources (i.e., systems and people). Whilst they're doing all this, they need to maintain their understanding about the relevance of newly emerging digital technologies. Once knowledge has been acquired, they then need opportunities to practice the continual application of that knowledge to cement their learning and maintain their overall relevance.

Learning is a process that enables the transfer of knowledge. The most effective type of learning is where the process of knowledge exchange fully considers the social context of the individuals receiving the knowledge. Thus, those individuals who plan to apply their knowledge in a work context should do their utmost to ensure that the learning process reflects their everyday practice. In considering such social contexts, individuals can 'learn-in-work' (Brown and Duguid, 1991) and develop their knowledge through 'mutual learning' i.e., where an'…*organization socializes recruits to the languages, beliefs, and practices that comprise the organizational code*', whilst simultaneously '…*the organizational code is adapting to individual beliefs*,' (p.74) (March, 1991)[266].

2.4.1 Education

Prior to entering the workplace, CIOs will have begun to capture knowledge (relevant to their profession) whilst attending university. Opportunities to then apply that knowledge then typically materialise either through pre-defined work activities or through changes in their workplace. The process of developing additional knowledge, generally, occurs either when CIOs access training (formally or informally) or via engagement with a variety of stakeholders within, or external to their workplace.

However, business executives and CIOs (in particular) experience multiple barriers (and issues) at nearly every stage of knowledge acquisition through

[266] Cf. (Whyte Jr, 1957) and (Maanen, 1973)

learning. For example, when attending university, prospect CIOs often face a binary decision to either learn about technology or learn about business.

In 1992, researchers declared that executive education in IT has largely been '…*abandoned to consultancies and vendors*,' leaving information executives with '…*no option but to the ride an ever changing IT boat down the turbulent river of information management*,' (p.lxii) (Ives, 1992); to address this, researchers suggested that education providers should develop programmes that '…*reflect the broad business and IT backgrounds that will be required by organizations in the future*,' (p.488) (Applegate and Elam, 1992).

In 1996, similar calls persisted; education providers were advised to develop programs that help CIOs learn to add business value, develop new business products and services, to become technology specialists, to be change agents and to employ IT resources cost-effectively (p.83) (Karimi et al., 1996); and again, in 2010, (La Paz et al., 2010) observed that as universities were still failing to provide '…*the market with professionals with a vision of management of IS/IT that supports the integration of business value along with the operational maintenance of the systems*,' (p.7), and recommend that they should '…*offer programs that integrate the current relation between business and ICT, being able to generate professionals that show an operational view of technology as well as a strategic view that generates business value*,' (p.2).

As a further suggestion, in 2017, (La Paz, 2017) recommended that CIOs wishing to become a 'strategist CIO' would have to '…*complement soft, technical, and managerial skills by choosing the right combination of educational programs (undergraduate, executive, or master's-level)*,' (p.54).

It seems then, that undergraduates seeking educational programmes that prepare them for IT leadership have been consistently failed by universities. There appear to be two reasons for this. Firstly, many institutions still consider the twin domains of IT and business as being unrelated; 'IT' should be taught as a purely technical subject in the school of computing, whereas 'business' is taught in terms of strategy, leadership and change in the business school. With few exceptions, this approach has endured since the 1990s.

An alternative reason for this ongoing issue is offered by (Sampietro, 2019), who suggests that executives are high status individuals whose roles are based on (or derived from) 'command and edict'[267], abilities that '…*cannot be taught through training or education*'[268], and who see themselves as 'leaders rather than learners'[269]; as such this provides '…*little incentive for academics and educators to create courses oriented around executives*,'[270] (p.3).

Whilst the reasons for the ongoing lack of courses that fail to meet the needs and expectations of practitioners are in dispute, it's clear that not all researchers agree about the longer ongoing relevance of a university education. For example; referring to the earlier study by (Applegate and Elam, 1992), (Gottschalk, 1999) suggested that '*Education, though examined in previous studies, seems to be a less important factor because of the amount of time that has passed since obtaining the degree*,' (p.394).

2.4.2 Training

CIOs who have long since left university may then consider training as an alternative process for obtaining new knowledge:

'*Training is thought of as the transmission of explicit, abstract knowledge from the head of someone who knows to the head of someone who does not in surroundings that specifically exclude the complexities of practice and the communities of practitioners,' (p.47) (Brown and Duguid, 1991)*

Organizations intending to help their CIOs develop their attributes further should be mindful of two key issues: the CIOs motivations for learning and the organizations level of preparedness for supporting CIOs to apply their recently acquired capabilities once they have returned to work.

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267 Cf. (Burnham, 1941)
268 Cf. (Cordiner, 1956).
269 Cf. (Senge, 1996)
270 Cf. (Wren, 1979)

In contrasting adult learning (or 'man-leading' (i.e., andragogy), with child learning (or 'child-leading' (i.e., pedagogy)), (Sampietro, 2019)[271] claims that the development of adult training courses should consider six assumptions, being that:

1. Adults need to know the reason for learning
2. Experience provides the basis for learning activities
3. Adults need to be responsible for their own decisions on education
4. Adults are most interested in learning subjects that have immediate relevance to their professions
5. Adult learning is more orientated to problem solving rather than on the theory of content; and
6. Adults respond better to internal motivators more that external motivators (p.5)

CIOs unable to make their own decisions on learning and education, or who's only option is to endure mandatory, seemingly irrelevant training (from their organisations) are therefore unlikely to develop a strong understanding of the relevancy of new or changing technologies and business practices.

Further, even if CIOs are content with the training they receive, they are likely to still experience barriers to practicing the application of their newly acquired knowledge as, executives returning from training programmes often have:

> *'…less power to change the system surrounding them than that system had to shape them.' ''Senior executives must first attend to organisational design.'* (p.53) (Beer et al., 2016).

Many of those returning from training, find themselves unable to implement their newly gained capabilities due to organisational intransigence. Leadership training (in particular) is perceived as an ongoing, time consuming process (Hickman and Akdere, 2018). Executives are busy, they can be very demanding and may not

[271] Cf. (Knowles, 1980)

remain in the same role for very long (Sampietro, 2019) and constant retraining is therefore seen as expensive and unproductive (An et al., 2019)[272].

2.4.3 Mentoring & Communities of Practice

If education and training both fail to provide CIOs with new knowledge on which to develop their dynamic capabilities, then CIOs can learn on the job by receiving support from their work colleagues; however, whilst newly recruited CIOs could expect to receive a measure of support from their new colleagues, the process may take considerable time and may not be available to everyone (Leidner and Mackay, 2007)[273]. Alternatively, and depending on the CEO, CIOs could consider securing access to more tailored mentoring programmes (Karimi et al., 1996)[274] and (Hickman and Akdere, 2018)[275].

Ultimately though, the CIOs primary vehicle for continuous acquisition and application of new knowledge to develop their overall capability and effectiveness, will reside in the experiences they gain through their everyday work activities.

Experience is the culmination of knowledge best achieved when 'learning through working' (Brown and Duguid, 1991). Analysing a case study to investigate the gap between espoused practice and actual practice, the researchers suggest that the '…*most conventional learning theory, including that implicit in most training courses*', endorses the view that abstracted knowledge is favoured over actual

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272 In the case of the CIO, it is surprising to discover the lack of structured training and accredited courses available that could help CIOs progress the professionalisation of their role (i.e., in a similar manner to Chartered Engineers, Chartered Accountants, etc.). Having spoken with many CIOs on this matter, the author has found that in nearly every case CIOs had learned on the job, largely through a process of trial and error. The implication of this is that many aspirational CIOs will generally be confronted with many years of slow, unstructured career progression, often having to follow the whims of their top management team (TMT) as technology trends rise and fall before, they can be deemed successful practitioners

273 Who suggest that CIOs should take one to two years to transition in order to overcome the influences of their predecessors

274 Who recommend that CEOs should provide new CIOs with mentoring programmes that provide '*…a broad knowledge of the firm and access to a broad network of organizational contacts,*'(p.82)

275 Who conclude that 'IT leadership development should involve formal mentoring, robust feedback that is integrated into the development plan, and should be treated as a core process for long-term success.'

practice, and as a result learning away from the place of practice (using abstracted knowledge) is 'unsound', (p.41). Those wishing to gain experience by learning in their place of work should adopt the view that they should *become* a practitioner and not learn *about* practice (p.48). Individuals should therefore combine learning with working by following 'organizational codes', by problem solving or by collaborating with others (e.g., through story telling) in communities of practice[276]. However, the researchers acknowledge that whilst organizations assume that individuals will exchange information freely, they overlook the way in which individuals and groups may '*…implicitly treat information as a commodity to be hoarded…rather than exchanged*,' (p.54).

Whilst learning on the job appears attractive, several underlying assumptions must be addressed[277]. Firstly, that organizations are able and willing to develop and support communities of practice; organizations that fail to promote and support the development of communities of practice risk a reduction in the levels of effective knowledge sharing and rates of learning. Secondly, that the learning objectives of the individual and the organisation will remain aligned over time. And thirdly, that assessments of the expected changes in 'performance' following a learning intervention are relevant, robust, and effective in helping the individual maintain motivation for continuous learning.

2.4.4 Professional Development Frameworks

In response to a call for the development of a 'framework of professions' for the CIO (Hogberg, E., Sjoman, 2018), various organizations have attempted to establish professional development frameworks for IT practitioners and business executives (though none of these are specifically for IT leaders or CIOs). Of note are, a:

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276 Cf. (Lave and Wenger, 1991)

277 CIOs also have access to a number of highly visible global networks. Notable examples include: The CIO Executive Council, provided by IDC. See: https://cioexecutivecouncil.com/ (Accessed: 03/11/22) and The National CIO Review. See: https://nationalcioreview.com/ (Accessed: 03/11/22)

1. UK based global professional body directly supporting IT professionals, the British Computer Society (BCS)[278] and
2. UK governmental body targeting senior executive leadership development (through level 7 apprenticeship standards), the institute for Apprenticeships and Technical Education[279]

2.4.4.1 The BCS

With 60,000 in over 150 countries, the BCS offer practitioners to obtain a number of numbers of widely recognised certification and accreditation, culminating in Chartered IT Professional (CITP).

The Skills Framework for the Information Age (SFIAplus), developed by the BCS, claimed as a globally recognised standard, comprises of seven levels of skills assessment for over 100 skills grouped under:

1. Strategy & Architecture
2. Change & Transformation
3. Development and Implementation
4. Delivery and Operation
5. People & Skills
6. Relationships & Engagements

Whilst the seven levels of skills imply an evolution in personal capabilities for 'IT Professionals', the framework does make any distinction between knowledge acquisition, the development of skills (in the workplace) to apply that knowledge, or the effects of dynamic environments on the individuals to enact their expected roles.

2.4.4.2 The Institute for Apprenticeships

Provides a level 7 Senior Leader apprenticeship (both degree and non-degree versions) targeted at Cxx and Director level individuals whose purpose is to

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278 See: https://www.bcs.org/it-careers/sfiaplus-it-skills-framework/ (accessed October 2022)

279 An executive, non-departmental public body sponsored by the Department for Education. See: https://www.instituteforapprenticeships.org/ (accessed October 2022)

'…*provide clear, inclusive and strategic leadership and direction relating to their area of responsibility within an organisation*'.

To obtain this qualification, administered through both the Chartered Institute of Management (CMI) and the Institute of Leadership and Management (ILM), individuals are assessed against an apprenticeship standard comprising Knowledge, Skills, and Behaviours.

Although not targeted at IT professionals, the standards make multiple references to knowledge of innovation and change, skills relating to communication, planning and relationship building, and behaviours encompassing collaboration, curiosity, and personal development, etc. As far as the author is aware, this is one of the few professional development frameworks for senior executives attempting to combine a behaviourist view of competency, with specific knowledge and skills as described in Blooms KSB taxonomy.

2.4.5 Motivation & Turnover

Whilst the issues and challenges arising from continuous personal development may not be new, they may explain the ongoing trend of relatively high-turnover rates for CIOs (in comparison with other executive roles). This sustained[280] trend has been monitored by researchers (Capella, 2006), (Dawson and Kauffman, 2011) and (Luftman et al., 2015) and business analysts and commentators alike (Nash, Kim, 2009) and (Rosenbush, 2017)[281].

CIO demotivation can arise as a result long tenure (Gorgeon, 2010)[282], or from long standing associations with IT project failures (Gerth and Peppard, 2016) or from mixed expectations of an already ambiguous role (Peppard et al., 2011)[283].

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[280] This appears to be an ongoing issue as identified in 1992 (Applegate and Elam, 1992) and 1996 by (Karimi et al., 1996)

[281] In discussing a study by (Korn Ferry, 2017) find that the average age/ tenure of the CIO is 51 and 4.3 years (in comparison to CEO at 58 and 8 years and the CFO at 53 and 5.1 years)

[282] CIOs pass through three distinct phases throughout their tenure (Conquest, Exportation and Settlement). This last phase (Settlement) suggests that '…*task interest wane, and with it their motivation and energy to defend, diffuse and implement new visions for IT*,' (p.10)

[283] According to Peppard, role ambiguity occurs where the expectations of the '*rights, duties and responsibilities*,' of the CIOs role, along with their behaviours and the consequences of these behaviours, are '…*non-existent or inadequately communicated*,' (p.41)

However, of these, continued role ambiguity has been strongly associated with increased levels of role conflict and poor performance (Tubre and Collins, 2000)[284], which in turn leads to dissatisfaction and demotivation.

2.4.6 Changing Jobs

CIOs who conclude that their organizations have failed to support their continual learning or hold unrealistic expectations for changes in their performance following an investment in learning do have one, final option. CIOs can seek alternative employment (Williams et al., 2017); However, this appears to be a risky strategy as:

1. '*Current recruitment practices are often ineffective and unsystematic,'* and that '..*current hiring practices to be haphazard at best and inept at worst*,' (p.74) (Groysberg et al., 2009)
2. There has been insufficient research into 'targeted' recruitment to help inform the recruitment process (Breaugh, 2012); and
3. HR departments and recruitment agencies still prefer 'more traditional approaches' of recruitment despite the advent of new digital tools such as Big Data (Lohr, 2013), or analytics (Rasmussen and Ulrich, 2015) or even social media (Allinen, 2018)

It seems that CIOs have few attractive options for continuous development of new capabilities with which to match or tackle changing demands from digitally enabled dynamic environments.

This ongoing challenge has been described as 'ironic' by some researchers, who claim that whilst organizations recognise a need '…*to cultivate the position and role of the CIO to derive value from IT*,' they have '…*neither procedures in place to train individuals to become CIOs nor do they even have succession plans in place to ensure the continuity of IT contribution in the face of a departing CIO,*' (p.631) (Preston et al., 2008)[285].

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[284] Who note that '…*that efforts to reduce role ambiguity could have a meaningful impact on job performance*,' (p.165)

[285] Cf. (Leidner and Mackay, 2007)

Whilst the reasons for demotivation and turnover are likely to be diverse (Bhanap et al., 2014), it's clear that the role is uniquely challenging:

> *'The position of corporate CIO continues to be one of the most politically dangerous and operationally difficult executive positions. Rapidly changing job responsibilities, dynamic organizational information requirements, and technology shifts have made the position of CIO too much to handle for one individual,' (p.8)* (Beatty et al., 2005)

However, there is an opportunity for CIOs to improve their situation, as:

> *'More definitive role expectations could also help reduce the relatively high turnover rate among CIOs and aid in career planning,' (p.396)* (Gottschalk, 1999)[286]

Nearly forty years of research clearly points to the need for deeper understanding of how individual CIOs can effectively manage multiple, changing expectations.

However, the question remains as to how CIOs can learn to do this? If learning is to be a continual process of knowledge exchange and practice, then researchers and practitioners need to agree a new career development framework that will enable them to identify shortfalls when meeting dynamically changing expectations; and perhaps more importantly then apply this framework to develop interventions that help CIOs learn to address those shortfalls in a practical and effective way.

2.5 Alternative Theoretical Perspective: Role Theory

As section 2.2 indicates, CIOs are expected to meet expectations in increasingly dynamic environments (i.e., by becoming more adaptive). However, much of the IS leadership research on CIOs remains entrenched with examinations of expectations in static, or unchanging environments. To remain effective in meeting changing expectations in increasingly dynamic environments, CIOs will

[286] Cf. (Applegate and Elam, 1992)

need to manage a continuous process of personal capability development. As new technologies, methods and processes emerge, CIOs should seek to continue the process of knowledge exchange and knowledge application if learning is to become a rewarding endeavour for CIOs and their stakeholders. In the field of HRD and HRM, for learning to be targeted and effective, employees and executives have largely relied on 'Competency Management', where the primary purpose of competency management is to '…*serve as a conduit of the organization's strategy into the day-to-day employee behavior*.' (p.57) (Sanchez and Levine, 2009). It is now considered the:

> *'…closest to describing a relational contract that regulates an implicit understanding between the employee and the organization. This understanding establishes a commitment to interpret not only the current role, but also future roles along the lines of certain behavioral themes representing maximal performance in line with the organization's strategy,' (p.57)*
> (Sanchez and Levine, 2009)

Similarly, HR professionals also consider that competencies have more '…*extensive horizons compared to KSAs'*, i.e., they are inherently *'…behavioral in nature, and not limited to a certain job*,' (p.8) (Dahooie et al., 2018)[287].

However, as literature review has revealed, investigations attempting to clarify the relevance of a CIOs competence with various expectations for effectiveness and performance appear inconclusive largely due to inconsistent definitions for CIO competence; an issue similarly reflected in the HR literature:

> *'Under the psychometric microscope, competencies appear to be troubling concepts, because their multi-faceted nature makes them unlikely to meet well-accepted criteria for construct validity such as forming a sound nomological network where acceptable levels of convergent and discriminant validities*

[287] cf.(Hooghiemstra, 1992) and (Kolařová and Žiaran, 2016)

among similar and dissimilar latent traits are observed,' (*p.58)*
(Sanchez and Levine, 2009)

If competencies are behavioural in nature, and difficult to define and examine, then alternative approach to CIO capability assessment and development is needed; this alternative approach is hinted at in the observation that competency-based capability assessments of 'traditional jobs' often overlook the fact that jobs are '…*essentially roles… which are both interpreted and enacted in very different ways depending on the job*,' (p.55) *(Sanchez and Levine, 2009)*.

Taking heed of this, the author now describes an alternative theoretical context for assessing and progressing CIO capabilities in terms of roles and behaviours.

2.5.1 Roles & Organizational Role Theory (ORT)

2.5.1.1 Roles

Some of the confusion in the attempts to define the CIOs role stems from the confusion surrounding the term 'role'. The term 'role' has been used in a variety of different ways. According to (Louchart, 2012), these include:

1. 'A particular patterned sequence of learned actions or deeds performed by a person in an interaction situation,' (p.225) (Sarbin, 1954)
2. 'A particular set of norms that is organized about a function,' (p.106) (Bates and Harvey, 1975)
3. 'A comprehensive pattern for behaviour and attitude,' (p.124) (Turner, 1979); or
4. 'A behaviour referring to normative expectations associated with a position in a social system,' (p.3) (Allen and Van de Vliert, 1984)

Citing (Buchanan and Huczynski, 1997), (Petrovic, 2001) claims that some of the confusion has been alleviated by the development of the following classifications of role definitions:

1. Prescriptive definitions: where roles refer to the duties specified in a job description i.e., what an individual enacting a part (i.e., as the focal person,

role incumbent, role occupant, job holder, actor, role receiver) should do when occupying a position or job within an organizational structure

2. Action definitions: where roles concern the actions involved in performing/pursuing duties given in a position/job
3. Evaluative definitions: where roles refer to the criteria used for the assessment of how well a job is being performed; and
4. Descriptive definitions: where roles represent the focal persons actual behaviours, that is, content of work and the nature of interactions engaged in it (e.g., studying how managers spend their time)

On the surface, whilst such definitions appear useful, they have, according to Biddle created further confusion. Much of this confusion arises from the fact that researchers have adopted mixed '…*definitions for the role concept*', have made poor '*assumptions*', and provided incomplete '…*explanations for role phenomena*,' (p.68) (Biddle, 1986).

However, whilst debates[288] about the definition for the term 'role' appear 'substantial', they are in fact more '…*terminological than substantive*,' (p.68) (Biddle, 1986)

In the case of the CIO, and in line with Biddle's perspective that the basic premise for a role-based theory concern:

> *'…characteristics of behaviours, parts to be played, and scripts for behavior,' (p.69) (Biddle, 1986),*

a useful analogy for the CIOs role is offered if we consider the original meaning of the word role.

Role, originally a French word, entered the English lexicon from the Latin word for little wheel, 'rotula.' According to (Biddle, Bruce and Thomas, Edwin, 1966) ,p.6 the little wheel, refers to the round wooden log used to minimise damage in

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[288] Including references to role being characteristic behaviours (Biddle 1979, Burt 1982), or social parts to be played (Winship & Mandel 1983), or the scripts for social conduct (Bates & Harvey 1975, Zurcher 1983)

the wrapping/ unwrapping of parchments for storage and reading. The word fell into popular use to describe official documents (e.g., in or law courts, or parliaments). Similarly, throughout antiquity, actors read their parts from such scrolls, or rolls; and later in the seventeenth century, actors read from paper 'roles', with each part eventually becoming referred to as a role (Moreno, 1960), p.80).

Applying this to the CIO, we can consider the CIO as an individual who develops their 'part' partially in response to the actions of their colleagues (or their fellow actors) and in response to the how (internal/ external) Customers (i.e., their audience) perceive them, whilst attempting to follow (and improvise from) a given job description or brief (i.e., their 'script').

Building on this premise, the author now examines perspectives on Organizational Role Theory (ORT) and how it offers a useful, alternative perspective on CIO research in increasingly dynamic environments.

2.5.1.2 Role Theory

Role theory is:

> *'…predominantly concerned with describing the mechanisms by which individuals are socialized to assume congruous societal roles in a manner that sustains a stable social order,' (p.50) (Jackson, 1998)*

The basic premise of Role Theory (RT) is that it describes characteristic behaviours (roles), parts to be played (social position) and scripts for behaviour (expectations for social conduct), where individuals not only hold expectations for their own behaviours, but for those of others as well.

Role theorists trace the origins of RT back to social theory in the 1900s and note that the theory encompasses two fundamentally opposing perspectives, the structural perspective as espoused by (Linton, 1936) and the dynamic or interactionist interpretation derived from the writings of (Mead, 1934) (see Table 4).

Structural role theorists take the view that sets of role behaviours are prescribed, having been associated with a position in a social structure; structural role theorists focus on the behaviours associated with the role rather than on the individual holding that role (Petrovic, 2001)[289].

Conversely, role theorists adopting the interactionist perspective perceive roles more as social constructs which are created though interactions with others in a social environment role (Petrovic, 2001)[290]. The interactionist perspective therefore considers how various aspects (i.e., characteristics, behaviours, and attributes) of both the individual and the group the individual is interacting with relate to the development of social norms. This process, developing social norms for the group, influences the behaviour of both the individual and the group (Mead, 1934) and (Turner, 1991). In his critique of role theory, Biddle 1986 identifies five perspectives on role theory, Table 4. According to Biddle, Functional role theorists focus on the behaviours expected from someone who holds a social position in a stable social environment, whereas Structural role theorists focus on the social structures that contain groups or sets of similar social statuses and positions.

Alternatively, Cognitive role theorists focus on the social conditions that give rise to role expectations of behaviour between individuals, whereas Symbolic Interactionist theorists focus on the evolution of roles over time, including those arising though informal interactions. The fifth perspective, Organizational role theory (ORT) is discussed in more detail in the next section.

2.5.1.3 Organizational Role Theory (ORT)

Organizational role theory (ORT), concerned with the development of roles in formal organizations, represents an ideal paradigm for describing and investigating the continuous development of the CIOs role in dynamic environments. According to (Biddle, 1986) ORT is derived from the works of (Gross et al., 1958) and (Katz and Kahn, 1978). ORT considers how roles arise

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289 cf. (Hogg and Doolan, 1999).
290 cf. (Biddle, 1979) and (Turner, 1990)

from (or are described by) pre-planned, task-orientated, or hierarchical conditions that exist in organizational settings and such roles are assumed to be '…*associated with identified social positions and to be generated by normative expectations*,' (p.73) (Biddle, 1986). As such, organizational roles can be viewed as:

> *'…a pattern of behaviours associated with an individual occupying a particular position/ job within the structure of an organization which links the individual to his/ her workgroup in order to perform the assigned organizational task,' (p.13) (Petrovic, 2001).*

However, organizations comprise of complex (formal and informal) social structures, which are subject to constant change. Organizational role norms vary greatly; roles are subject to formal (organizational) demands and informal expectations of other individuals and/ or groups. As there are multiple sources for role norms, much of the research on ORT (according to Biddle) has focused on describing role conflict and role change.

Of the five perspectives, ORT lends itself well to the study of the CIO. However, Biddle criticises ORT, in that it fails to address (i) roles that evolve and/ or are '…*generated through nonnormative expectations*', and (ii) the assumption that organizations are perceived to be '…*rational, stable entities, that all conflicts within them are merely role conflicts, and that the participant will inevitably be happy and productive once role conflict is resolved*,' (p.74).

Whilst ORT may not represent a singularly ideal perception of the effects of complex and dynamic environments on the CIOs role, ORT and RT do provide a means for investigating the relevance of expectations for developing more effective CIO behaviours in highly uncertain organizational environments.

For the purposes of this research, it is useful to examine key concepts from the field of RT and ORT i.e., Socialization, Expectation Management (in terms of role taking and role making) and Expectation Enactment.

	Functional	Structural	Cognitive	Symbolic Interactionalist	Organizational
Proponent/ Focus/ Summary	• Linton 1936 -> Parsons 1951	• Levy 1952 -> Burt 1976)	• Gross 1958 -> Kahn 1964	• Mead 1934	• Gross 1958 -> Kahn 1964
	• Behaviours characterised by the social position they hold in a stable social environment • Roles conceived as shared normative expectations that prescribe and explain these behaviours • Norms are 'taught' and conformity is sought • Dominant in RT until 1970s	• Focuses on social structures which are construed as stable organisations containing sets of people in social positions and statuses who share same patterns of behaviours which are directed to others in the same structures • Focus more on social environment and less on the individual • Usually described using complex mathematical symbols.	• Focus on the relationship between role expectations and behavior • And on social conditions that give rise to expectations and to techniques for measuring expectations, and to the impact of expectations on social conduct • Alternative focus is on ways in which a person perceives the expectations of others and the effects of those perceptions on behavior. • Sub fields: o Role Playing (Moreno 1934). Person attempts to imitate the roles of others. Effective when producing changes in expectations (Janis and Mann 1977). o Group Norms (Sherif, 1936). Focus Leader/ Follower roles. o Anticipatory Role Expectations (Rotter 1954). Expectations not as norms but as 'beliefs' • Role Taking (Mead 1934). One group attribute sophisticated thought to another group	• Roles of individuals evolve through social interaction • They use cognitive concepts to understand and interpret conduct of themselves and others • Norms provide broad set of imperatives within which detailed roles are worked out over time • Makes strong contribution to how roles evolve in informal interactions	• Focus on social systems that are pre-planned, task-oriented, hierarchical. • Roles assumed to be associated with identified social positions and generated by normative expectations • Norms vary among individuals and reflect both the official demands of the organization's pressures and from informal groups. • As there are multiple sources for norms, individuals often subjected to role conflicts in which they must contend with antithetical norms for their behavior.
Criticisms	• Roles not associated with o Identified social positions, or o Just functions • Not all social systems stable • Norms not always shared • Conformity not always sanctioned • Roles can reflect other cognitive processes (not just norms)	• Mathematical symbols unhelpful • Doesn't tackle: o Non-conforming persons outside of poorly structured environments o Or social change	• Insights skewed towards American culture • Doesn't address contextual limits of organizational effects • Ignores dynamic human interactions • Don't consider social positions associated with structures	• Researchers use ambiguous definitions • Ignore contextual limits of their findings • Lack of work on structural constraints or expectations of other actors • Not clear on how expectations are generated and how those relate to conduct (or behaviours)	• Precludes roles that evolve or are generated by non-normative expectations • Implies orgs are rational, stable • Conflicts are merely at role level and once resolved individual will be happy and productive

Table 4: Role Theory Summation cf. (Biddle, 1986)

2.5.1.4 Socialisation

Secondary socialisation[291] is the process of learning the most appropriate behaviours as a member of a small group within a larger society (Mead, 1934).

It is the process in which individuals learn and adopt the norms, value systems and behaviour patterns of a group (Schein, 1988).

Investigations into the socialisation process take one of three approaches, organizational, individual or interaction based (Fang et al., 2011). Organizational socialisation (Maanen, 1978) focuses on the procedures and processes an organization puts in place to integrate new joiners. Individual socialisation (Jones, 1986) focuses on the attributes (and socialisation 'tactics') a new employee can use to achieve integration, and interaction based socialisation (Reichers, 1987) centres on the combination of the two approaches; that is recognising that both the Individual and the organisation have parts to play in shaping the role of the individual and those they interact with.

However, each of these approaches has its critics.

According to (Van Maanen, J.E. and Schein, 1979) a fundamental weakness in the Organizational Socialisation process is that it is subject to much variation as, newly recruited employees who need to develop the '…*social skills and knowledge necessary to assume a particular job in an organization*,' are exposed to multiple people processing strategies (p.3). In response to this, Van Maanen proposes six tactics that organisations should use to structure the socialisation process for new comers to yield the desired results; however, critics of this approach find that application of such tactics can lead to unexpected outcomes, (Jones, 1986).[292]

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[291] Primary socialisation occurring when a child learns the attitudes, values and actions appropriate to individuals of a particular culture

[292] Jones showed that the application of the tactics at each extreme of the spectrum (proposed by Van Maanen) generated unexpected results i.e., tactics applying 'institutionalised' socialisation which should have led to a 'custodial role orientation' for the new joiner, is moderated by the individual's inherent level of self-efficacy.

As a result of these findings, Jones proposed that researchers should attempt to understand the relevance of the differences in individuals and the tasks they would be expected to perform as organisations applied different socialisation tactics in their attempt to influence the socialisation outcomes for the new joiners.

The relevance of the individuals' attributes in influencing the organisational socialisation process has been studied widely. For example, investigation has shown positive correlation between organizational socialisation tactics and an individual's level of performance , (Berlew and Hall, 1967), their (subsequent) level of commitment (Bruce, 1974), their attitudinal variables such as general satisfaction, internal work motivation, job development (Feldman, 1981) and more recently and an individual's information acquisition capabilities (Saks and Ashforth, 1997).

However, as the field of interactive socialisation has progressed, researchers have paid considerable attention to the relevance of the individual's level of proactivity (e.g., relationship building, sense making, etc.) in facilitating their own socialisation process (Bauer and Erdogan, 1996).

As socialisation is most visible during the onboarding of new employees (or newcomers), researchers have extended this to consider that effective socialisation is a proactive two-way process between new comers and insiders (Reichers, 1987) and have also started to posit the 'tactics' that individuals can employ (such as seeking feedback, informal mentorship or relationship building with supervisors and/ or co-workers, etc.) to improve socialisation outcomes (such as job satisfaction, job performance, retention, etc.) (Griffin et al., 2000);

More recently, researchers have also shown the relevance of interaction that encourages new-comer proactivity to access and then mobilise social capital (such as access to network structures or the resources within those structures as provided by insiders) (Fang et al., 2011).

Such studies have drawn several important conclusions about the socialisation process:

1. That insiders are '…*important to new comers efforts to access beneficial social capital*,' (p.148) (Fang et al., 2011)
2. That the rate of the socialization process is important (Reichers, 1987)[293]; and
3. Those tasked with the socialisation process should adopt a mix of context, content or socially related organisational tactics to positively impact the proactivity of individuals, (p.470) (Griffin et al., 2000)

Whilst ineffective socialisation leads to a high turnover rate for newcomers (impacting productivity, increasing recruitment costs and diminishing workforce loyalties (Fang et al., 2011)), it is important to note that socialisation should be considered a continuous, functional and career spanning process (Schein, 1971). And, if we also consider that organisational socialisation is the process by which:

> *'…an individual acquires the social knowledge and skills necessary to assume an organizational role,'(p.3)* (Van Maanen, J.E. and Schein, 1979)

then in considering the effects of increasingly dynamic environments on the CIOs role, researchers need to clarify how changing expectations for the CIOs role impacts the effectiveness of the socialisation process.

If role expectations are the 'major generators of roles' (Biddle, 1986), p.69), then it is important to consider how those expectations have arisen in the first place.

According to Biddle, expectations can arise simultaneously by being 'prescribed' (or agreed 'norms'), from subjective probabilities (or 'beliefs') and from personal attitudes (or personal 'preferences'); each 'mode' of expectation having been learned from previous differing experiences.

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[293] For individuals, a rapid socialization period means a quicker reduction of the anxiety associated with lack of situational identity (Wanous, 1980). For the organization, this reduction in anxiety also is desirable because it means that individuals can begin to focus sooner on job performance (Katz, 1980).' (Reichers, 1987) (p.278)

Conceptualizing organizational roles in terms of expectations has enabled researchers to monitor and assess observed or reported role expectations and their effects on role behaviours, and ultimately, the socialisation process.

2.5.1.5 Expectation Management

CIOs should *'…align role requirements and their own expectations for the role with those of other members of the C-suite*,' (p.42) (Peppard et al., 2011).

According to Katz and Kahn, human organisations can be described in terms of an open system of roles. Organizations attain constancy and stability from the patterned recurrence of acts, rather than in terms of the persons who perform them (p.187) (Katz and Kahn, 1978). This is illustrated by the fact that even when people change jobs, organisations retain their constancy. As such, organizations continue to exist only if the attitudes, beliefs and perceptions, habits and expectations of individuals evoke the required motivations and behaviours. Behaviours are motivated through a process of learning the expectations of others, accepting them, and fulfilling them, primarily for the rewards of membership. Interdependent behaviours can be described in terms of a social system, or subsystem, and can represent a stable collective pattern in which people play their parts.

Claiming that, to study role behaviour, researchers should consider '…*locating the recurring events that fit together in converting some input into an output*,' (p.189), the authors, in considering the effects of the immediate organizational environment, adopt the concepts of role-sending, role receiving and role taking.

Individuals who have a vested interest in the performance of another, develop attitudes and beliefs about what they expect from that person. Role expectations not only consist of the activities expected from the individual but can also comprise of expectations for that person's characteristics and beliefs; such expectations can either be clearly communicated, or 'sent' to the focal person through a process of influence.

The focal person, the person receiving the sent role, will hold perceptions and cognitions about what expectations for the role were sent; and alignment between

what was sent and what was received will depend on '…*the properties of the senders, the focal person, the substantive content of the sent expectations, the clarity of the communication, and the like*,' (p.192).

Katz and Kahn refer to this four-step process (i.e., attributed (or pre-conceived) expectations for a role, the communication (or sending) of those role expectation's, the perception of the received role by the focal person and the subsequent behaviours from the focal person (i.e., their response)) as a 'role episode' (see Figure 4).

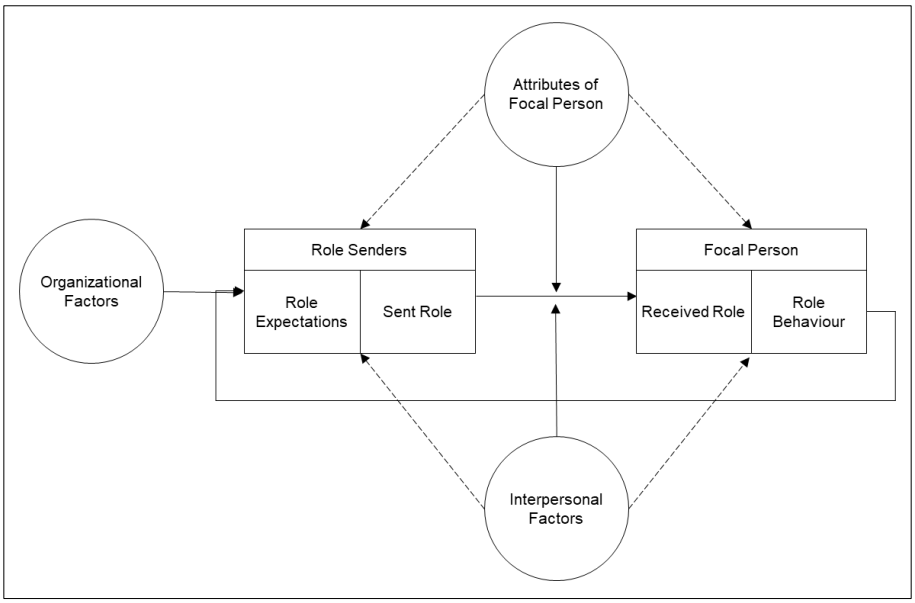

Figure 4: Role Taking (Katz ad Kahn p.196)

This ongoing cyclical process doesn't occur in isolation; it is shaped by individual, interpersonal, and organizational 'contextual factors' that are largely based on '…*abstractions and generalizations based upon recurrent events and behaviours*,' (p.196). As expectations for the focal persons role[294] are derived from pre-conceived or prescribed organizational contexts, then the behaviours of the focal person are (initially at least) informed in the structural (or functional) contexts of RT, which the researchers refer to as 'role-taking'.

[294] Sometimes referred to as a role-set, or a set of expectations for behaviors associated with the 'office' (a relational concept) held by individuals in an organization (p.188), cf. (Katz and Kahn, 1978)

According to Biddle, role taking, a concept originally proposed in 1934[295], describes the '…*development of the self and the participation in social interaction*', which '…*both require that the person 'takes the role of the other*,' (p.84) (Biddle, 1986). However, symbolic interactionists tend to avoid the extreme relativism implied by role making as organizational roles are fluid and every interaction produces a different and unique role; the implication of this is that role taking produces consistent patterns of behaviour that can be associated with various types of social actors.

Role taking assumes that the focal person, over a period remains accepting, or accommodating of the expectations of the sent role; it ignores the existence of the individuals pre-existing 'motives and beliefs' about work roles, or about the specific role itself. The effects of this on the role taking process materialise through the 'feedback' process from the focal person to the role sender.

Research exploring the effects of the feedback process have, according to (Fondas and Stewart, 1994)[296] been supplemented by the work of (Graen et al., 1973).

In his 1973 study, Graen examines the process of role assimilation of newly appointed managers in a US university. According to Graen, when taking a new role, newly appointed managers experience a discrepancy between their expectations for the job and those originally communicated to them (in this case, the role set communicated to them by their new boss). In this situation, the new role appears ambiguous. In confronting their new reality, the newly appointed managers then experience conflict that materialises in initial confrontations about their expectations for the role. However, as role interaction (with their boss, or holder of the role set) continues, they 'negotiate' a mutually acceptable set of role expectations. The process of interaction involves the focal person testing the initial expectations for the role by deviating from them. This deviation provides feedback to the role sender who makes a choice between issuing sanctions for

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295 Cf. (Mead, 1934)

296 Who refer to the feedback process in terms of as expectation modification (p.89)

non-compliance or by making an adjustment to the expectations they had originally sent. If the focal person no longer receives expectations that deviate from their own expectations, then Graen considers that the sent role expectations have been successfully altered, a process he calls 'role-making'.

According to Petrovic, in this process, the focal person is not '…*merely the passive recipient of role expectations but is highly creative in negotiating and changing his/ her role*,' (p.23) (Petrovic, 2001)

2.5.1.6 Expectation Enactment

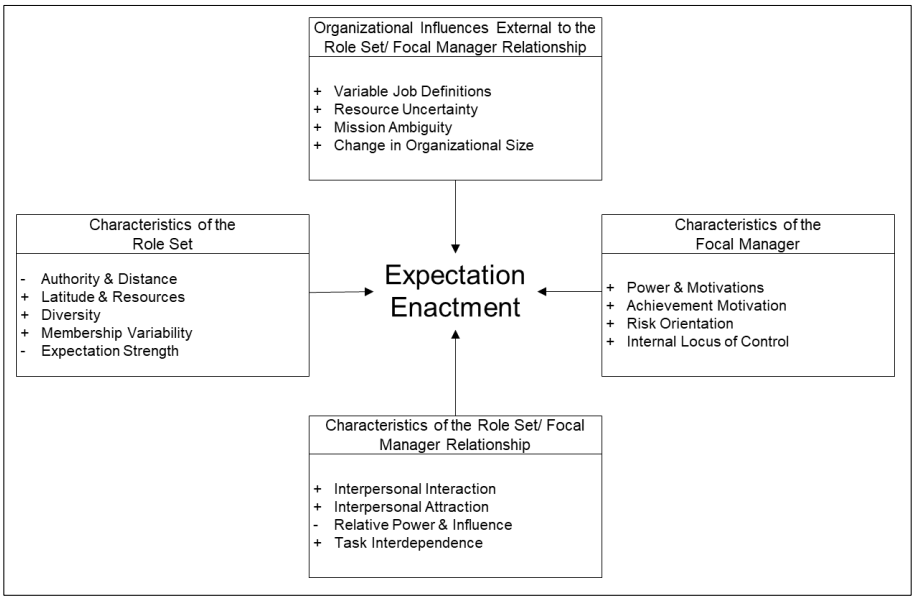

Figure 5: Managerial Expectation Enactment (Fondas 1994)

Role making, in comparison to role taking is therefore perceived as a proactive, dynamic process that involves the focal person actively influencing the expectations others hold for their role. Reflecting Graen's 1973 study, (Fondas and Stewart, 1994) explain that Graen suggests that successful role making depends on: (i) organizations not insisting on fixed definitions for jobs and that supervisors are empowered to provide managers with a degree of latitude when enacting their behaviours, (ii) that supervisors can exchange valuable resources with other managers as a means to motivate them to perform above role expectations and (iii) that managers possess the ability and motivation to perform above the minimal requirements of the role, (p.88). However, Fondas also suggests that whilst Graen perceives role making as a '…*rare phenomenon,*

occurring only in the early weeks of job occupancy,' (p. 90), she claims that symbolic interactionists perceive it as a continuous occurrence where the messages from the focal person don't merely consist of responses (or feedback) to the role sender but involves a proactive process that '…*actively recast expectations so they will be more acceptable and consistent with the job holders' own preferences*,' (p.90). In this scenario, expectations are not fixed, they are variable, continually modified through mutual, complementary adjustments by the role set and job holder (cf. (Turner, 1985). This process, dependent on the objectives and characteristics of the individuals and the effects of their environments has been referred to either as role reciprocity (Gouldner, 1960) or Role-Making (Turner, 1962). In an attempt clarify the determinants of role expectations management in organizations, Fondas and Stewart introduces their theoretical integrative model of expectations enactment (Figure 5). According to Fondas and Stewart, the focal managers expectations for their role are determined by:

1. Their own characteristics (i.e., their own motivations, their propensity towards risk taking, etc)
2. The characteristics of the role set associated with their role (i.e., the degree of authority associated with the role set, the strength of expectations for the set, etc.)
3. The effects of organizational influences on the role set/ focal manager relationship (i.e., the degree of variability in job definitions or the ambiguity in the organizational mission, etc.); and
4. The effects of the characteristics of the relationship between the role set and the focal manager (i.e., their level of personal interaction, differences in structural power and influence, etc.)

2.5.2 The CIO & Organizational Role Theory

'…It is not just the hierarchy that is important but the perceptions of the two executives and their mutual understanding and acceptance of those roles that is important. This requires clarity in the discussion between the CEO, CIO and CFO regarding expectations of their roles to avoid misperceptions' (p.5080) (Denford and Schobel, 2011)

One may argue that RT has provided the context for much of the IS leadership research on the CIO. The interactionist dimension certainly provides a perspective for the various expectations of the CIO from their peers in the TMT, and the structuralist perspective enables research to understand the CIOs structural power. However, there appear to be very few studies that consider expectations for CIO role behaviours, and role-making. Of note are two empirical investigations by (Louchart, 2012) and (Gerth, 2013).

Interviewing 25 CIOs, Louchart investigates the how CIOs perceive their current and future roles in terms of their perceived role demands, constraints and choices. Louchart identifies two new CIO models, the 'Abeyant CIO' and the 'Transmuted CIO'. Louchart's model for the abeyant CIO, a CIO considering making the move from manager to leader, considers that the CIOs role as formulated by a pre-conceived role set which ultimately determines demands and constraints in the individual's environment. In contrast, transformative CIOs, those who adopt a process of self-reflection are able to make more informed choices about their careers and hence become more actively involved in role making. For both roles, Louchart identifies the relevance of various individual CIO Characteristics (including their IT knowledge, their role behaviour, their leadership style, their working experience, etc.).

In 2013, Gerth, in his PhD research investigated the socialisation process for newly appointed CIOs. Claiming that newly appointed CIOs experienced a mutual adjustment process in the development of their role set and with their senior IT leadership team, the CEO, and other members of the TMT, Gerth suggests that CIOs experience three 'overlapping' phases when 'taking charge', being 'Entry',

‘Stabilization’ and ‘Renewal’. Gerth also shows that CIO socialisation is heavily influenced by the expectations for their role set when CIOs enact demand side and supply side leadership.

2.6 CIO Literature Critique

In meeting objective 1 of this research, the author now highlights key issues, or research gaps, in the body of knowledge on IS leadership for the CIO.

Whilst the CIOs role has certainly evolved from one expected to have a purely operational focus, into one that is expected to influence the development and application of digital business strategies, this transition hasn’t been binary; expectations for the role have not transitioned, they have expanded. CIOs are expected to enact roles that straddle operations and strategy simultaneously; this expansion in expectation has manifested in a variety of roles that are not only more salient to the business but are also more transient in nature. The capabilities to achieve these dynamically changing expectations are under researched. This shortfall, representing a major gap in the body of knowledge can be summarised in terms of five (limiting) factors:

1. The philosophical perspectives adopted by the researchers during their research
2. An apparent disregard of known issues with under pinning theories used to substantiate many claims for CIO performance
3. Models comprising variables and constructs based on:
    a. subjective perspectives on expectations for CIO outcomes, and
    b. inconsistent definitions for attributes
4. Methodologies that not only encompass limited stakeholder perspectives about the role, but methods that only allow for an investigation of a ‘snap-shout’ of stakeholder expectations at a single point in time; and
5. Lack of research into how CIOs can address perceived shortfalls in expectations, particularly in increasingly dynamic environments

Many CIO researchers have adopted the philosophical view that there are pre-defined, deterministic relationships between an individual CIOs attributes and

stakeholder expectations. The implication of this assumption is that individual CIOs who can apply any one of a growing list of personal attributes (knowledge, skills, etc.) will increase their chances of meeting various expectations for outcomes (i.e., in delivering performance, alignment and/ or enacting expected roles) in any conceivable scenario. This suggests that CIOs simply need to develop a given attribute (i.e., through education and training) to always deliver the expected outcomes to the satisfaction of their stakeholders in all circumstances, in Perpetua.

This narrative appears to gain credence through the numerous investigations, contextualised in RBV theory, that assume the CIO represents a critical resource. Such studies often claim to reveal deterministic relationships between CIO attributes and expected CIO outcomes. Whilst acceptance of direct, causal relationships between the individual CIO and, via various firm level measures towards strategic competitive advantage (SCA) appears absolute, the author believes that such claims not only ignore the assumption that casual relationships exist between a CIOs attributes and various expectations for outcomes in all circumstances, but that they also appear to disregard a fundamental criticism of RBV, that is, the effects of causal ambiguity.

RBV researchers have not been able to account for the relevance of the multiple (sub-level) factors (or resources) that are likely to also impact SCA. In other words, researchers have not been able to account for the effects of other resources (in addition to (say) individuals such as the CIO) that impact SCA. The difficulty in identifying the relevance of the contribution of any single resource to SCA is described as ‘causal ambiguity’ (Collis, 1994) and represents the risk of an ‘infinite regress’ (Kraaijenbrink et al., 2010) for those seeking to identify (and assess) higher orders of resource capability within the organisation. As concluded by Kraaijenbrink et al:

> *'RBV does not address fundamental differences in how different types of resources may contribute in a different manner to a firm’s SCA,’ (p.358)*

Relationships between individual CIOs and firm level performance are difficult to establish due to the fact that '…*many other factors may account for firm performance*,' and that the effects of the CIO on firm level performance tends to be implied (p.10) (Larson and Adams, 2010).

It is the authors opinion therefore that studies claiming the significance (of any) individual CIO attribute in relation to expected performance or alignment, whilst ignoring the potential relevance of the effects of the multiple IT (and business) resources available to the CIO, risks creating a mis-leading narrative.

In assessing the degree of success a CIO has exhibited, and to avoid the issues associated with the use of the RBV (i.e., causal ambiguity and infinite regress), CIO researchers have attempted define success in terms of effectiveness (see:2.3.1.4). The literature on CIO effectiveness centres on the expectation that a CIO can not only perform the activities that stakeholders expect from their given role but do so to the satisfaction of their stakeholders. However, in addition to the observations made by the author (i.e., that effectiveness is still perceived in terms of outcomes and/or perceptions on how well CIOs enact expected tasks), researchers also remain reticent about the use of the term with respect to IS leaders, or CIOs. In 1992, Browns suggestion that there is:

> *'…little empirical evidence on which to predict the effectiveness of IS executive behaviors, let alone provide guidelines for the practitioner,' (p.400) (Brown, 1993)*

Appears substantiated by more recent observations, that there is:

> *'…limited empirical research to examine the antecedents of CIO role effectiveness,' (p.218) (Smaltz et al., 2006a)*

And that,

> *'…despite the individual value of each single investigation, an integrative view on CIO role effectiveness does not exist.' (p.30) (Hutter and Rield, 2017)*

Given these concerns, the author believes that a reconsideration of CIO behavioural effectiveness may represent a new means for articulating rapidly changing expectations for CIO behaviours; and if achievable, would represent a significant contribution to the body of knowledge.

The third limiting factor in the literature arises from the significantly inconsistent use of terminologies and definitions for nearly all aspects of the CIOs role. In terms of expected outcomes, and in addition to a burgeoning list of expectations for firm level performance, CIOs are still expected to achieve and then maintain various aspects of business-IT alignment. However, whilst research investigating the CIOs role in terms of expectations for the level of IT-business strategic alignment appear plentiful, researchers have yet to agree on a unifying model that describes alignment and have (so far) failed to address the effects of dynamic environments on such a model.

Expectations for role enactment are also problematic. For example, managerial roles[297] overlap, they pay little attention to the effects of the environment, and they focus on what activities CIOs are expected to perform with virtually no attention given to how CIOs are expected to learn to perform those activities. Researchers are also highly inconsistent when referring to a CIOs 'leadership' role. Whilst it's clear that some researchers have attempted to align their definitions for leadership with some of the more commonly, widely accepted categories of leadership (i.e., contingent, behavioural, etc.), many studies introduce new definitions that appear to be highly subjective (e.g., demand side leadership, supply side leadership, etc.). However, as noted by Yukl:

> *'Vague definitions of leader "types" have long been popular in the literature, but they are often simplistic stereotypes with limited utility for increasing our understanding of effective leadership,' (p.302) (Yukl, 1999)*

[297] E.g., Mintzberg

Whilst investigations into expectations for CIOs enacting leadership roles do take account of what the individual is expected to do, they provide little insight into the relevance of the attributes the individual needs to develop and apply to enact those roles to the satisfaction of their stakeholders. In fact, the term 'satisfaction' also appears mis-leading here as different stakeholders are likely to deem success in many ways.

Whilst the body of knowledge contains many examples of investigations attempting to establish the significance of the relationships between CIO attributes and these expected outcomes, many researchers have noted the poor state of CIO attribute research. For example, (Peppard et al., 2011), noting much confusion over the terms being used, comments that:

> *'While interesting, much of the research,' into the '…competencies, personal attributes, and characteristics that are required for success,' has '…added little to help organizations as they seek to capitalize on IT,' (p.33).*

This is exemplified when one considers the research on the relevance of a CIOs demographics. Investigations into CIO demographics reveal that whilst CIOs are compensated for the length of their tenure and level of education, neither of these dimensions have yet been shown to be directly relevant to the outcomes expected from the CIO. Similarly, CIO studies investigating the relevance of a CIOs social capital[298] have yet to fully determine:

- How a CIOs structural power (i.e., their reporting line) may relate to informal/ formal social mechanisms and/ or the CIOs personality traits
- The relevance of structural power to a CIOs ability to develop cognitive capital (i.e., use shared languages and experiences) to help forge and meet various expectations
- The relevance of the structural power of the individual who holds expectations for the CIO; and

[298] E.g., examinations of relationships between expected outcomes and various descriptions of a CIOs structural power, cognitive capital, and relational capital

- The relevance of both structural power and cognitive capital on a CIOs ability to develop relational capital

And, given the lack of consensus on role definitions and group norms for the CIO (especially as a member of the TMT), researchers have not yet established how changing expectations for the CIO relate to any (or all) aspects of the CIOs attributes when developing relational capital.

Researchers examining a CIOs 'competency' (i.e., their inherent, learnt abilities) in relation to expectations for performance, alignment and enactment seem to agree that competence is more important than the CIOs social capital when addressing expectations. However, researchers have yet to agree a unifying a competency framework for the CIO. Whilst researchers have agreed that CIO competency is somewhat mediated not only by CEO and TMT knowledge, but also by capabilities residing in the IT department[299], and the business[300], research has not yet revealed how CIOs would address these constraints. Researchers also agree that CIOs should have competency in both business and technology management. However, not only are the individual attributes (i.e., skills, knowledge, traits, behaviours, characteristics, etc.) within these grouped competencies mixed and inconsistent, but the relevance of any one attribute has not been fully established in relation to CIO stakeholder expectations. This does little to help those seeking to identify the relevancy of attributes to develop them.

A review of the myriad of inconsistently defined skills[301] suggests that expectations for CIO skills may (over time) have shifted from technical and human skills, towards more conceptual skills. Whilst this trend appears unnoticed in the literature, researchers have continued to place considerable emphasis on 'communicating' and 'planning' skills more so than any other skills. However, to

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299 For example, the, business competence of information technology professionals, after (Bassellier and Benbasat, 2004)

300 For example, the technology competence of business managers, after (Bassellier et al., 2001)

301 Skills form part of competencies, are referred to as activities, tasks and in some cases, behaviours throughout the literature

date, CIO researchers have not determined: (i) how skills interrelate, (ii) how skills can be developed and/ or, (iii) how skills relate to dynamic environments.

Agreement on expectations for a CIOs knowledge (and how it may relate to CIO stakeholder expectations), like many CIO attributes has avoided the scrutiny of CIO researchers. Whilst there is agreement that CIOs need 'strategic knowledge' of both IT and the business, and that such knowledge is (by the authors inference) critical to the development of cognitive capital, coherent and practically useful definitions for CIO knowledge are yet to be agreed. As with other CIO attributes, research has yet to consider how knowledge is attained or maintained in either stable, or dynamic environments.

The fourth limiting factor, arising from the methods adopted by CIO researchers comprises of two fundamental issues: (i) an 'unbalanced' view of expectation articulation and (ii) issues surrounding data collation.

Of all the limiting factors, this first issue has less to do with assumptions about direct, singularly causal effects of a CIOs attributes on expectations for outcomes or role enactment, but more to do with the lack of comparison of expectations that CIOs hold for their own role with those of their stakeholders.

Investigations soliciting stakeholder perspectives have been entirely restricted to individuals within the CIOs organization i.e., expectations from customers and/ or third-party stakeholders have not yet been considered.

Whilst researchers have attempted to describe the development of shared mental models about the role of IT with stakeholders internal to the CIOs organization, they have failed to investigate how CIOs can accommodate the differences for what they expect of themselves in the role with those of their stakeholders. As a pragmatist, the author believes that this is one of the most concerning aspects about the current literature on the CIO as researchers have, as yet been able to propose a means for helping CIOs address this gap in expectation. This issue, exasperated by (digitally enabled) increasingly dynamic environments and the rapidly changing expectations that those foster, represents a critical omission from the body of knowledge as practising CIOs have little or no useful insight into

how they can address rapidly changing expectations for their already ambiguous role.

CIO researchers have also encountered limitations and biases when collating data for analysis. Access to CIOs and their C-suite level stakeholders is highly limited:

- Nearly all CIO studies are cross-sectional as C-suite executives rarely stay in post for long periods of time, limiting opportunities for prolonged, in situ longitudinal studies focusing on: (i) the before/ aftereffects of CIO appointments, (ii) changing, or highly dynamic environments and (hence) changes in expectations
- Whilst many studies seek to capture two perspectives on the CIOs role when meeting expectations for outcomes (i.e., capturing two points of view from 'dyadic-pairs' within the CIOs own organization), researchers have assumed that: (i) targeted individuals have a relevant (and informed) perspective of outcomes from the CIO and, (ii) those shared biases arising from shared organizational cultures are irrelevant
- Researchers are often also left with the difficulty of interpreting the relevance of data based on (sometimes) confusing and inconsistent responder job titles. Such interpretations introduce researcher bias as they attempt to interpret the meaning and/ or relevance of the individual's relationship to the CIO
- Researcher bias is also introduced into many studies where researchers have approached their investigations with pre-defined roles for the CIO (e.g., Minztbergs roles, Transformational Leadership, Transactional Leadership, etc.). With pre-defined roles, researchers are assuming: (i) that the role is relevant to the targeted sample, and (ii) and that expectations for that role are defined and agreed in advance; this is also likely to bias the responders, who aren't afforded the freedom to describe, unfettered, their actual expectations for the CIOs role, based on their own observations and circumstances

The fifth limiting factor in the literature is represented by lack of research into how CIOs can address perceived shortfalls in expectations, particularly in increasingly dynamic environments. Whilst some work has been progressed in understanding what is expected of CIOs in increasingly dynamic environments (i.e., CIOs should become ‘ambidextrous’, or they should ensure that their IT departments do so), definitions for role ambidexterity are still emerging.

Perhaps in response to this a small number of authors, adopting role theory, have turned their attention towards defining the CIOs role in terms of role behaviours (as opposed to activities and tasks). However, whilst these studies investigate expectations for the CIOs role in the context of role-making, they do not: (i). make distinctions between expectations for behaviours and attributes, (ii). account for changing expectations in increasingly dynamic environments, or (iii). offer an account of what constitutes success for CIOs who are attempting to manage changing expectations.

This last factor, how CIOs can improve their chances of addressing rapidly changing expectations, indicates a major gap in the current body of knowledge i.e., the lack of research into the causes of CIO demotivation and turnover. CIO turnover appears stubbornly high; though demotivation undoubtedly contributes, the relationship between learning, continual professional development and CIO demotivation remains unproven. For CIOs seeking to maintain their chances of continued employment in a rapidly changing world, they not only need access to the latest knowledge, but they need to be provided with opportunities to exercise the application of that knowledge in their place of practice. However, a lack of consensus on a definition for the role has not only prevented the development of a role or career development framework but has also prevented the development of role capability development programmes.

To address the opportunities arising from these limitations, the author proposes to adopt alternative theoretical and philosophical perspectives in the development of a new model describing rapidly changing expectations for a CIOs role behaviours and attributes in increasingly dynamic environments.

3 METHODOLOGY

This chapter address's objectives 2 and 3 of this research, the development and validation of new theoretical constructs that model changing expectations for the CIO.

Literature review has revealed how the problem of causal ambiguity in determining a singular source of causation in relation to expected outcomes limits understanding about the true nature of the relationship between a CIOs attribute(s) and what stakeholders expect from them. Literature review has also shown the use of highly subjective terminologies when authors have attempted to describe how well a CIO has been deemed to have delivered those outcomes or met those expectations.

However, literature review has also revealed an alternative:

1. theoretical perspective for describing dynamically changing expectations for a CIO, i.e., changing expectations for role behaviours in role theory; and
2. for describing how well CIOs can address a growing list of expectations, i.e., role effectiveness

Role making appears to present a useful paradigm with which to investigate the ongoing effectiveness of the CIO. If increasingly dynamic environments create increasing dynamic expectations, then role making may describe how CIOs can collaborate with stakeholders to: (i) assess expectations, (ii) to monitor changing expectations, and (iii) to differentiate between the needs for CIOs to change their own behaviours to align with stakeholder expectations or, to influence and change the expectations of the stakeholders themselves.

Considering the potential usefulness of the alternative paradigms presented by effective role-making, the author reflects on the research aim:

To develop a new CIO effectiveness model to help CIOs and their stakeholders improve how they communicate dynamically changing expectations for the CIOs role

To postulate three key questions:

1. In todays' increasingly dynamic business environments, which stakeholders hold what expectations for the CIOs role behaviours?
2. How well do those expectations align with the CIOs own expectations for their role? And
3. Which attributes do CIOs need to develop and apply to continuously manage those expectations effectively?

And to propose the research question:

In increasingly dynamic environments, how to determine the degree of expectation alignment between CIOs and their stakeholders for a CIOs most important attributes when effectively managing rapidly changing expectations for the CIOs most effective behaviours?

To progress an answer to this question, the author now describes his approach to research design.

3.1 Research Design

According to (Cresswell, 2009), research design is the *'…plan or proposal to conduct research*', and it involves '…*the intersection of philosophy, strategies of inquiry, and specific methods*', (p.5). Similarly,(Saunders et al., 2016) refers to his 'research onion' to describe the '…*issues underlying the choice of data collection techniques and analysis procedures*'. (p. 122). In other words, to provide confidence that new theory has been developed using robust and repeatable methods, researchers need to explain the choices and decisions made in the collection and analysis of data used to justify that new theory. For this research the author therefore examines his philosophical world view, approach to theory development, methodological choice, strategy and time horizon and techniques and procedures adopted.

3.1.1 Alternative Context of Social Enquiry

Literature review has revealed that, in their examination of the CIOs role, many CIO researchers adopt a positivist perspective in that they believe that the 'truth' about CIOs can be derived through analysis of data solicited from practising CIOs or their stakeholders using survey instruments to demonstrate deterministic relationships between a wide range of variables. Such studies appear to represent empirically derived 'truths' between expectations for CIO performance, alignment and role enactment and their attributes (i.e., demography, knowledge & skills, etc.).

There are a small number of exceptions to this approach i.e., studies where researchers believe that truth is derived through interpretation of the views solicited from CIOs or their stakeholders via interview. Researchers adopting this interpretivist perspective, reliant on qualitative methods are also seeking to identify deterministic relationships between similar variables through in-depth interview with either CIOs or CIO stakeholders.

Whilst both approaches attempt to provide insight into the potential relevance of a CIOs attributes to a variety of (often highly subjectively defined) expectations, the author believes that many studies: (i). ignore the impact of differing perspectives (between CIOs and their stakeholders) on the nature of the deterministic relationships between various expectations for a CIOs competence, and (ii). assume that such deterministic relationships hold true in all scenarios, at all times.

It is the authors assertation that claims arising from this approach present CIOs with a misleading representation of what they can (or should) do when engaging in practice. CIO research suggests that CIOs must 'merely' acquire and then apply relevant knowledge to meet expectations in all situations. Their chances of success also appear to relate to their structural power (or status) and their (undefined) abilities to influence their colleagues.

However, whilst the author cannot fully deny the potential relevance of individual factors contributing to a CIOs effectiveness, researchers should not lose sight of

changing expectations from an expanding list of stakeholders in increasingly dynamic environments. Factors, promising to reveal deterministic relationships between multiple variables, derived from a study of the opinions of: (i) individual CIOs, or (ii) individual CIO stakeholders at a given point in time are unlikely to help CIOs continuously address rapidly changing expectations for their role.

Researchers who persevere with positivistic or interpretivist examinations of factors antecedent to expanding stakeholder expectations in dynamic environments are likely to continue to generate expanding lists of variables and factors as they attempt modelling of ever more complex scenarios. Additional factors are not only likely to include knowledge of rapidly evolving technologies, and/ or customer and business trends (from real-time data), but also a continued refinement in descriptors for myriad skills and enactment in a growing list of roles. For CIOs with an already ambiguous role, increasingly complex models are likely to add to the confusion about what practising CIOs can practically do to develop and/or leverage their attributes to respond effectively.

To address this problem, the author proposes to adopt an alternative perspective in the study of the CIO when attempting to determine the importance of a CIOs attributes in meeting rapidly changing expectations for their roles. This alternative perspective, pragmatism, is discussed in the next section.

3.1.2 Research Philosophy & Pragmatism

Research philosophy '…*refers to a system of beliefs and assumptions about the development of knowledge*, (p.124) (Saunders et al., 2016). When developing such knowledge through research, individuals are held to make assumptions about human knowledge (epistemological assumptions), they are expected to encounter certain realties throughout the research process (ontological assumptions) and their own values will influence the research (axiological assumptions) (Burrell and Morgan, 1979).

In other words, to advance understanding about the relevance of increasingly (digitally enabled) dynamic environments on expectations for CIOs, the author should not only consider what is already claimed to be known about the role (i.e.,

from peer reviewed research) but should also take account of his own assumptions on realty (i.e., reflections from the authors own experiences as an IT practitioner) whilst simultaneously maintaining an awareness of the potential effects of his own beliefs and values on the research process.

Before considering the relevance of the epistemologies and ontologies of pragmatism to this research, the author reflects on his own assumptions.

Having spent nearly thirty years studying and working in Manufacturing Engineering and then IT Consultancy, the authors' beliefs and values have developed as result of the development of ideas and workable (or practical) solutions to (often highly) complex technical problems across the public sector and in many industries across the private sector. The author recognises that successful outcomes are almost entirely in the eye of the beholder; that is, when agreement is reached amongst a wide range of stakeholders that outputs and outcomes from a particular activity are deemed successful. It is the authors belief that the means adopted to achieve this success represents truth, in the sense that a repeat of the same activities will also generally result in similar outcomes. For example, in the authors experience, the combined application of effective resources and industry standard programme management and project frameworks (i.e., MSP, Prince2 or AgilePM) represents a practical (and effective) means for achieving successful organizational change. This combination has come to represent a truth for both the author and practitioners of organizational change. As IT has emerged as a strategically critical resource, those charged with adopting and exploiting digital technologies also continue to rely on such truths – that the combination of effective resources and methods will continue to yield acceptably successful results for stakeholders. This, the author believes not only represents reality for those implementing change and being impacted by the change, but also for those leading it, in the context of this research, the CIO.

Acknowledging such assumptions, the author now examines the development of (and hence advantages offered by) pragmatism in the development of new insights in the study of the CIO.

3.1.3 Pragmatism

In their comparison of ontologies, epistemologies and axiology's of the five major philosophical theories that encapsulate business and management studies[302], (Saunders et al., 2016) cite (Kelemen and Rumens, 2008) in claiming that pragmatism '…*asserts concepts are only relevant where they support action'*, (p. 143).

Pragmatism, according to (Legg and Hookway, 2021), was developed as a 'philosophical tradition' in the United States in the 1870s. The first generation of 'classical pragmatists', Charles Sanders Peirce and Wiliam James, focused on theorising inquiry, meaning and the nature of truth. Building on this foundation, a second generation of classical pragmatists, John Dewey and Jane Adam focused their attention on the application of pragmatism to 'social improvement' (in the context of politics, education, and social work) whilst Henry Mead, a key figure in the development of socialisation and role theory, focused on the clarifying perspectives of relationships between the individual (or 'self') and their communities.

The original work by Peirce and James centres on rules for clarifying the concept of truth; truth derived from the implications and consequences arising from the clarification of the meaning of hypotheses in specific situations. Peirce and James proposed that those attempting this process of clarification, referred to as the Pragmatic Maxim, should accommodate a measure of fallibility during their inquiries[303]. The development of an alternative perspective by James and Dewey, that the process of clarifying truth should embrace multiple, or various modalities of realism, sparked a great deal of debate amongst the classists to the extent where Peirce, to clarify his own viewpoint, renamed his view as pragmatism. Whilst James and Peirce continued to agree that truth could be clarified using hypotheses, James took the view that that those engaged in the process of accepting scientific evidence (or empirical facts), as a pure representation of truth

[302] Positivism, Critical Realism, Interpretivism, Post-modernism and Pragmatism

[303] Which Legg refers to as production of '…*a distinctive epistemological outlook: a fallibilist, anti-Cartesian explication of the norms that govern inquiry*', (p. 2)

should expect to remain subject to a variety of human values such as idealism, optimism, religious faith, and a belief in free will.

Given this, James declared that pragmatism is better considered as a mediating philosophy, one that accommodates both '*...adherence to tough-minded epistemic standards,*' whilst also acknowledging the presence of human values, (p.28) (James, 1907). To make such an accommodation, he suggested that pragmatic methodologies embrace the roots of both perspectives, that is, to identify and consider differences in practice. James suggested that to clarify truth, seekers should consider '…*the effects of a practical kind that the object may involve – what sensations we are to expect from it, and what reactions we must prepare*', (p.29). In other words, that truth seekers should focus on the practical differences and consequences that arise from analysis of empirical (or what he called scientific) data and from data that is subject to human values. This led James to suggest that pragmatic theories should therefore be viewed as '…*instruments and not answers to enigmas*', (p.31).

Whilst James had introduced the concept of practice to accommodate both empirical, objective perspectives and non-empirical, subjective views on truth (as shaped by human values), Peirce persevered with the view that the process of ascertaining truth is enhanced by adopting ever greater levels of clarity when defining and describing how concepts such as probability and reality, are employed in practice.

Peirce's attempt to further refine his proposal for clarifying truth introduced the concept of *reality*. For Peirce, truth arising from a convergence of opinions should be considered as representative of reality. However, Peirce also acknowledged the process of a successful convergence of opinion would require consideration of the approach taken to achieve that convergence, i.e., a process of *inquiry*. This led him to conclude that truth is therefore the product of inquiry, and that this product (or truth) represents reality.

Contrary to this, James persisted with his view that *belief* can also become truth if it contributes to 'happiness' and 'fulfilment' and that ideas can become true

'…*just in so far as then help us get into satisfactory relations with other parts of our experience'*, (p 34),

Acknowledging the opposing views of James and Peirce on the clarification of truth and definitions of reality, and in consideration of the researchers own perspectives, the author now considers the core epistemologies of pragmatism, which according to (Legg and Hookway, 2021) comprise of fallibilism, inquiry, experience and representations.

Peirce argues that as individuals are unable to fully set aside their own beliefs (or their conscious and unconscious biases) when seeking truth, then they should accept the premise that they will never reach the truth, and that the best they can hope for is the identification and (as far as possible) the elimination of errors. Individuals should then accept their fallibility when seeking truth and the '…*the focus of epistemological inquiry should not be on showing how we can possess absolute certainty, but on how we can develop self-correcting methods of inquiry*'. Legg and Hookway suggest that James also supported this view, conceding that the '… *harder we try to avoid error, the more likely it is that we will miss out on truth; and the more strenuously we search for truth, the more error we are likely to let in the error'*, (p.10) (Legg and Hookway, 2021)[304]

In addition to fallibility, pragmatist also consider how the process of inquiry should be defined. In his paper 'The fixation of belief', (Peirce, C., 1877) Peirce argues that if *inquiry* is the struggle to replace doubt with *settled belief*, then methods that *fix* belief must represent the '…*correct method of science*.' In other words, accepting of fallibility, pragmatists focusing on the *process* of deriving truth through inquiry, pragmatists should attach significant emphasis to the capabilities and virtues of the inquirer to allay fears that the process of inquiry, suspectable to further fallibility, would cast doubt on a fixed truth. Contrary to this idea of developing a fixed truth as a result of inquiry, (Dewey, 1938) emphasises that the practical, transformative process of starting with a problematic situation and, through a process of inquiry, break this situation down into its constituent parts to

[304] Cf. (James, 1897), (p. 30)

yield an acceptable whole. In other words, whilst Pierces view that inquiry yields a fixed belief, Dewey proposed that inquiry should focus more on fixing the situation as far as possible.

In addition to fallibility and inquiry, pragmatic epistemologies also encompass the notion of *experience*. According to Legg and Hookway, abilities to think about things external to self, to improve our understanding of them rests on an individual's experience. Individuals are '…*passive recipients of determinate and singular 'sense-data*,'[305]. This description of experience suggests that the process of receiving such data (resulting in an accumulation of knowledge) represents an individual's only connection with the real world. However, pragmatists also suggest that experience goes beyond the mere acquisition of knowledge, but also involves the process of cognition i.e., an ability to (i). understand the experience and, (ii). connect experiences together to draw generalities about them. This continuous process leads to the perception of reality. Dewey[306] progresses this idea and suggests that an individual's experience is shaped by their habit of expectation (or their internal world of concepts); this complex process is likely unique to the individual, and therefore represents a challenging notion for those individuals seeking to develop empirical datums for experience.

Classical and contemporary pragmatists also propose several perspectives on *representations* of truth e.g., those derived from mental states, or 'habits' (Peirce), from the thoughts of the 'Almighty', 'beliefs' (James), those derived from the effectiveness of instruments adopted in the search for truth (James and later on, Dewey), or those derived from interpretations of the 'signs' assigned to an object (Peirce). Central to this, and contrary to the view that the 'content' of a thought, or a *representation* of truth, should be considered as an intrinsic property (such as a structural property, or state or condition) of thought, pragmatists take the view that the content of a thought should be considered in the role that it fulfils during the process of inquiry and is therefore subject to interpretation.

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[305] Cf. C.I. Lewis and Wilfrid Sellars (no specific reference given)
[306] Cf. (Dewey, n.d.)

Building on the work of the classical pragmatists, neopragmatists, acknowledging the presence of fallibility and open questions on the impact of experience and representation when searching for truth, prefer to accept that inquiry will never reveal truth, rather the aims of an inquiry can only be established once achievements arising from that inquiry can be recognised and accepted in the community (Rorty, 1991). Similarly, that the vocabularies adopted when describing pragmatism aren't tested '…*by seeing whether they enable us to discover truths or by showing that they can be read off the nature of reality. Instead, we evaluate them by seeing how they enable us to achieve our current goals, formulate better and more satisfying goals, and generally become better at being human*', (p.16) (Legg and Hookway, 2021)[307]. Complementing this perspective is the more recent proposal that the '…*rich understanding of experience and science offered by pragmatists may show us how to find an objective basis for the evaluation and criticism of institutions and practices*', (p.16) (Legg and Hookway, 2021)[308].

3.1.4 Design Principles

Reflecting on the philosophical perspectives offered by pragmatism, the author considers that the development of new theory and a methodology for testing this theory, when contextualised in pragmatism, should consider a process of conceptualisation and inquiry that accommodates the following principles:

1. A process for developing theory which minimises the effects of the authors beliefs and experiences (i.e., constructs and hypotheses developed from a variety of sources external to the authors experiences)
2. A means for testing theoretical constructs in a variety of circumstances (i.e., the testing of constructs in more than one business scenario)
3. A process for identifying agreement on what is considered true – or representative of reality - for these constructs and circumstances within a community of practitioners; and

[307] Cf. (Rorty, 1995)
[308] Cf. (Putnam, 2004)

4. A means for reflecting on the richness of the findings in fulfilling the aim of the inquiry

3.2 Approach

In keeping with the aim and objectives of this research, and to answer the research question, the author therefore proposes:

1. To apply the alternative theoretical context of ORT for describing dynamically changing expectations for the CIO
2. To develop a new conceptual framework that contrasts how CIOs and CIO stakeholders (nCIOs) perceive the CIOs most effective behaviours and the importance of the CIOs attributes when enacting those behaviours
3. In consideration of this framework, develop the central research question and underpinning hypotheses that suggest how expectations for a CIOs attributes and their most effective behaviours may relate
4. Develop more confidence in the research question and the hypotheses by validating current perspectives on UK stakeholder expectations for the CIOs role through an analysis of UK CIO job adverts
5. Reflect on the findings from this analysis to develop variables and constructs that can be empirically tested across increasingly dynamic (or digitally maturing environments) with a representative sample of CIOs and CIO stakeholders (nCIOs); and
6. Reflect on the findings from the above studies and determine the fulfilment of the research aim and the contribution to the limiting factors already identified in the literature review

To fulfil these steps, it therefore seems appropriate to adopt a sequential explanatory design for conducting a multi-method quantitative investigation. This approach, shown in Figure 6, involves two sets of data collection and analysis. Firstly, an analysis of recent expectations in UK CIO job adverts and secondly, by developing survey instruments, an analysis of expectations from CIOs *and* their stakeholders.

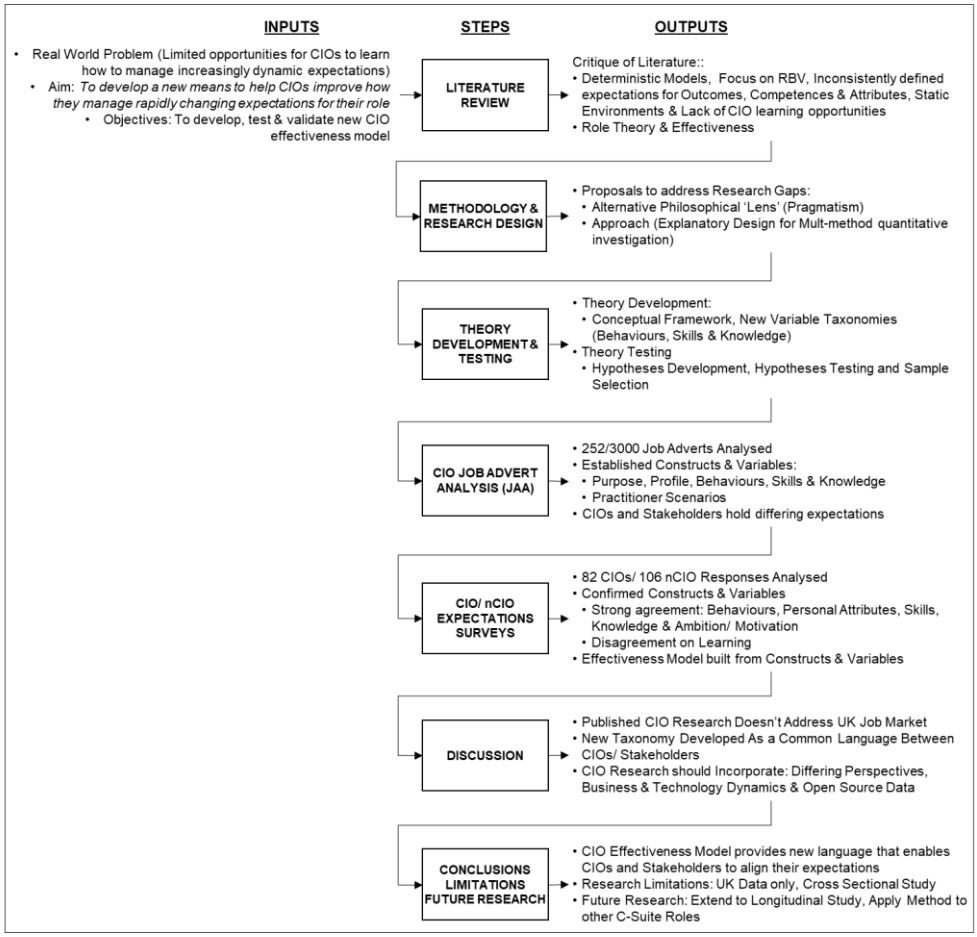

Figure 6: Approach

The rationale for the initial quantitative study, UK CIO job advert analysis, is to develop insight into: (i) the organizational contexts and environmental scenarios that CIOs are currently expected to effectively operate in, and (ii) current perspectives on the 'requirements' UK organizations have for newly appointed CIOs, specifically, to identify:

1. Role expectations i.e., what is expected of UK CIOs and which CIO behaviours are deemed most important and/ or desirable? And,
2. Role attributes i.e., which CIO attributes are deemed most important and/ or desirable for UK CIOs?

The outcomes expected from this first study are:

1. Increased confidence into the validity of the research question
2. An indication of CIO operating environments/ scenarios
3. Refined definitions for CIO attributes (i.e., variables for the model)

4. Clarification of the potential relationships between CIO attributes i.e., an indication of an overall CIO role effectiveness model and its theoretical constructs; and
5. Sufficient insight to develop detailed survey instruments with which to capture expectations for a range of internal and external stakeholder expectations for CIO behaviours and attributes

Building on the findings from the CIO job advert analysis, the rationale for the second study of CIO and CIO stakeholder expectations, is to:

1. Capture additional, scenario specific stakeholder perspectives about expected CIO role behaviours, skills, and knowledge
2. Identify alignment/ misalignment between stakeholder role behaviour expectations
3. Identify the importance of CIO attributes to either meet or alter the behavioural expectations CIO stakeholders hold

The outcomes expected from this second study are:

1. Identify if the responders agree with the descriptions for digitally maturing scenarios
2. Identify if stakeholders agree on the importance of the CIOs attributes for combinations of expectations for behaviours and scenarios
3. An increase in the level of confidence in proposing the new CIO Effectiveness Model

3.2.1 Role Effectiveness & Theory Development

To progress the aim of this research and considering the above design principles arising from the pragmatist's perspective, the author reflects on organizational role theory and management theory to propose a new, alternative perspective on CIO effectiveness.

As organizations represent stable, social systems, then organizational role theory can be used to focus on social positions arising from (or described by) pre-planned, task-orientated, hierarchical conditions that exist in organizational settings (Biddle, 1986). As such, organization role theory is useful for:

'...explaining how a manager affects and effects the expectations others hold of his or her behaviour in the job,' (p.85) (Fondas and Stewart, 1994)

Whilst organizational role theory provides a means for representing expectations for behaviours, CIOs will need to understand if their behaviours are deemed effective by their stakeholders.

The literature on CIO effectiveness centres on the expectation that a CIO can perform to the satisfaction of stakeholders for their given *role*. This creates an inextricable link between expectations for a defined role and the performance of the individual in fulfilling the expectations for that role. This linkage is important as it suggests that in order for an individual to be deemed effective in a role, there must be consensus on: (i) what the role is and (ii) what constitutes acceptable performance (Welbourne et al., 1998)[309].

According to management theory, effectiveness can be described as the:

'…extent to which what managers actually do matches with what they are supposed to do,' (p.88) (Hales, 1986)

To this end, the author proposes that CIOs who improve their capabilities in managing changing expectations for their behaviours, through role-making, can be said to be more effective.

Given this, the author proposes that:

1. Effectiveness can be conceived in terms of role behaviours i.e., that CIOs who continue to meet expectations for their role behaviours maybe deemed to be effective; and
2. That to address expectations for role behaviours, that CIOs should possess (or develop) various antecedent attributes

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[309] Having suggested that individuals were likely to be performing multiple activities outside of their designated roles job descriptions, Welbourne, et al. concluded that organizations wishing to enact a comprehensive performance assessment process should develop and assess their employees by defining 'roles' they considered, from an organizational perspective to be most important.

Definitions for the CIOs role are numerous; however, whilst differences between authoritative and influential role behaviours have been acknowledged, researchers have largely focused on the activities and tasks CIOs are expected to perform in each role. Subjective assessments of roles defined by activity, rather than by behaviour have done little to help clarify the relevance between CIO attributes and more effective responses to changing expectations for role behaviours. ORT suggests that CIOs can assess expectations for their role behaviours and then engage in an iterative role making process with stakeholders to positively impact perceptions about their effectiveness.

The literature on competency assessment, role performance and effectiveness also suggest that the application of some (yet unknown) combination of attributes (including skills and knowledge) enables CIOs to either alter the behaviours expected of them or alter stakeholder expectations for their behaviours.

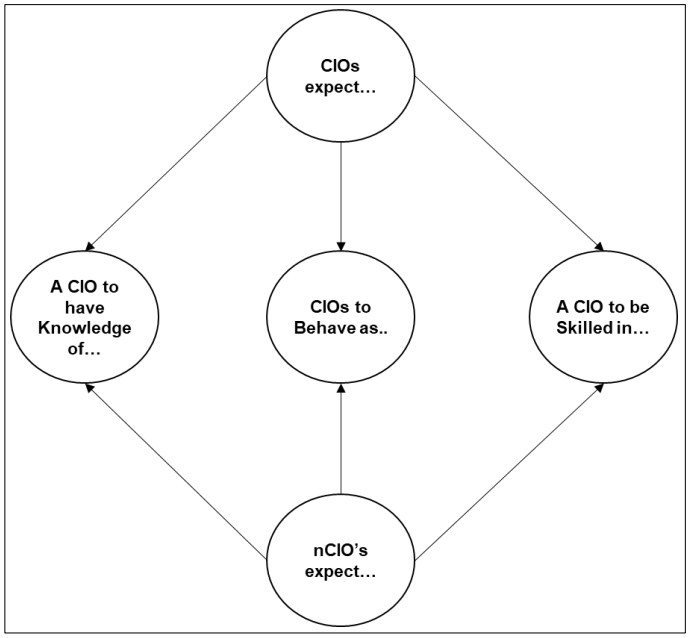

Figure 7: Conceptual Framework

If skills and knowledge do play a key part in the development expectations for expected behaviours, and to develop and test a CIO role effectiveness model, an alternative perspective on the relationship between CIO role behaviours and the underlying skills and knowledge is needed; this relationship is proposed in Figure 7.

In the proactive creation of/ change in CIO role expectations (i.e., expectation enactment in the role making process), CIOs and their stakeholders (non-CIOs, or nCIOs) will dynamically exchange expectations for behaviours.

As demonstrated in the literature, it is likely that different stakeholders will hold different expectations for the CIO[310]. For example, where CEOs may expect CIOs to attain strategic alignment between the business and IT (Johnson and Lederer, 2010) or to be able to impact the firms competitive standing (Bassellier et al., 2008) , CFOs may expect CIOs to focus on shorter term cost savings (Banker et al., 2011). Similarly firms with a CDO may expect the CIO to focus more on day to day operations of the IT department, rather than taking a leading role in digital transformation (Horlacher, 2016b).

In meeting the aim of this research, the author therefore proposes that, for the role they hold, CIOs will need to gauge the effects of the behaviours they have exhibited with a range of stakeholders and, if appropriate, use their skills to (re)apply knowledge to influence expectations for those behaviours (i.e., to either maintain that expectation or to attempt to change it). Whilst the author recognises that a CIOs demography, social capital, and environmental factors are also likely to impact the enactment of effective CIO behaviours, at this conceptual stage, these are not shown in Figure 7. For CIOs to be deemed effective when enacting the expected role behaviour, the author also proposes that both sets of attributes will be needed; in other words, an inability to apply existing knowledge, through a lack of skills is deemed an ineffective behaviour. Similarly, an attempt to use a skill (such as clarification) without the prerequisite knowledge is also deemed to represent an ineffective behaviour.

3.2.1.1 Role Behaviours Taxonomy

Perhaps the biggest challenge in developing and testing a conceptual framework that identifies the significance of the relationships between CIO behaviour, their

[310] Expectations can partially relate to the CIOs reporting line, or level of structural power

knowledge, and their skills centres on the absence of agreed taxonomies for all three dimensions.

Unfortunately, in the case of behaviours, research that has attempted to clarify the significance of relationships between CIO roles and behaviours have either focused on meta-categories for managerial behaviours (i.e., Mintzbergs roles), leadership behaviours (i.e., transformational leadership) and (in a few cases) more specialist or salient roles (i.e., Utility Director, Innovator CIO, etc.). Whilst these studies provide an indication of some of the complexities associated with effective role behaviours, CIO research has, as yet failed to apply a sufficiently detailed taxonomy of behaviours to the CIOs role. A taxonomy for effective CIO role behaviours, in environments with rapidly changing stakeholder expectations for behavioural changes, would enable practitioners to: (i) monitor and assess their current level of expected behavioural effectiveness and then, (ii) develop and apply the most appropriate attributes enabling them to improve any perceived shortfalls in their behavioural effectiveness; such a taxonomy should be sufficiently broad to suite multiple scenarios and sufficiently detailed to help CIOs make informed changes to their own behaviours, or their approach in influencing a change in expectations amongst their stakeholder communities.

To meet a similar challenge (i.e., the development of a sufficiently broad and detailed taxonomy for effective leadership behaviours), leadership researchers have developed a 'hierarchical taxonomy of leadership behaviour' (Yukl et al., 2002), (Yukl, 2012) and (Yukl et al., 2019).

To ensure that leadership behavioural categories are '…*highly useful for designing research and formulating theories*,' Yukl proposes that '…*leader behavior categories should be observable, distinct, measurable, and relevant for many types of leaders*', and that such a taxonomy should be '…*comprehensive but parsimonious*,' (p.66) (Yukl, 2012).

Yukl's taxonomy, which according to (Hogan et al., 1994) is one of the 'broadest' taxonomies of leadership behaviours (p.3), comprises of four meta-categories:

1. Task-orientated behaviours: behaviours focused on improving the '…*efficiency and reliability of activities carried out by the leader's team or work unit*'
2. Relationship-orientated behaviours: behaviours needed to ensure that subordinates maintain '…*commitment, confidence, and cooperation'*, to the task
3. Change-orientated behaviours: behaviours needed to identify and implement changes to tasks or the work of the leader's team; and
4. External-monitoring orientated behaviours: behaviours required to '…*acquire necessary information and resources*,' (Yukl, 2012).

Whilst Yukl's taxonomy has been investigated in the context of leader/ subordinate roles, it has not yet been applied to relationships between leaders and other stakeholders i.e., their superiors, peers, to other indirect reports and/ or even other stakeholders who are expected to interact with the focal role (or leadership) role. In the case of the CIO, the author therefore proposes to apply Yukl's taxonomy to a wide range of CIO stakeholders to determine the usefulness of the four behaviours in assessing differing perspectives on behaviours expected to be associated with the CIOs role.

3.2.1.2 Skills Taxonomy

Yukl's four meta-categories of leadership behaviours also contain (what Yukl refers to as) fifteen sub-categories of behaviour. However, Yukl acknowledges that '…*some studies on effective leadership use skills rather than observable behaviours as the independent variables'*, and that whilst '*Skills are not equivalent to actual behaviours…they can help us understand why some leaders are able to select relevant behaviours and use them more effectively*,' (p.77) (Yukl, 2012).

Given this, and the paucity of clearly defined CIOs skills in the literature, the author proposes to infer CIO skills from Yukl's taxonomy, in the context of the three-category typology of skills proposed by (Katz, 1955).

This mapping, (Table 5), also appears to lend itself well to the major skills identified in the literature (i.e., tasks, interpersonal (or 'soft-skills'), influencing skills, communicating, facilitating, and planning as detailed in section 2.3.2.5).

Meta-Category (Yukl)	**Sub-Category (Yukl)**	**Inferred Skills (Katz)**
Task Orientated	Planning – short term activities and making decisions about objectives and priorities	Conceptual Skills
	Clarifying – task objectives and role expectations	Human Skills
	Monitoring – operations & performance	Technical Skills
	Solving Problems – to deal with disruptions to normal operations and/ or dealing with undesirable member behaviours	Technical Skills
Relationship Category	Supporting – showing consideration, acceptance and concern for the needs and feelings of other people	Human Skills
	Developing – primarily coaching, and showing someone a better way of doing a task	Human Skills
	Recognising – showing appreciation of effective performance in others, primarily to boost morale and/ or increase subordinate satisfaction	Human Skills
	Empowering – delegating more to provide more autonomy to gain greater commitment from subordinates	Human Skills
Change Orientated	Advocating Change – explaining why things need to be changed urgently (noting when gradual change occurs, individuals fail to recognise emerging threats and opportunities)	Human Skills
	Envisioning Change – articulating an inspiring vision for a better future to gain greater commitment	Conceptual Skills

Meta-Category (Yukl)	Sub-Category (Yukl)	Inferred Skills (Katz)
	Encouraging Innovation – in others to stimulate intellectual thinking in a safe environment	Human Skills/ Technical Skills
	Facilitating Collective Learning – to improve the performance of a group or an organization (can involve improving current practices through exploitation or discovering new methods and strategies through exploration)	Human Skills/ Technical Skills
Externally Orientated	Networking – developing/ maintaining relationships with others to secure new information, resources and/ or support	Human Skills/ Technical Skills
	External Monitoring – analysing information about relevant events outside of the organisation to identify new opportunities and/ or threats	Technical Skills / Conceptual Skills
	Representing – leaders representing their teams or organizations in transactions with external and internal stakeholders	Human Skills/ Technical Skills

Table 5: Inferred CIO Skills (Yukl, 2002, 2012) and Katz (1955)

Whilst this mapping does not produce a detailed list of skills, the author believes this to represent a practically useful taxonomy for identifying the relevance of CIO skills to expectations for behaviours.

3.2.1.3 Knowledge Taxonomy

Literature review reveals that CIO knowledge should be considered in two dimensions, business, and technical knowledge and that both dimensions should be considered at two levels i.e., at the strategic and tactical (or operational) levels. This 'spectrum of CIO knowledge', depicted in Figure 8, contains four major descriptors, or dimensions of CIO knowledge[311].

[311] E.g. (Armstrong and Sambamurthy, 1999) and (Smaltz et al., 2006b)

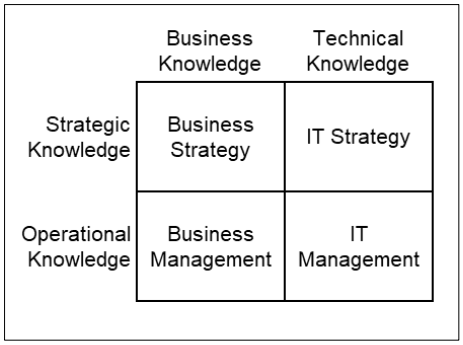

Figure 8: Spectrum of Expected CIO Knowledge

The author proposes that it is reasonable to expect a CIO should know about:

1. Business Strategy: whilst not all CIOs will play an active role in the development of business strategy, CIOs are (at least) expected to understand it well enough to secure and maintain the most appropriate IT resources. In situations where IT is perceived as a resource critical to strategic competitive advantage, then CIOs may also be expected to have developed knowledge of the broader competitive landscape for their business to identify the relevance of new, emerging technology trends and how these may (or should) be applied to the business
2. Business Management: in responding to business demands for developing more effective, or new, IT products and services, CIOs are expected to have sufficient knowledge about current and future (or desired) IT enabled business capabilities. In developing this knowledge, CIOs will be expected to collaborate closely with business stakeholders to help them understand where technology can help them meet their strategic and operational objectives and how the attainment of these new IT enabled capabilities is likely to impact their business. Whilst CIOs may not be expected to have detailed knowledge about all business capabilities, failure to attain sufficient knowledge exposes the CIO and their IT department to reputational risks if they fail to deliver the most effective products and services in the most efficient manner
3. IT Strategy: the knowledge most widely expected from the CIO is perhaps their knowledge about current IT capabilities and their knowledge of the potential of new (or yet to be acquired) IT capabilities. Having developed this knowledge, CIOs should also understand how to transition from current IT

capabilities to new IT capabilities in such a way that business operations experience minimum impact and gain maximum advantage. Knowledge of this overall picture, a.k.a. the IT strategy enables CIOs to ensure that they and their IT resources are perceived not only to be adding value to everyday business operations, but also provide a source (and a means) for continuous business innovation

4. IT Operations: at the very least, business stakeholders expect that IT products and services are relevant, efficient, effective, and compliant. Whilst the structure and capabilities of IT operations vary greatly, CIOs are expected to ensure that effective governance structures and controls are in place that enable IT resources to continue to not only meet the changing expectations of business users and leaders, but to also ensure that compliance with legal and regulatory frameworks are maintained. Not all IT resources will be directly 'owned' by the CIOs organization (e.g., outsourced services) and CIOs will also need to understand how to establish and maintain effective commercial frameworks for (potentially) sizable, long-term investments.

Whilst knowledge across all four dimensions is expected, CIOs also need to understand that there is a continuous process of 'exchange' across this spectrum; Business technologies can be used to develop new business insight which shapes the business strategy and the subsequent management of the business. Similarly, changes in the wider competitive marketplace can impact the business strategy, ultimately producing new requirements for IT. As such CIOs need to understand the sources and effects of an ongoing process of 'alignment' between the wider marketplace, the business, and various IT resources.

3.2.2 Theory Testing

Whilst the research question:

In increasingly dynamic environments, how to determine the degree of expectation alignment between CIOs and their stakeholders for a CIOs most important attributes when effectively managing rapidly changing expectations for the CIOs most effective behaviours?

allows for an investigation into the potential importance of attributes to expectations for more effective behaviours, it doesn't provide sufficient richness by which to investigate the relevance of individual attributes or behaviours. To gain this clarity, the author not only develops hypotheses that allows for an examination of (changing and) differing perspectives for the CIOs most effective behaviours (i.e., the CIO and CIO Stakeholders, or nCIOs), but also for the attributes highlighted in the literature.

Hypotheses suggesting the potential importance of a CIOs attributes, grouped as demography, skills. knowledge, learning preferences and motivation[312], provide a means by which the author can secure new data from CIOs and nCIOs. These are shown in Table 6:

Hypotheses	
H1	CIOs and nCIOs agree on the relative importance of the most effective CIO behaviours in digitally maturing scenarios [313]
H2	For the most effective behaviours in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of the CIOs Demographic attributes
H3	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of the most effective CIO skills
H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge

Table 6: Research Question Testing – Hypotheses

Whilst literature has provided a degree of confidence in the relevancy of CIO attributes, unifying definitions for all three attribute groups are lacking. To address

[312] Learning preferences and motivation, not part of the original proposal have been developed as a result of the JA analysis

[313] To develop empirical data for increasingly dynamic environments, the author has elected to define such environments, or scenarios, in terms of digitally maturing scenarios, section 5.1.2

this shortfall, and to develop variables and constructs for the proposed model, the author seeks to ensure that:

1. The attributes adopted in the model reflect current UK stakeholder expectations
2. The variables used to describe the attribute are not only as fully defined as possible but are also recognisable to practitioners (ideally in terms of their everyday parlance); and that

Biases introduced from the selected methods of data collation (i.e., common method bias) are offset as far as possible[314].

3.2.2.1 Sample Selection & Data Collection

To test these hypotheses, the author proposes to adopt a pragmatic approach to developing empirical evidence from practitioners; such an approach will be 'inductive'. An 'inductive' approach is preferable as, (i) literature provides theoretical constructs, that although varied and (in some cases) incomplete, provide sufficient basis for describing fundamental dimensions for CIO effectiveness in dynamic environments, i.e., CIO expectations and attributes, (ii) the author has access to both CIOs and CIO stakeholders to generate data that is expected to comprise of new, additional themes with which to develop new and/ or enhanced theoretical constructs for expectations and attributes, and (iii) the author can develop confidence about the validity and usability of the findings when reflecting on personal past experiences as an IT consultant.

Sample selection and data collation will rely on access to senior executives who are unlikely to have a great deal of time or motivation to provide detailed data about their perspectives on the CIOs behaviours and attributes. Remaining pragmatic, the author will aim to initially solicit data from their own network. However, as this is likely to intrude a measure of bias into the process (in the

[314] Citing, (Podsakoff et al., 2003), (Shao et al., 2012) suggests that '…*one way of controlling for common method bias is to collect the measures of these variables from different sources*,' (p.2407)

sense that the CIOs network may not be representative of the UK CIO community), that author will ensure that the selected method will make use of:

1. A broad spectrum of CIO practitioners i.e., a sample containing perspectives from practitioners that have a diverse set of experiences that are different from the authors own; and
2. Multiple data sources i.e., seek data from practitioners who have worked in a variety of (internal and external) positions close to CIOs, but not necessarily with, the same CIOs who are also providing data.

On this second point, the author notes that empirical studies in the literature have generally taken two different approaches in collating data from individuals about the CIO. The first approach is where researchers either solicit perspective from CIOs only or from CIO stakeholders only. The second approach is to collate data from 'CIO-dyads' (i.e., from CIOs and from their immediate stakeholders within their organizations). The author believes that to develop a more holistic perspective of the CIOs role, data should be solicited from individuals who have worked closely with CIOs, but not necessarily within the same organization. The advantage of this approach is that it reduces the potential effects of organizational biases and cultures on the data provided.

A research method attempting to understand the effects of dynamic environments on expectations for the CIO is likely to be impractical as CIOs only remain in post for short periods of time (i.e., less than 3 years); this means that the chances of completing a successful longitudinal study that captures changes in expectations for an individual CIO are unlikely.

To account for both these issues and suggesting that dynamic environments lead to an increase in the number and variety of stakeholder expectations, the author proposes to capture a range of expectations for CIO behaviours, from multiple 'types' of CIO stakeholders, across increasingly dynamic business/ IT environments.

4 CIO JOB ADVERT ANALYSIS

This following two chapters of this thesis address objectives 2 & 3 of this research, the development, testing and (hence) validation of the new CIO effectiveness model; this is achieved by detailing an analysis of empirical data collated from UK CIO job adverts (JA's) and, via two survey instruments, data collated from UK CIOs and a broad range of their stakeholders.

To develop confidence that, for a given scenario, UK CIO stakeholders have clear expectations for CIO behaviours and attributes, the author proposes to examine advertised CIO role expectations from publicly available UK CIO job adverts. CIO recruitment offers a good opportunity to capture (initial) consensus on a definition for the CIOs role; in many cases it is likely that organisations have undergone a period of review and reflection before not only agreeing on a definition for the newly advertised CIO role, but also in terms of what attributes are currently most important considering their current organizational circumstances. An analysis of publicly advertised CIO job adverts should therefore not only provide a rich source of role expectations but may also provide insight into the breadth of expectations for any given circumstance; this is crucial if this research is to identify the relevance of those CIO attributes that enable CIOs to be effective at role-making with their new employer.

4.1 Approach

Literature review revealed several options for capturing and analysing the content of job adverts (JAs). Studies detailing word frequency count (Niederman and Sumner, 2019) indicated a suitable starting point for the analysis; however to elicit more detail and insight, the author also took heed of studies suggesting additional analysis that may reveal useful, additional insights. In addition to the expected benefits of additional insights, the author also seeks to ensure that author bias is reduced to a minimum by also making use of IT software to develop 'unsupervised' (i.e., independent of the author) insights.

Noting the work of (Pejic-Bach et al., 2020)[315], the author therefore elected to conduct a three stage process of analysis, Figure 9, starting with a word frequency count, then an analyse of word clusters[316] (or word 'co-occurrence' (Kino et al., 2017)) and then a final analyse using '…*unsupervised machine learning algorithms*,' (p.336) (Guo et al., 2016) using computer enabled dictionary-based text analysis (Sohrabi et al., 2018).

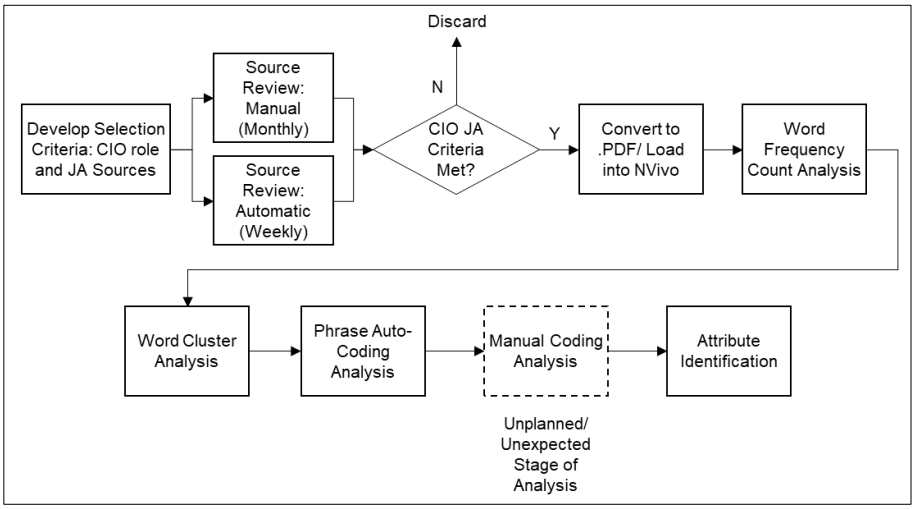

Figure 9: Approach to UK CIO Job Advert Analysis

To ensure results could be verified independently, a standard off-the-shelf application containing these automated analytical tools was selected[317].

To collect and analyse UK CIO job adverts, the author needed to address two fundamental questions: (i) given inconsistencies in job titles and role definitions, what would constitute a representative and appropriate CIO role advert? And (ii) given the sensitive nature of executive recruitment, how would the author gain access to appropriate sources of UK CIO job adverts?

To address these two questions, the author developed selection criteria for both the advertised CIO role and the sources of the advertised role. Having

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315 Who combine descriptive and text mining analysis to develop a profile for Industrie 4.0 job advertisements

316 Cluster analysis is an exploratory technique that enables the identification and grouping of data points that are more like each other in comparison with other data points within a sample

317 NVivo, is a data analysis computer software package launched in 1997 by QSR international; since its inception, the tool has developed increasing levels of functionality, culminating in the current version of NVivo12. For this study, the author used NVivo 12plus (which, for the sake of brevity is referred to as just NVivo)

approached several major (global) specialist executive recruitment firms, the author discovered that many specialists were either unwilling or unable to provide access to recently advertised roles, primarily because they fail to keep a central repository of the roles they had recruited for. To overcome this issue, the author therefore identified two alternative types of sources for publicly advertised roles and then adopted a dual approach to source monitoring and advert selection.

Over a period of 12 months (May 2019 to April 2020), the job advert sources were monitored through a combined process of automated emailed job alert and monthly manual reviews. Those adverts deemed to meet the pre-defined inclusion/ exclusion criteria were then saved as .pdf files and loaded into NVivo for cleansing and analysis.

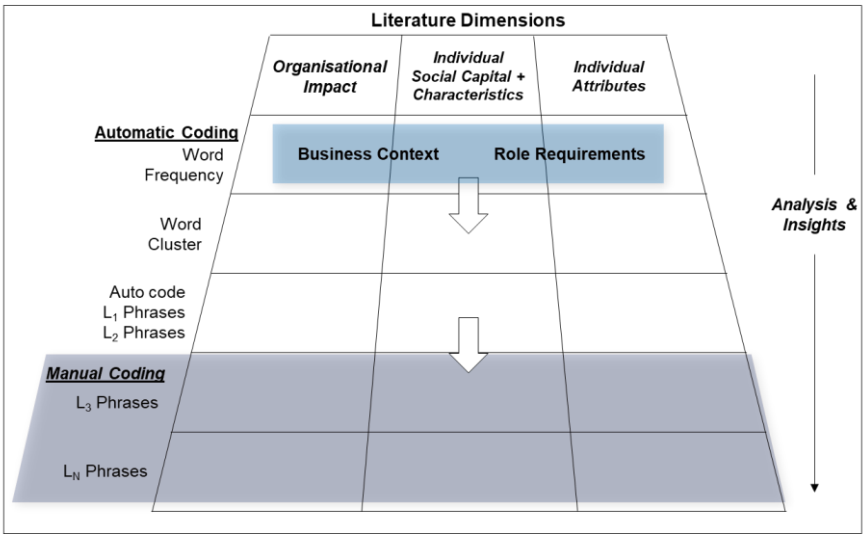

Figure 10: CIO Role Classification Development

Figure 10 depicts the initial framework constructed to describe and analyse ever more granular levels of advertised CIO role 'attributes.'

Three core dimensions discussed throughout literature (Role Expectations (i.e., performance, alignment, and effectiveness), Demographics and Social Capital i.e., experience, rank, education, etc.) and Attributes (i.e., knowledge and skills) informed the creation of two macro categories, Business Context and Role Requirements), which in turn suggested three sub-categories of Role Purpose, Role Profile and Role Attributes. Having developed a measure of insight into the job adverts using the pre-planned three stage approach of analysis the author

determined that whilst the final auto-coding stage had revealed a structured set of phrases, further manual analysis was still needed to group phrases into 'dimensions' for CIO role expectation. Whilst this may arguably have introduced a measure of author bias into the analysis, the author remains confident that as the phrases had been automatically generated, the subsequent manual grouping of phrases into dimensions introduced an acceptable level of bias. As such, the author was able to conduct manual (or self-supervised) codification ($Level_1$ to $Level_N$ phrases) of the automatically generated results.

4.2 Results

4.2.1 Data Sourcing & Selection

Source/ Advert Selection Criteria	
Data Source(s)	• Generalist: LinkedIn, CWJobs, Total Jobs, Indeed • Specialist: 5 x Anonymised
CIO Role Inclusion Criteria	English Language, UK based, Board Level, Cross functional, Cross Sector/ Industry, CTO (business change focused)
CIO Role Exclusion Criteria	Start-up company, Director, CTO Technology (only) focus, Service desk (only) focus, Infrastructure (only) focus, Apps (only) focus, Programmer (only) focus, Public Sector (not board), Consultancy, IT services (only) focus, Architect, or product (only) focus, Head of (operations), Operations (only) focus, Strategy (only) focus

Table 7: Source/ Advert Selection Criteria

Table 7 summarises the two types of data sources used to capture publicly available job adverts i.e., 'Generalist' sources (such as LinkedIn) and (anonymised) 'Specialist' sources (such as executive recruiters/ 'head-hunters').

Having collated 3000 job adverts over the twelve-month period, the author applied this inclusion/ exclusion criteria to identify 252 advertised roles. This process was unexpectedly time consuming as automated email alerts from generalist sources:

1. Were largely irrelevant:
    a. With many suggested adverts (seemingly) being for a huge range of unrelated IT roles (e.g., developers, business analysist, SQL writers, etc.)
2. Contained high repetition of the same roles
    a. Frequent re-advertising of the same role
        i. From the same source, several times a day (or days apart), or
        ii. From different sources (either being a direct copy of the original source, or containing slight variation in content)
3. Contained job descriptions that were generally of a poor ‘quality’:
    a. Many adverts appeared incomplete, inconsistent, and lacking in specificity. For example, they:
        i. Failed to adequately declare why the role was being advertised (i.e., what was the business context)
        ii. Failed to declare the reporting line (and hence ‘scope’) for the role and
        iii. Contained significant variations and inconsistencies in terminology.

The most unexpected result was:

1. A high count for (purest, highly technical) Chief Technology Officers (CTOs); and
2. A low count of C-suite roles specifically dedicated to digital technologies (i.e., Chief Digital Officer, or CDO)

Whilst every effort was taken to ensure that only the most relevant roles were captured (i.e., those that encompassed a good mix of business leadership and IT management activities), a significant number of the (automated email) results were for (technical, not business change) CTOs; whilst a count of these was not

maintained, the author is confident in estimating a CTO: CIO job advert ratio of c.5:1.[318]

4.2.1.1 Word Frequency Analysis

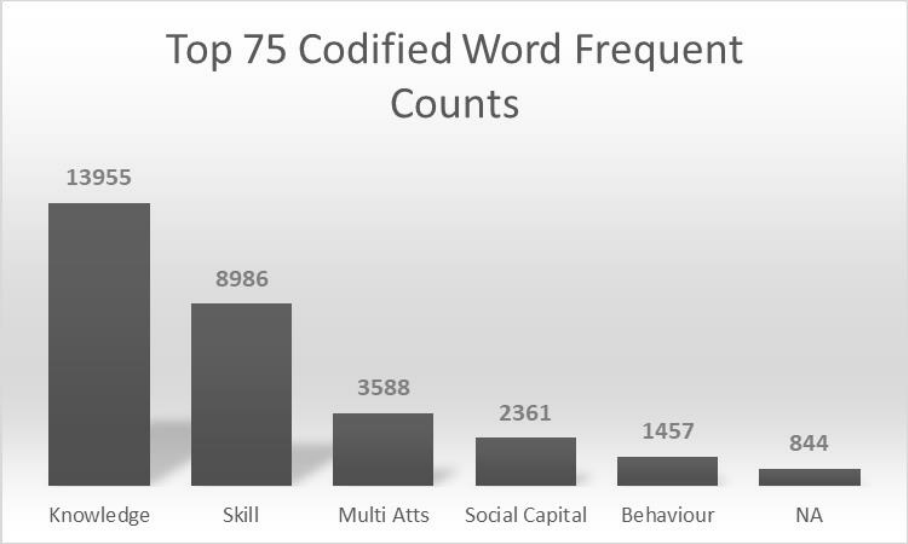

Figure 11: Top 75 Codified Word Frequent Counts

The first stage of analysis, a word frequency count in NVivo revealed that a combination of the top-75 most frequently occurring words, with 5 of more characters with matching synonyms yielded a consistent and comprehensive result.

This analysis revealed initial 'dimensions' for role codification. Figure 11 depicts the frequency of these word counts by dimension.

14/75 of the selected words (some 3588 counts) could not be easily codified and they were thus assigned a code of 'multi-attributes' and 4/75 of the words ('Opportunity', 'Create,' 'Competitive' and 'Following') could not be classified at all.

These results are fully tabularised in appendix B.2. Although useful as an initial indicator of role descriptors, these dimensions remained open to interpretation

[318] In support of this estimate, a comparison of advertised, permanent UK roles showed that the number of advertised roles for 2018, 2019 and 2020 were: CIO: 59, 57 and 82 and CTO: 210, 178 and 256 respectively (source: https://www.itjobswatch.co.uk/ (accessed 15th May 2020)

and conjecture. E.g., 'Customer' (the 19th most frequently counted word) could have been referring to either internal or external customers and meaning either knowledge of individual customers or the customer market, or perhaps the CIO's ability (or skill) in dealing with customers.

This first stage analyses yielded two important observations:

1. Given underlying assumptions that digital technologies would be impactful on the CIO's role, the author noted that although the word 'digital' appeared quite highly in the count (ranked 6th highest), it only accounted for 991/31991 counts (or 3%) of the total top-75 count of the sample; and
2. Words describing the business context (or role purpose) for the advertisement remained absent from these results.

4.2.1.2 Word Cluster Analysis

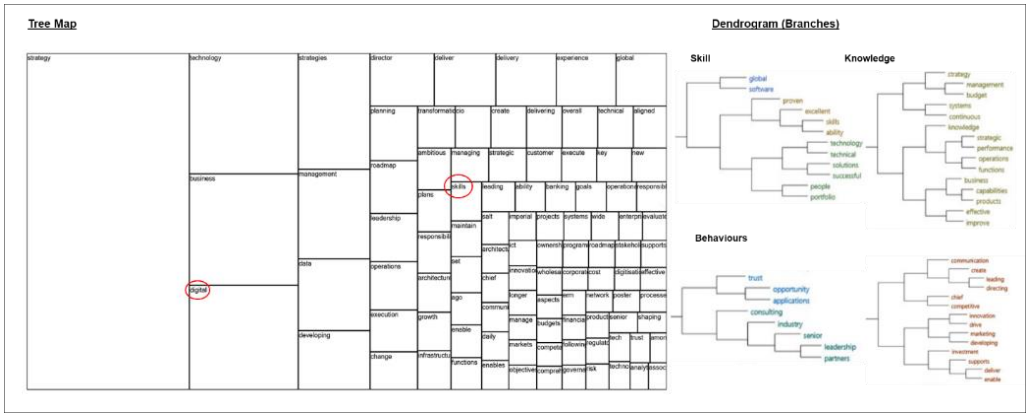

Figure 12: Tree Map/ Dendrogram Analysis

Following on from the word frequency count, the author once again discovered that a combination of top-75 most frequently occurring words, having a word length greater than 5 and selected with word matching using synonyms also yielded the most insightful results. Subsequent experimentation with NVivo's visualisation tools enabled the author to discover deeper insights; the combination of 'Tree-Map' and 'Dendrogram' proving most useful[319].

[319] 'Word Trees' also proved moderately useful in trying to uncover related words for key words. Example for words relating to 'knowledge' and 'skills' are presented in section B.3 of the appendix

The Tree Map (illustrated on the left on Figure 12) provided a first glimpse of word associations E.g., ‘Skills’ appeared near to be ‘Managing’ and ‘Maintain’.

The words ‘Knowledge’ and ‘Behaviour’ did not appear at all, although there were some words that could be interpreted as being associated with Knowledge (‘architecture’, ‘data’) or Behaviour (‘Leadership’, ‘Supports’, ‘Shaping’). Additionally, Tree mapping also failed to reveal any aspect of role purpose or profile.

Analysing the data using a vertical dendrogram, ‘Skills’ appeared again, but this time associated with ‘Global’, and ‘Software’ and close to ‘Proven’, ‘Excellent’, ‘Ability’ and ‘Technology’. ‘Knowledge’ appeared for the first time and was associated with ‘’Strategic’, ‘Performance’, ‘Operations’ and close to ‘Business’, ‘Capabilities’, ‘Products’, Effective’ and ‘Improve.’ Words associated to ‘Behaviour’ were still absent, but indicative words included ‘Consulting’, ‘Leading’, ‘Directing’ and ‘Driving’.

This second stage analysis demonstrated:

1. Some evidence of the CIO attributes, but no evidence of perspectives on role purpose or profile; and
2. Some, but little additional insight into how recruiters perceived the relevance of the role with digital technologies

Whilst the word ‘digital’ was (once again) prominent, being strongly associated with the words ‘Strategy’, ‘Technology’, ‘Business’ and ‘Data’ on the word tree and the words ‘Transformation’, ‘Benefits’, ‘Delivery’ and ‘Change’ on the Dendrogram, the desired level of role insight, in relation to digital technologies, remained elusive.

Whilst these results appeared to be a marked improvement on frequency counts[320] of standalone words, the author was still left with many questions regarding role purpose, profile, and attributes.

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[320] Although many other clusters were almost non-sensical (e.g., ‘trust’ being associated with ‘opportunities’ and ‘applications’)

4.2.1.3 Phrase Auto-Coding

Auto Coding		Manual JA Coding					
		L_3 Role Dimensions					
L_1	L_2	Purpose	Profile	Primary Knowledge	Secondary Knowledge	Skills	Behaviour
		L_4 Dimension Descriptions					
e.g., 'Project'	e.g., 'project management', 'digital projects'	e.g., Business Performance, Business Growth	e.g.: Status, Rank, Experience	e.g., Business Capabilities, Business Requirements	e.g., Finance/ Commercial	e.g.: Managerial, Innovation & Change	e.g.: Inspirational, Motivational

Table 8: JA Phrase Auto/Manual Coding Codification Schema

Auto-coding represented a significant break-through in understanding the advertised roles.

The process revealed 30 Level 1 (L_1) codes containing (counts of) 3030 Level 2 (L_2) phrases.

For example:

1. \services\service management strategy - 19
2. \leadership\market leadership - 2
3. \data\implementing data privacy policies - 2

'Services,' 'leadership' and 'data' represented L_1 codes and 'service management strategy,' 'market leadership,' and 'implementing data privacy policies,' represented the L_2 phrases appearing 19, 2 and 2 times, respectively.

The top-3 L_2 phrases for each of the 30 L_1 auto-codes are summarised in appendix B.4 (the five highest number of L_1 codes being 'Technology', 'Business', 'Management', 'Services' and 'Experience').

Downloading these results into MS Excel, the author was able to manually analyse the L_2 phrases. Of the 3030 phrases (totalling 38670 counts), 509 phrases were deemed irrelevant to the study (largely because as standalone phrases they were nonsensical in nature); this left 2521 useable phrases for analysis (or a final total phrase count of 34415).

Table 8 depicts the final codification schema for the JA sample. Whilst L_1 and L_2 codes and phrases had been generated automatically by NVivo, subsequent manual coding (in Excel) revealed two further levels coding, L_3 (phrases grouped into role dimensions) and L_4 (phrases describing various role qualities within those grouped dimensions).

L_3, coding enabled the author to develop new role dimensions:

1. Purpose: a description of business circumstance leading to role advertisement, implying a perceived (or expected) role 'purpose'
2. Profile: categorised as an:
    a. Intrinsic 'quality', where the job advert requested specific experience(s), academic or professional qualifications, etc., or
    b. Extrinsic 'quality' such as rank or status (evidenced either by previous experience or about the seniority of the advertised role)
3. Behaviours: specific reference to a behaviour (largely 'leadership' or behaviours such as being Influential or Motivational).
4. Skill(s): clearly stated and/ or largely comprising of phrases containing a verb
5. Primary knowledge: clearly stated knowledge requirement (largely identified as adjectives/ nouns); and
6. Secondary knowledge: implicit knowledge requirement[321]

When conducting counts of L_4 phrases, within grouped L_3 role 'dimensions', Figure 13, it was possible to show that advertisers had placed a heavy emphasis on (or have a clear perception of) Knowledge and Skills, with rather less emphasis on (in descending order of counts) Profile, Behaviours and Context. Further consideration of L_4 phrase counts within each dimension, started to reveal several key trends in the sample.

[321] Manual coding of the 3030 phrases proved challenging as many phrases implied knowledge of multiple subjects e.g., 'senior product manager' suggested knowledge of 'products' and 'service management,' and 'senior infrastructure engineer' implied knowledge of IT infrastructure, and knowledge of technical architecture. As such the author developed two descriptors of knowledge, primary and secondary knowledge to safeguard the development of insight

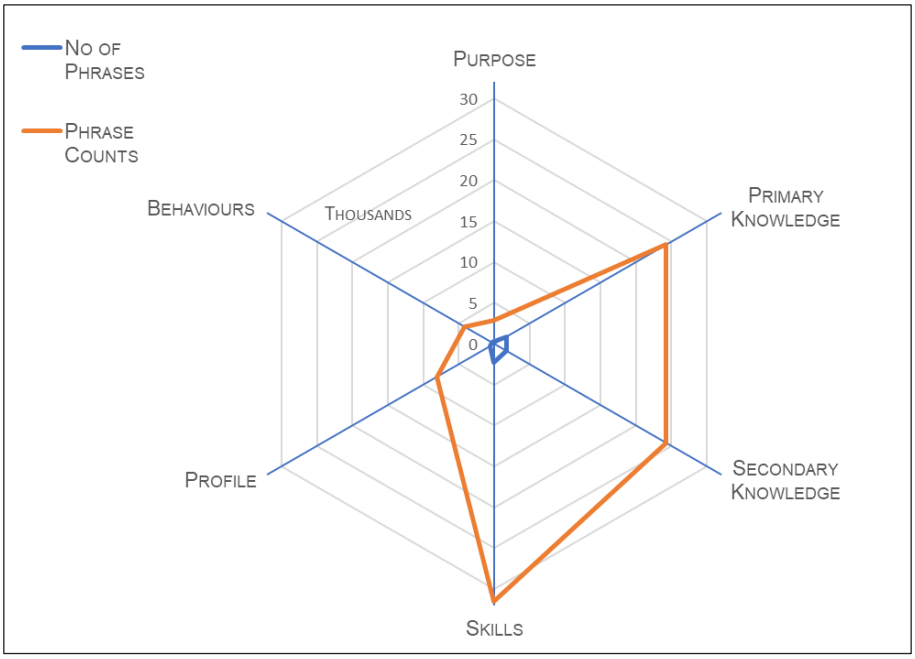

Figure 13: Advertised CIO Role Classification Count Comparison

The results for each dimension are presented graphically in the Appendices (B.5 to B.9.)

Looking at phrase counts that made up more than 10% of the phrase counts for each dimension; the sample showed that UK organisations perceived that:

1. A CIOs role Purpose is to:
    a. Play a role in Organisational and Business Change (22%)
    b. Achieve/ maintain 'strategic' alignment between IT and the Business (16%)
    c. Impact Business Growth (9%)
2. A CIOs role Profile should demonstrate:
    a. Experience (76%)
    b. Status (15%)
    c. Credibility (4%)
3. CIO role 'Behaviours' should include:
    a. Leadership in the management of their IT departments (83%)
    b. That they are 'Sociable' (4%); and
    c. Collaborative (2%)
4. CIOs should be 'Skilled' at:

a. Day to day management (of the IT department) (75%)
b. Innovation and Change ((15%); and
c. Be involved in business strategy development (4%)

5. CIOs should have demonstrable ‘Knowledge’ of:
    a. Business (in terms of requirements and capabilities) (40%)
    b. Current Business Systems (12%)
    c. Programmes and Project Methods (10%)
    d. Service Management (7%)

4.3 Stakeholder Expectations & Conclusions

This study reveals several important findings in the development of a CIO role effectiveness model. Firstly, there are multiple, seemingly incongruous expectations for UK CIOs. Whilst it’s not clear on who has these role expectations (i.e., whether the CEO, members of the TMT, the head of HR) or who may have interpreted these expectations (i.e., the recruiting agent or the advertiser), inconsistencies in the use of terminologies (perhaps through the adoption of ‘business speak’) makes for a complex picture of expectation. However, despite this, a comparison of the top phrase counts for expectations of the CIO with the key themes in the literature, it is possible to start to map out where expectations may align or diverge.

For example, if we consider role purpose, then comparison with literature suggests some commonality of expectation for CIOs to maintain business-IT alignment, whilst practitioners (or the perspectives drawn from the job adverts) seemingly prioritise Business Change and Business Growth whereas researchers, agreeing on the need for business-IT alignment also emphasise the expectation for CIOs to impact firm performance in terms of business and IT.

Similarly, it is possible to begin to make similar inferences for expectations for CIO skills, behaviours, and their profile (Figure 14); the one exception to this appears to be in the case of expectations for CIO knowledge. Whilst CIO job advertisers seem to emphasise the expectations for CIOs to know most about Business Requirements, Business Systems, Project Management and Service Management, literature places more emphasis on Business Management, IT &

Business Strategy, and IT Manager/ Business Manager/ TMT stakeholder management.

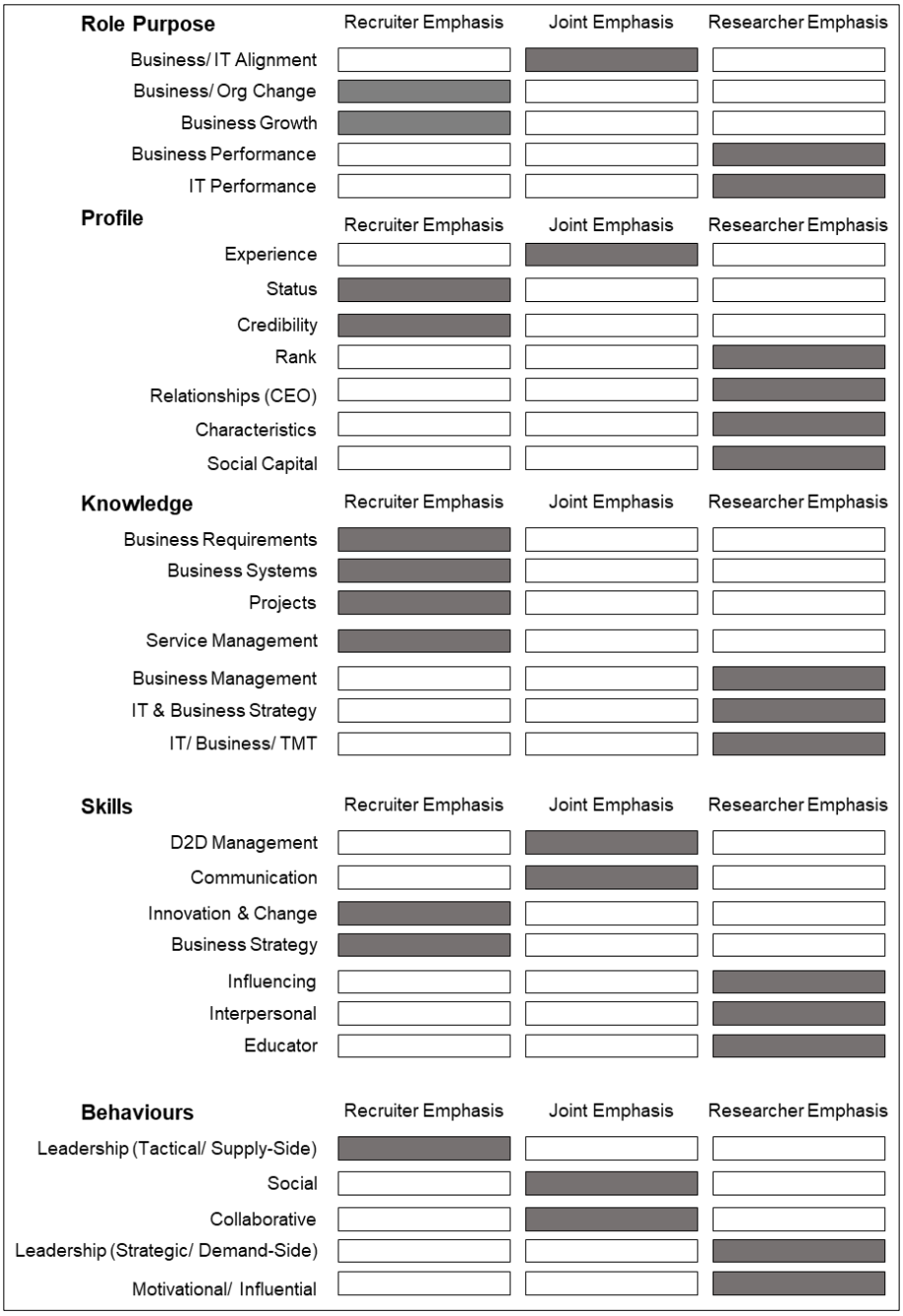

Figure 14: CIO Recruiter Expectations

The second important finding from this analysis, is that it has new been possible to develop an enhanced degree of confidence in the relevance of skills and knowledge as important dimensions of stakeholder expectation. Whilst many phrases were deemed ambiguous or non-sensical (i.e., 509 coded phrases, representing about 16% of all phrases), the two attributes collectively represent

a significant proportion of the coded expectations (i.e., with expectations for knowledge representing 50.4% of the overall phrases and skills representing 33.2%). Conversely, but perhaps unsurprisingly, the proportion of counts for expected Behaviours, Purpose and Profile were relatively low (at 4.4%, 3.5% and 8.5% of the count respectively).

The third important finding from this analysis has been an initial indication of the diversity in the types of environments CIOs are expected to operate in. For example, an examination of the phrases for CIO 'Purpose' suggests that are expected to contend with Organizational Business Change, Enterprise Transformation, Changing Business Demands, an Evolving Customer Base and External Customer Service Requirements etc. Whilst advertisers have not been explicit in differentiating between differing maturity levels of their clients' organizations, it is possible to deduce that CIOs are still expected to be effective in either 'traditional' IT functions (i.e., those which are more operationally focused and transactional in nature) or in (the rather less well defined) more modern 'digital' environments (i.e., those that are more dynamic in nature and strategically impactful).

The fourth important finding from this analysis, in keeping with research objective 2, is that the author has been able to develop insights for defining new, additional variables for behaviours, skills, and knowledge. For behaviour, it is apparent in this analysis that there are expectations for CIOs to engage in (what Yukl refers to as) 'task' orientated behaviours. However, an examination of the results suggests that one may infer a 'split' in the definition for task into two sub-categories, which the author defines as:

1. Non-technical task (orientated behaviours) - the enactment of behaviours focused on improving the efficiency and reliability of activities carried out by non-IT personnel, and
2. Technical tasks (orientated behaviours) - the enactment of behaviours focused on improving the efficiency and reliability of activities carried out by the CIOs IT personnel

Similarly, whilst the results appear to align with Katz taxonomy on skills (i.e., Human, conceptual and technical), analysis suggests further refinements (or additional variables) should be considered in terms of expectations for CIOs to work with a growing number of 3rd party IT service providers[322]. In acknowledgement of expectations (in the literature) for CIOs to act as 'educators' (cf. (Smaltz et al., 2006b)), the author proposes to develop constructs suggesting skills for CIOs to transfer knowledge amongst their stakeholders, to collaborate with Customers (cf. (Saldanha and Krirshnan, 2011b) , and with 3rd Parties. Given references to strategy development, the author also proposes to develop variables for strategic planning (in contrast to operational planning) for the 'task' dimension of the skills theme in the proposed model.

In terms of knowledge, and in contrast to the authors own recent experiences as an IT consultant, the author was surprised to find a lack of reference to CIOs being expected to have a useful working knowledge about the:

1. aspirations of their stakeholders – a working knowledge of the aspirations of their stakeholders often informs (relatively shorter term) priority setting and longer-term decisions (i.e., in terms of investment decisions arising from the development of new technical architectures)
2. skills and/ or the knowledge that their stakeholders already possess – CIOs who discount the current capabilities of their stakeholders are likely, at best, to either waste their own time investing in unnecessary communications, or at worst, risk wasting the time of their stakeholders communicating about things that they already have, or know about)
3. features of (sometimes legally, or commercially) binding agreements that their stakeholders are currently subjected to – attempts to introduce change without consideration of current constraints are likely to stall or fail
4. issues, risks, and opportunities presented by all aspects of data – given the current emphasis about the importance of data when deriving value from digital technologies, the author suggests that it is important for CIOs

[322] A trend the author has noted from his own experiences in delivering new, 3rd party provided IT service capabilities

to develop a close working knowledge about both current and potential issues and opportunities presented by data; and

5. issues, risks, and opportunities presented by current IT service provision - given the propensity for organizations to increasingly rely on 3rd parties to host and manage a range of application and infrastructure services, the author proposes that CIOs would need a working knowledge of all aspects of service design, implementation, and management

Finally, considering the gap in the literature concerning the lack of research into CIO development, the results for the CIO profile prompted the author to develop two new questions about how CIOs are motivated to learn to develop their effectiveness, i.e., how do CIOs maintain their motivation? And how are CIOs expected to continuously learn and develop to ensure their profiles are deemed relevant against changing expectations? These questions suggest two new, additional hypotheses:

H5	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO learning preferences
H6	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO assessment, ambition, and motivation

Table 9: Additional Hypotheses

5 EXPECTATIONS SURVEY

Having developed confidence that not only do a CIOs Skills and Knowledge represent a significant set of expectations for CIO stakeholders, but also that environmental circumstance, demographics, and behaviours are also important aspects of CIO stakeholder expectations, in keeping with objective 3 of this research, the next stage in this research is to test the hypotheses to determine how these various expectations may correlate.

To achieve this, it is necessary to develop variables for each proposed dimension of expectation and then test the relevance of the relationships between these with both practicing CIOs and CIO Stakeholders. Successful testing should not only reveal where expectations align, but also where they differ or diverge. In either circumstance, the author aims for practitioners to be able to act on the findings to develop interventions for managing stakeholder expectations for more effective CIO behaviours.

5.1 Theory Development

Having reconsidered the gaps in the literature, the findings from the CIO JA analysis and reflecting on the conceptual framework (Figure 7), the author, in continuing to meet objective 2 of this research (development of new constructs modelling stakeholder expectations for the CIO) proposes constructs for a CIO role behaviour effectiveness model, Figure 15. Expectations for effective CIO role behaviours are considered from two key perspectives, those of practicing CIOs and those who have a close working knowledge of the CIO as they perform their everyday duties, CIO stakeholders, or nCIOs in the diagram. Both parties will have developed expectations for the CIOs role in terms of CIO behaviours and attributes.

According to Role Theory and Organizational Role Theory, expectations for effective CIO role behaviours are shaped through expectations for social conduct, and such behaviours should fulfil the singular aim of establishing improved levels of social integration through a socialisation process i.e., role making. To be deemed effective in role making, CIOs should therefore aim to identify and then

address the expectations nCIOs hold for their behaviours in the given circumstance (or in this case 'Scenario').

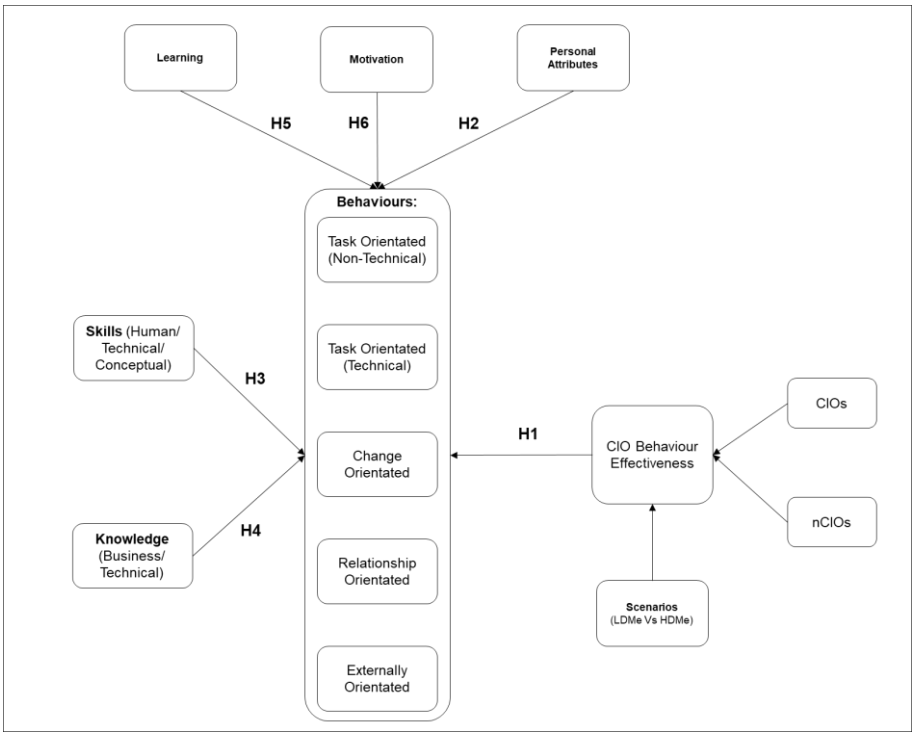

Figure 15: Proposed CIO Effectiveness Model

For a given scenario (in the model these are shown as Low Digital Maturity environments and High Digital Maturity environments, or LDMe and HDMe), CIOs and nCIOs will also hold expectations for various factors that are perceived to relate the CIOs personal attributes, e.g., their experience and qualifications (i.e., their demographics), their structural power (i.e., their reporting line), their personal motivations, their learning preferences, their skills, and their knowledge. From the literature, the author notes that many of the studies examining attributes antecedent to the various outcomes expected by the CIOs stakeholders attempt to demonstrate that certain attributes are causal to the expected outcome i.e., the attribute under examination is pre-requisite to the CIO meeting that expectation. There are many examples of this; (Smaltz et al., 2006b) declares that the CIOs capability is dependent on the CIOs strategic knowledge of IT and their interpersonal skills, (Shao et al., 2016) also claim that improved IT assimilation into the business is dependent on both the CIOs knowledge of both IT and the business and (Wu et al., 2008) claims that CIO effectiveness (in improving IT) is dependent on the CIOs 'technology competency' (mixed skills and knowledge

relating to IT infrastructure, business applications and business technology integration) and the CIOs 'business management competency' (business domain knowledge, interpersonal skills and management practice knowledge). As a result of these, and many other similar claims, the author assumes that each of the attributes in the model will be casual to the enactment of expected behaviours, as indicated by the arrow heads on each construct in the diagram.

The author therefore proposes that agreement (or disagreement) on combinations of these factors represents an assessment of CIO role effectiveness and provides an indication of which attributes a CIO would need to develop and then apply to help fulfil (or change) the expectations of the CIOs stakeholders (nCIOs).

5.1.1 Hypotheses & Construct Development

Maintaining a pragmatic approach to structuring an inquiry with practitioners about the validity of the hypotheses proposed to address the research question (in Table 6 & Table 9), and utilising the taxonomy on behaviours, skills and knowledge (as detailed in 3.2), the author identifies constructs that represent possible explanations for the relationships, in increasingly dynamic scenarios, between variables for expectations on CIO behaviours and CIO attributes; these are shown in Table 10[323].

Whilst most of the variables selected have been derived from literature, the author identified a number of additional variables from the job advert (JA) analysis and from the authors own experiences as a practitioner. These comprise:

1. Personal attributes – professional qualifications: whilst researchers have alluded to the diminishing relevance of an individual's academic qualifications in lieu of practical experience, the author is unaware of any studies assessing the relevance of professional qualifications in relation to expectations for any aspect of performance. However, it is the authors

[323] Hypotheses and constructs are also combined in appendix C.5 and presented as part of the results analysis process

experience that clients seeking support, often request professional qualifications (such as ITIL or Programme Management, etc.) or professional certification sin vendor products (such as SAP, CISCO, etc.)

2. Knowledge – of stakeholder aspirations, the IT skills and the IT knowledge that stakeholders possess. Whilst literature makes reference to meeting the requirements of stakeholders in terms of impacting IT operations (i.e., cost reduction) or impacting the business (i.e., increasing innovation), the author is unaware of any literature that investigates how CIOs ascertain the relevance of current aspirations and/or the capabilities both tin IT or the business in meeting those same aspirations
3. Knowledge – stakeholder agreements: literature does not address the relevance of the opportunities and/ or constraints imposed on CIOs in the shape of formal (contractual) agreements between stakeholders. The author proposes that CIOs need to develop this knowledge before attempting any adjustment to behaviours
4. Knowledge – obtaining value from data: given the growing importance of data, the author proposes that CIOs need to understand the current and desired 'quality' of business data before being able to enact behaviours to address this shortfall. Whilst quality is partially subjective here, the author proposes variables to ascertain the availability of useful data from either internal, or external sources
5. Knowledge – IT services: given the recent trend in the Servitisation of IT, the author proposes that knowledge of all IT services is pre-requisite in meeting stakeholder expectations
6. Learning preferences – sources of knowledge. Given the lack of professional institutions for CIOs, the author proposes to understand if CIOs and their stakeholders hold a preference for where CIOs are expected to obtain their knowledge

Hypotheses	Constructs	Sources	Variables	SQ' s
	1. LDMe: Low Digital Maturity Environments 2. HDMe: High Digital Maturity Environments	Author	1. S1: Inhouse Reactive Business Services 2. S2: Distributed Reactive Business Services 3. S3: Inhouse Dynamic Business Services 4. S4: Distributed Dynamic Business Services	1. SC1
H1: CIOs and nCIOs agree on the relative importance of the most effective CIO behaviours in digitally maturing scenarios	1. RELOB: Relationship Orientated Behaviours 2. CHGOB: Change Orientated Behaviours 3. EMOB: Externally Orientated Behaviours 4. NTTOB: Non-Technical Task Orientated Behaviours 5. TTOB: Technical Task Orientated behaviours	Yukl	1. RELOB: Focusing on Effective Working Relationships 2. CHGOB: Focusing on Continuous Improvement and Change 3. EMOB: Focusing on Developing/ Disseminating Knowledge **4. NTTOB: Focusing on Relatively Non-Technical Tasks** **5. TTOB: Focusing on Relatively Technical Tasks**	1. B0
H2: CIOs and nCIO agree on the relative importance of the CIO personal attributes that enable CIOs to enact the most effective behaviours in digitally maturing scenarios	1. TENURE: Years as CIO 2. DIGEXP: Years working with Digital Technologies 3. SECEXP: Sector Experience 4. RPTLVL: Reporting Level 5. BUDGSZ: Budget Size 6. ACDLVL: Academic Qualification Level 7. ACDMJR: Academic Major 8. PRFQLS: Professional Qualifications	1-5: JA Analysis 6-7: Li (2006), Liu (2018) 8: Author	1. TENURE: 1-2, 2-3, 3-5, 5+ Years 2. DIGEXP: 1-3, 4-6, 7-10, 10+ Years 3. SECEXP: Low Transactional, Hight Transactional, Public Sector 4. RPTLVL: Sub TMT, TMT 5. BUDGSZ: £1-10m, £10-100m, £100-499m, £500m+ 6. ACDLVL: UG, G, PG 7. ACDMJR: Business, Technical, Business& Technical 8. PRFQLS: Technology Management, Business Management, Project Management	1. D4 2. D5 3. D6 4. D8 5. D20 6. D23 7. D24 8. D26
H3: For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of the most effective CIO skills	1. CONC: Conceptual Skills 2. HUMA: Human Skills 3. TECH: Technical Skills	1-3: Katz And 1: Kearns (2006), Philip (2007) 2:Stephens (1994), Smaltz (2006) 3: Feeny (1998), Peppard (2000)	1. RELOB: Supporting, Developing, Recognising, Empowering, **Exchanging Knowledge (Author)** 2. CHGOB: Influencing, Advocating, Envisioning, Encouraging Innovation, Facilitating Learning, **Facilitating IT System Changes (Weiss, 2004), Gorgeon (2010)** 3. EMOB: Networking, External Monitoring, Representing, **Customer Collaboration** (Saldhana, 2011), **3rd Party Collaboration** 4. TTOB: **Strategic Planning**, Operational Planning, Clarifying, Monitoring, Solving Problems	1. S2 2. S3 3. S4 4. S1
H4: For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge	1. STKSAT: Stakeholder Satisfaction 2. STKASP: Stakeholder Aspirations 3. STKITSK: Stakeholder IT Skills Gap 4. STKITKN: Stakeholder IT Knowledge Gap 5. STKAGRS: Stakeholder Agreements 6. STRGPLN: (Org) Strategic Planning 7. ORGRQS: Organizational Requirements/ Priorities 8. ORGEXP: Organizational Expectations/ Capabilities 9. BUSPRSR: Business Products/ Services 10. DTAVAL: (Obtaining) Value from Data 11. ITOPS: IT Operations Management 12. ITPRDAPS: IT Products/ Applications 13. ITSRVS: IT Services 14. TECARCH: IT Infrastructure/ Technical Architecture 15. PRJMNG: Project Management	1: Jones (1995), Chen (2015) 2: Author/ JA Analysis 3: Author 4: Author 5: Author/ JA Analysis 6: Smaltz (2006), Chen (2015, 2017) 7: Lee (2007), Berepiki (2017) 8. La Paz (2010) 9: Wu (2008), Chen (2011) 10:Author 11:Earl (1994), Wu (2008), Trigo (2009) 12: JA Analysis, WU (2008) 13: Author, JA Analysis 14: Wu (2008) 15: Gottschalk (2005), Lane (2007)	1. STKSAT: Customer, Bus leader, Bus Manager, IT Manager, 3rd Party 2. STKASP: Customer, Bus leader, Bus Manager, IT Manager, 3rd Party 3. STKITSK: IT, 3rd Party, Bus Operators, Bus Managers & Leaders, Customers 4. STKITKN: IT, 3rd Party, Bus Operators, Bus Managers & Leaders, Customers 5. STKAGRS: Direct Reports, 3rd Party, Bus Managers, Bus Leaders, Customers 6. STRGPLN: Dig Cust Strat, Dig Bus Strat, IS Strat, IT/ Bus Strat Align, IT/ Bus Plan Align 7. ORGRQS: Req Auth, Customers, Bus Leaders/ Managers, IT Managers, 3rd Party 8. ORGEXP: Ext Audit, Customers, Bus Leaders/ Managers, IT Managers, 3rd Party 9. BUSPRSR: Sup Chain Risks, Competitors, Market, Customers, Strategy 10. DTAVAL: BusData Qual, Bus Access, 3rd Party Access, R'Time Intern, R'Time Ext 11. ITOPS: IT Perf, IT Chang Mng, IT Ops Design, IT Res Planning, IT Ops Strat 12. ITPRDAPS: From IT, From 3rd Party, Bus Use, Customer Use, Compet Use 13. ITSRVS: From IT, From 3rd Party, Bus Use, Customer Use, Compet Use 14. TECARCH: From IT, From 3rd Party, Bus Use, Customer Use, Compet Use 15. PRJMNG: Spns Portf's, Spns Progs, Mng IT Proj (Cust), Mng IT Proj (Bus), Mng IT Proj (IT)	1. K1 2. K2 3. K3 4. K4 5. K5 6. K6 7. K7 8. K8 9. K9 10. K10 11. K11 12. K12 13. K13 14. K14 15. K15
H5: For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO learning preferences	1. SBJTS: Subjects 2. KNWSRC: Sources of Knowledge	1: Armstrong (1999), Trigo (2009) 2. Author	1. SBJTS: Data Mng, Bus Perfor Improv, IT Products/ Apps, IT Infra, Customers 2. KNWSRC: IT Mngrs, 3rd Parties, Bus Mngs/ Leaders, Customers, Ext Prof Networks	1. K26 2. k27
H6: For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree that CIOs should be motivated by in work assessments and/ or progression of personal ambitions	1. PASSMT: Performance Assessment 2. AMBIT: Ambitions 3. MOTIV: Motivations	1: Author/ JA Analysis 2: Author 3: Yayla (2008), HU (2012)	1. PASSMT: Ful Strat Objs, Imp Bus Perf, New Caps to Time/ Cost, IT Perf, Tangible Bus Benefits 2. AMBIT: Tech Dev, Construc Feedbk, In work Opps, Chang Employer, Chng Rep Line 3. MOTIV: PDP Goals, Financial Gain, TMT Recog, Customer Recog, Peer Recog	1. PD1 2. PD3 3. PD2

Table 10: CIO Effectiveness Model Variable Development

7. Motivations – performance assessments and ambitions: whilst the literature on CIO motivation centres on compensation, CIOs researchers have not attempted to identify alternative methods for motivating CIOs. As such, the author proposes to identify if CIOs and stakeholders agree on appropriate mechanisms for performance assessment and continued motivation

5.1.2 Scenario Development

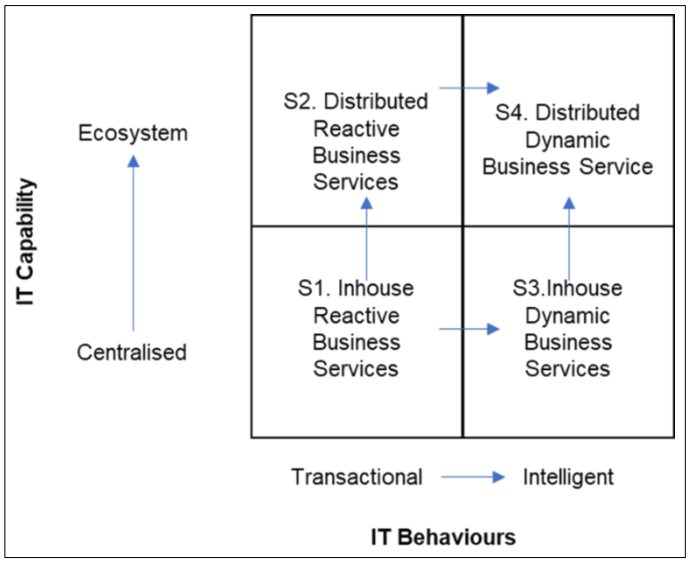

Figure 16: Scenario Mapping

Proposing that a CIOs environment is likely to impact CIO (and stakeholder behaviours), the author proposes to investigate the relevance of different scenarios in the study. Having reflected on multiple definitions for 'digital maturity', the author proposes that CIOs are likely to be operating in environments that can be described through two fundamental dimensions, (i) their spectrum of influence over their IT resources (i.e., whether those resources are centralised or dispersed throughout the extended enterprise, or 'eco-system', and (ii) the behaviours displayed by those same IT resources in-providing the products and services required of them (i.e., whether they are reactive to business demands, displaying transactional behaviours, or whether they are proactive in shaping the demands for their products and services using data and information).

Combining these two dimensions, Figure 16, the author proposes there are (at least) four scenarios that, collectively encapsulate four types of scenarios:

- S1: the ‘traditional’ inhouse IT capability which takes a highly transactional, reactive approach to product and service provision. In this scenario, IT’s ‘customers’ are in-house business units and functions. IT is likely to be perceived as a cost centre and only required to provide IT products and services that meet the relatively tactical requirements of their business
- S2: the ‘distributed traditional’ IT capability that describes a partial, or fully distributed IT capability. In this scenario, the business attitude towards IT capabilities are similar to those for the traditional perspective but organizations have opted to continue with cost reduction by outsourcing many IT capabilities to external, third parties. In this scenario, IT service and product provision remains focused on internal stakeholders in the business, and it is highly reactive and transactional in nature
- S3: the ‘dynamic inhouse IT capability that describes a changing attitude towards IT from being a cost centre, to becoming a strategic asset. In this scenario, organizations have recognized that their IT capabilities are of strategic importance in achieving competitive advantage, and as such, are prepared to invest in them as an inhouse, protected capability. In this scenario, IT resources have increasing amounts of exposure the business customers and are able to develop a more in depth understanding of the current and potential needs of the business and their customers simultaneously. As a strategic resource, IT is expected to take a proactive approach, not only in the identification of opportunities for business improvement, but also for strategic advantage in the marketplace. In the extreme version of this scenario, IT may take a proactive role in acting on this information to make changes to business products and services as well as changes to business processes, entailing, for example, the use of artificial intelligence
- S4: in the final scenario, ‘the dispersed dynamic’ IT capability, the organization has identified that dynamic IT services can be more impactful and effective if IT resources are dispersed more widely throughout the enterprise and wider ecosystem. Whilst the decision to do this may relate to more effective management of costs, it is more likely to be perceived as a risk mitigation

strategy as organizations attempt to manage increasing levels of unexpected demand and change. In this scenario, organizations are likely to make increasing use of Cloud based infrastructures and services, hosted by third parties, and shared with many other organizations.

Whilst it may be possible to add more detail and complexity to these (and other many 'sub') scenarios and given the lack of consensus on definitions for digital maturity, the author proposes that they provide sufficient differentials with which to examine the potential impact of increasingly digitally enabled, dynamic organizations on CIO role behaviours. For the purposes of this research, S1 and S2 are deemed to represent a lower level of digital maturity environment (LDMe), whereas scenarios S3 and S4 represent a higher level of digital maturity environment (HDMe).

5.1.3 Theory Testing

5.1.3.1 Population and Sampling

To ensure consistency in responder selection, the author applied the criteria shown in Table 11. Whilst attempts to secure access to CIOs already supporting studies for several global commercial organizations met with little success, the author was able to identify a representative sample of CIOs and CIO stakeholders (or nCIOs) for this study. To secure a reasonably sized sample and to reduce author bias in sample selection, the author decided to combine non-randomised sampling with randomised sampling. Since 1999, the author, working in various capacities as an IT consultant, has developed an extensive network of UK based IT professionals, and this, combined with more recent and deliberate networking activities with specialised IT interest groups enabled identification of individuals known to the author.

CIOs	Holds, or has held the title 'CIO' at some point in their career
	And/or appears to have held a title relating to the most senior IT person in their organizations (i.e., Head of IT, VP, etc)
	Has, largely (although not exclusively) held the title 'CIO', or equivalent whilst working in the UK
	Has worked in this this role for more than 2 years
CIO Stakeholder (or 'nCIO')	Holds, or has held a job title that indicates close association with a CIO in the same company as the CIO (i.e., CEO, TMT Member (i.e., CFO, CTO, etc.), Subordinate to CIO (i.e., IT Director or equivalent))
	Holds, or held a job title that indicates close association with a CIO in a company external to the CIOs company (i.e., Head-hunter, Recruiter, Consultant, Journalist, Professor, etc.)
	Has, largely (although not exclusively) worked closely with a 'CIO', or equivalent, in one of the above roles, whilst working in the UK
	Has worked in this this role for more than 2 years

Table 11: CIO Sample Selection Criteria

Once individuals had agreed to participate, the author also asked if the individuals were willing to either nominate or contact a suitable individual who could also contribute to the research. Whilst this randomised approached, often referred to as 'snowballing' [324] reduced the authors level of control over who was invited to participate, the author decided that the advantages offered by increasing the sample size would outweigh the potential scale of any data cleansing needed once data collection had completed. To further increase the chances of increasing the sample size, and to offset additional biases introduced by snowballing (i.e., where participants only recommend individuals who are similar

[324] cf. (Biernacki and Waldford, 1981)

to themselves[325]) the author also elected to use self-selection sampling and seek data from individuals who have a strong interest in the role of the CIO and as such, had elected to voluntarily join various online CIO interest groups on the LinkedIn platform (see listing of groups in Appendix C.3).

5.1.3.2 Instrument Design

In developing the hypotheses and constructs (Table 10), the author identified 144 attributes (variables). To secure data for each of these the author developed two survey instruments using an online survey tool, Qualtrics. Each survey, one for CIOs and one for nCIOs contained the same questions, with the only difference being in the use of the first person for CIOs to answer questions about themselves and third person for nCIOs to answer questions about the CIOs they had worked with.

The surveys consisted of 52 questions (see appendix C.2 for the copy of the CIO 'version' used), which Qualtrics estimated would take approximately 20 minutes to complete. The survey questions were split into eight sections, the first section for providing an explanation of the aim of the research and an explanation of how to answer the questions and to secure informed consent. The next six sections aligned to the hypotheses and a final section requesting contact details should the responder which to conduct a follow-up consultation. To ensure that the responders were answering questions in the context of their specially chosen scenario the author ensured that their chosen scenario continued to be referred to in many of the questions. To ensure the responders selected their strongest expectations for each question, the author also chose to use nominal scales for nearly all the questions, permitting the responders to only select a single answer; the exceptions being for selecting previous sectors, qualifications, and certifications. To reduce bias, the author enabled randomisation of the questions and the order in which the selection boxes were presented. The author also prevented responders returning to previous questions to remove the risk of the changing answers as the responders learned more about the information being

[325] Resulting in a homogeneous sample, (Lee, 2000)

sought. The survey was fully anonymised to encourage spontaneity and to encourage responders to provide open and honest answers without fear of identification or unintended reprisals. Piloting both surveys with four professional colleagues provided the author with reassurance that the surveys appeared sensical and useable.

5.1.3.3 Survey Management

The author approached 836 individuals (via email[326] and LinkedIn messages) from an initial list of 1635 personal contacts. Of these, 220 confirmed that they would be willing to participate, Table 12 :

	Identified	Approached	Did Not Respond	Declined	Agreed
CIOs	224	224	63		52
nCIOs	2522				
TMT		664	492	24	249
Externals		58	46	2	20
					220

Table 12: Survey Response Counts

To increase this sample size, the author asked each of these candidates if they would be willing to either recommend further contacts, they deemed relevant to the study. In addition to this, the author targeted CIO interest groups and published the two surveys online.

[326] See appendix C.1 for a copy of the message sent to those who had agreed to take part

5.2 Results

5.2.1 Survey Responses

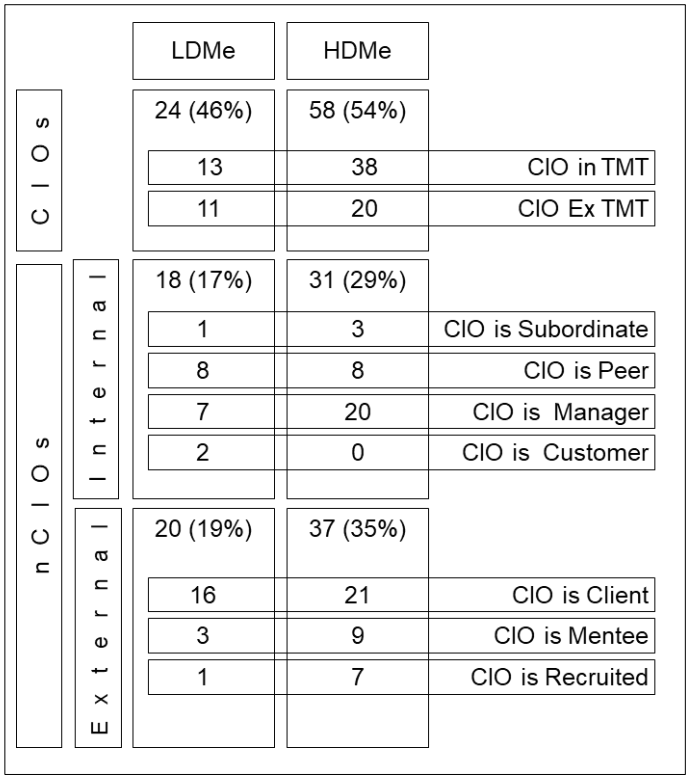

Figure 17: Survey Responder Counts

The surveys remained open from 2nd July 2022 until 25th February 2022; during this time a total of 138 nCIOs started their surveys, of which 106 were complete/ useable and 118 CIOs started their surveys, of which 82 were compete/ useable. Of these 82 CIOs, 8 declared themselves to be female (10%), whereas of the 106 nCIOs, 100 declared themselves to be male, 1 declared as female (c. 0.9%), with 5 preferring not to disclose.

Grouping those who work within the same organisation as the CIO as 'internal nCIOs' and those that work with CIOs outside of the CIOs organisation as 'external nCIOs', Figure 17, we see that the largest proportion of responders are those that work with CIOs in HDMe (i.e., 64% of the sample). In the HDMe sample, the largest proportion of responders are external nCIOs, representing 54% of the HDMe sample. External nCIOs also represent the largest group in the LDMe sample, representing 53% of the LDMe sample.

5.2.1.1 nCIO Relationships

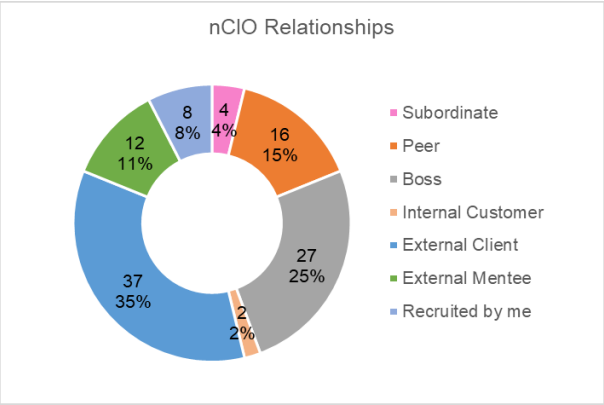

Figure 18: nCIO Relationships

Figure 18 summarises the profiles of nCIO responders. Of the 106 nCIOs, the largest proportion of responders were those who worked externally to their client CIOs (35%). The second largest group were those that described the CIO as their direct line manager, or Boss (25%), and the third largest group of responders described themselves as Peers to the CIO.

5.2.1.2 CIO Profiles

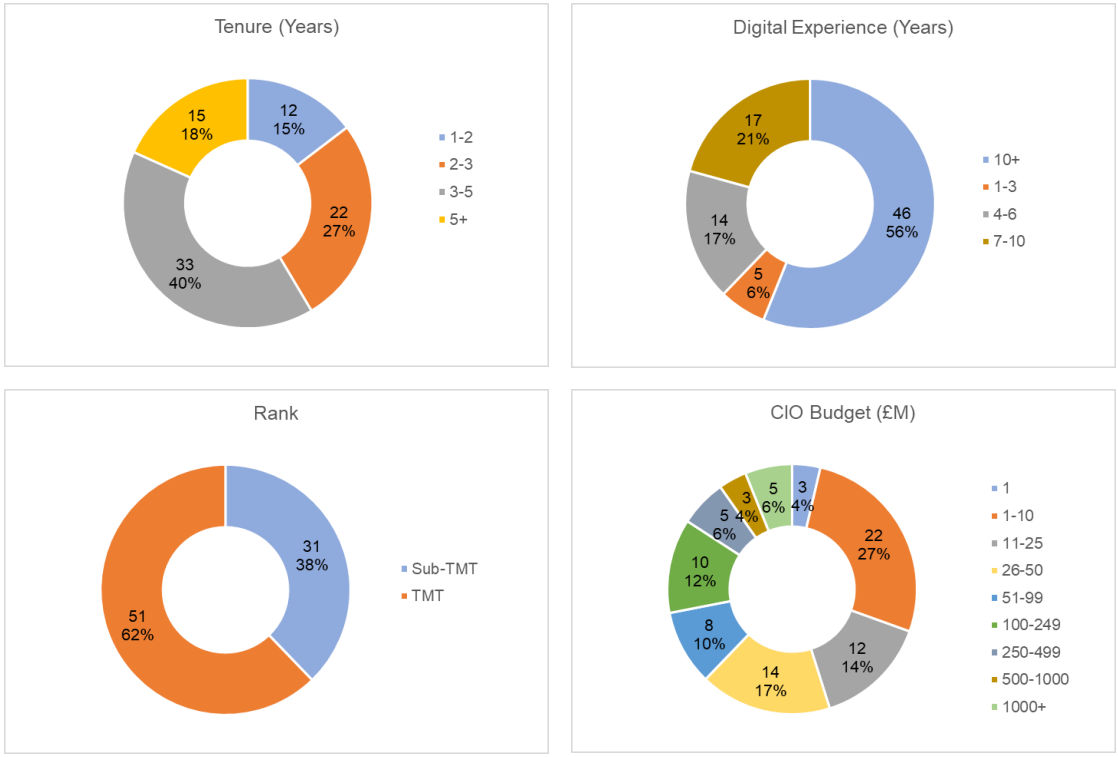

Figure 19: CIO Profiles – Digital Experience & Status

When examining the profile of the 82 CIO responders Figure 19 and Figure 20, we see that the majority of CIOs have tenures of 3-5 years, have 4-6 years' experience of digital technologies, are members of the TMT and have IT budgets of between £1m and £10m.

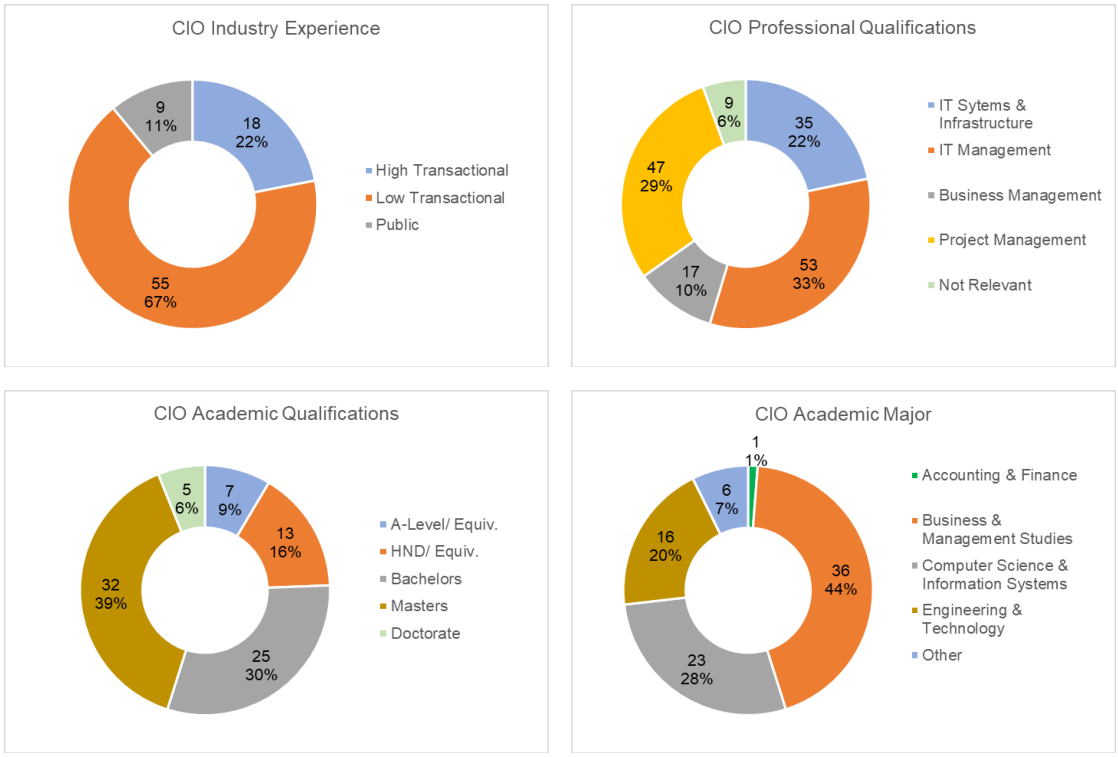

Figure 20: CIO Profiles - Industry Experience & Qualifications

Most CIOs also work in relatively 'low transactional' industries (i.e., utilities, transportation, defence, construction, etc.), hold a master's degree, majors in Business and Management Studies and holds professional certifications in IT Management (i.e., IT Service Management, Information Security, Networks and Cloud etc.

5.3 Analysis & Key Findings

Appendix C.4 presents survey counts from CIOs and nCIOs. These results have been examined using Pivot tables in Excel to identify the number of counts for behaviours and attributes from each stakeholder group (CIO and nCIOs) and for each environment (LDMe and HDMe).

Appendix C.5 presents a comparison of the relative proportion of counts for each bar chart in Appendix C.4, where, for each hypothesis, the author has identified:

1. The attributes that CIOs and nCIOs have rated as most effective for their given environment (i.e., those with the highest counts); and
2. Identified where CIOs and nCIOs rate:
   a) The same attributes highest (i.e., ‘fully agree’, coded green),
   b) Two attributes equally high but only one of each match (e.g., if a CIO rates ‘Relationship’ and ‘Change’ equally high, but the nCIO rates ‘Relationship’ and ‘External Monitoring’ equally high, the author has deemed this to be a ‘partial agreement’ on ‘Relationship’, coded amber)
   c) Different attributes highest (i.e., ‘disagree’, coded red)

The following sections presents these findings and summarises the degree of alignment, between CIOs and nCIOs, for the most effective CIO behaviours and attributes in either LDMe or HDMe.

5.3.1 H1 - Expected Behaviours

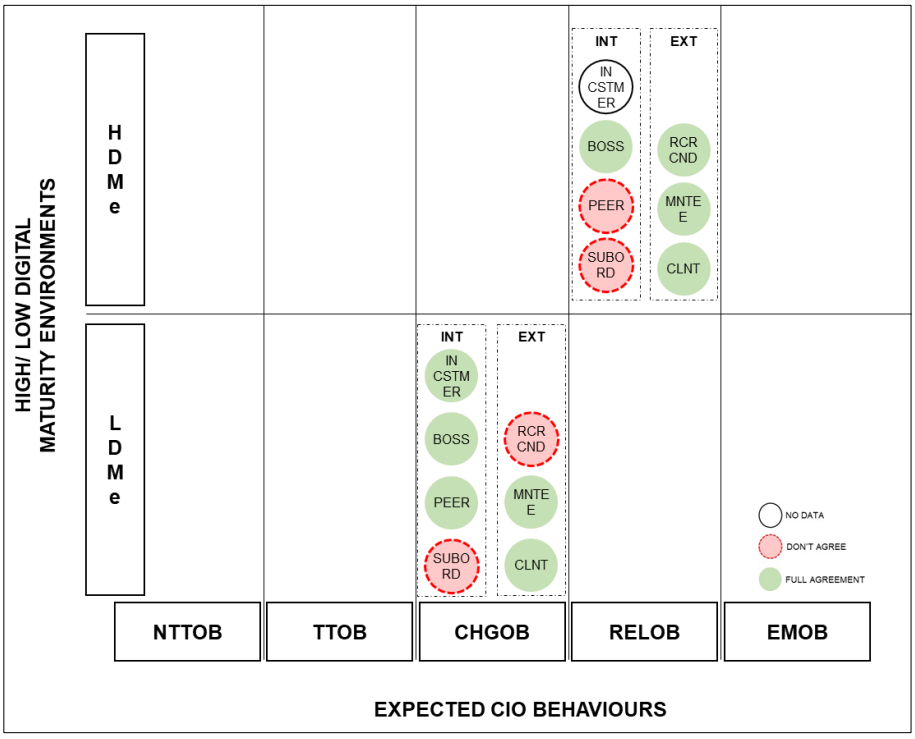

Figure 21: CIO Behaviour Expectations/ Scenario

Figure 21 depicts a mapping of relatively strengths of agreement between CIOs and nCIOs for CIO behaviours across the two scenarios. Neither CIOs nor any of the nCIOs selected behaviours oriented towards Technical Tasks (TTOB). For Non-technical Tasks (NTTOB), only one CIO out of the 82 suggested that behaviours orientated towards non-technical tasks were expected (in the highest HDMe) and one nCIO (Peer) out of the 106 nCIO respondents suggested behaviours orientated towards Non-technical Tasks were expected (in the lowest level of LDMe). Similarly, low scores were also received for External Monitoring orientated behaviours, with only 4 CIOs (in the highest HDMe) and two nCIOs (Peer and Subordinate) in the LDMe expecting these behaviours.

Expectations for the two remaining two behaviours, Change and Relationship are counted as follows. In LDMe:

1. Most internal stakeholders (i.e., the CIOs Peers, Subordinates, and their internal providers) agree with the CIO that Change orientated behaviours are most effective (i.e., 10/18, or 56%); the CEO disagrees, expecting CIOs to enact Relationship orientated behaviours in LDMe; and
2. Half of external stakeholders (i.e., 10/20, or 50%) also agree with the CIO that Change orientated behaviours are expected to be the most effective i.e., stakeholders who have CIOs as clients (e.g., consultants and/or 3rd parties delivering on site services) or those who mentor them; however, stakeholders who recruit CIOs expect them to enact Relationship orientated behaviours.

And in HDMe:

1. Most internal stakeholders (i.e., 19/31, or 61%) and most external stakeholders (21/37, or 57%) agree with the CIO that Relationship orientated behaviours are most effective
2. However, this is slightly mis-leading as the CIO Peers and their CEO (internal nCIOs) both expect CIOs to enact Change orientated behaviours, whilst the CIOs subordinate agrees with the CIO in expecting CIOs to enact Relationship behaviours

However, whilst these results show that individual nCIO stakeholder groups have varying opinions on the behaviours expected of the CIO, the majority of all nCIOs agree with the CIO that Change orientated behaviours (CHGOB) are mostly expected in LDMe and Relationship orientated behaviours (RELOB) are expected in HDMe.

5.3.1 Expectations for CHGOB in LDMe

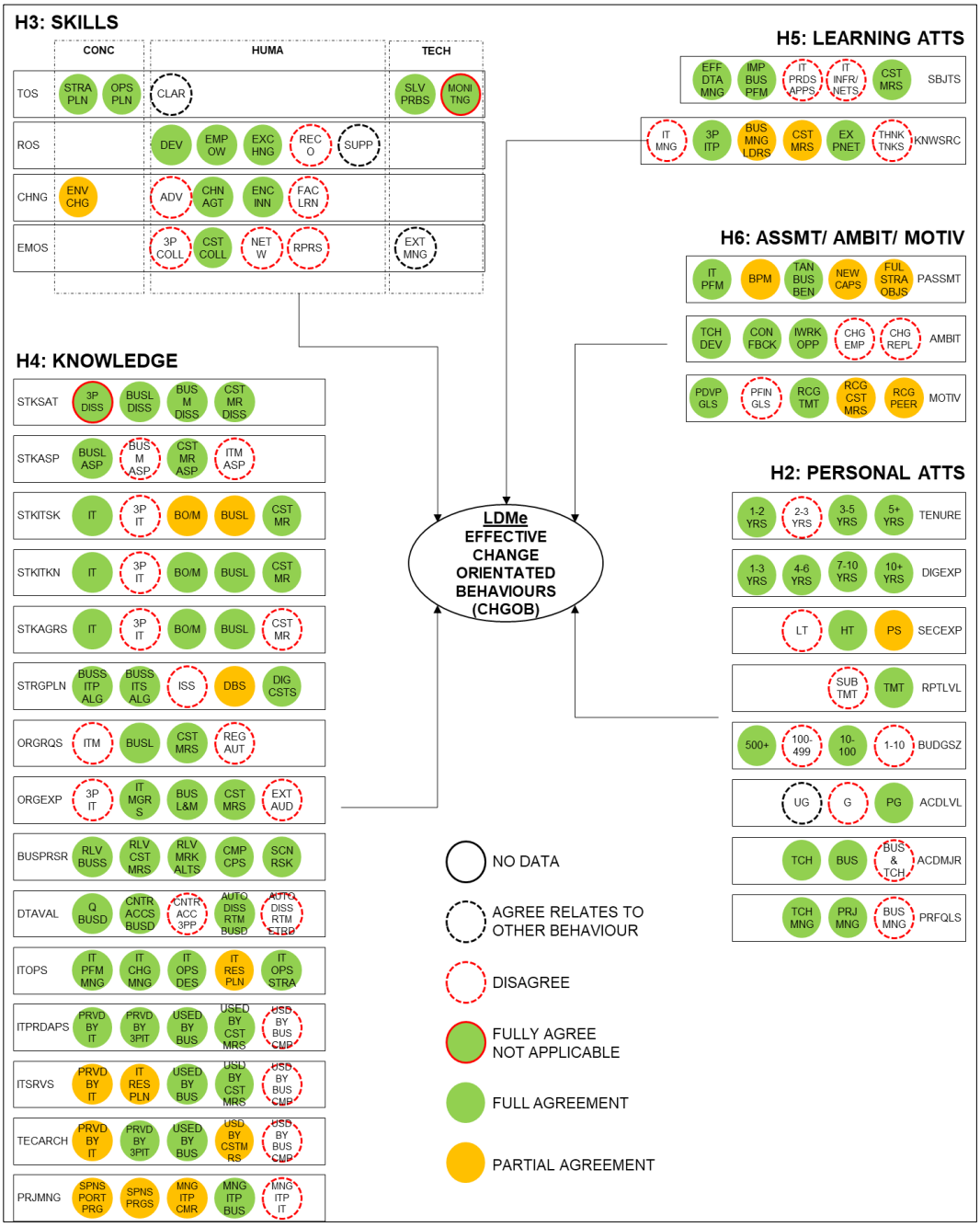

Figure 22: LDMe Agreement on CHGOB & Attributes

Figure 22 summarises the level of agreement on the attributes expected to be most effective when CIOs enact Change orientated behaviours in LDMe. Reflecting on the effectiveness model, attributes are grouped by hypotheses (H2 personal attributes, H3 skills, etc.). For additional insight the author has also added the additional categorisation for skills (i.e., Human, Conceptual and Technical) as described in Table 5. Examining expectations for CIO attributes for CHGOB in LDMe we see that out of the 144 attributes, CIOs and nCIOs:

1. Agreed that 82 (or 57%) would be most effective and that one of these (e.g., the skill of 'Monitoring') would not be expected at all
2. Partially agreed that twenty (14%) would be most effective
3. Disagreed on expectations for 38 (26%) of the attributes; and
4. Agreed that four attributes were expected exclusively when CIOs enacted RELOB (i.e., the human skills of 'Clarifying' and 'Supporting', and the technical skill of external monitoring)

Of the 38 attributes CIOs and nCIOs disagreed on, the greatest proportion of disagreement is in expectations for CIO learning (i.e., hypotheses 5, what CIOs are expected to learn and who they're expected to learn from), with 36% of the attributes in dispute. nCIOs and CIOs also disagreed on Personal Attributes (31%), Skills (30%), and Knowledge (24%).

Expectations for attributes that were least disputed were grouped in H6, attributes grouped under the CIOs personal motivations, with only 20% of the attributes in dispute.

5.3.2 Expectations for RELOB in HDMe

Examining expectations for CIO attributes for RELOB in HDMe (Figure 23, we see that out the 144 attributes, CIOs and nCIOs:

1. Agreed that 101 (or 70%) would be most effective and, again, that one (e.g., the skill of 'Monitoring') would not be expected at all
2. Partially agreed that 28 (19%) would be most effective
3. Disagreed on expectations for thirteen (9%) of the attributes; and

4. Agreed that two attributes were expected exclusively when CIOs enacted CHGOB (i.e., the human skills associated with ‘Change Agent’ and knowledge of the aspirations of their IT Managers)

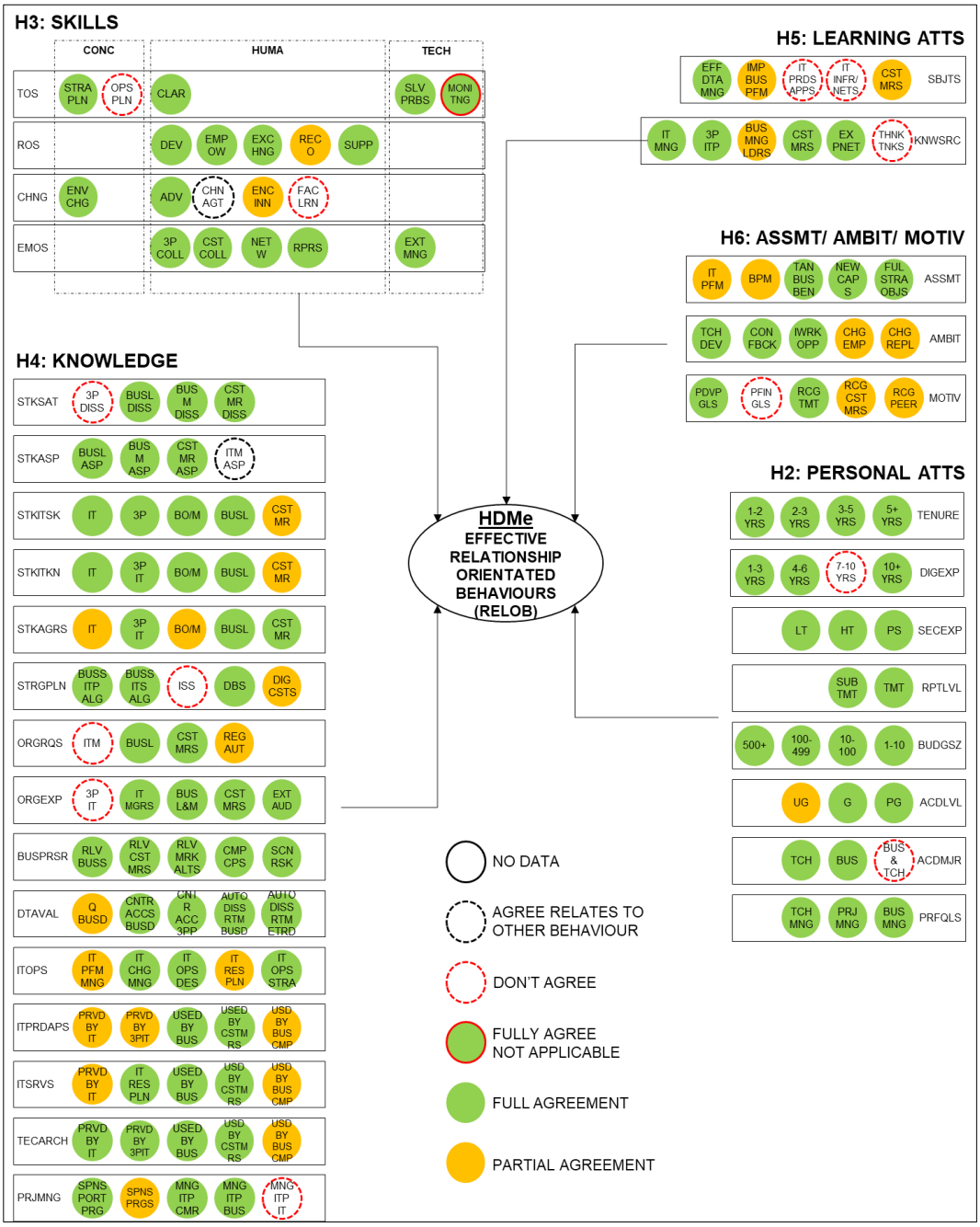

Figure 23: HDMe Agreement on RELOB & Attributes

Of the thirteen attributes CIOs and nCIOs disagreed on, the greatest proportion of disagreement is in expectations for CIO knowledge (i.e., hypotheses 4, what CIOs are expected to have knowledge of), with 38% of the attributes in dispute. nCIOs and CIOs also proportionally disagreed on Learning Attributes (23%),

Personal Attributes (15%) and Skills (15%). Expectations for attributes that were least disputed were again those grouped in H6, attributes grouped under the CIOs personal motivations, with only 8% of the attributes in dispute.

5.4 CIO Effectiveness Model

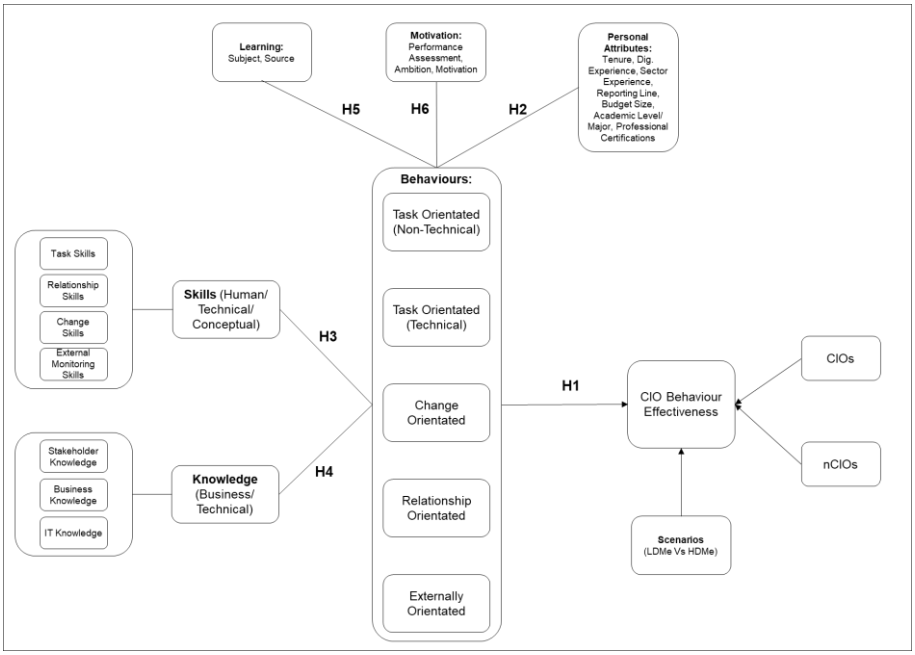

Figure 24: CIO Effectiveness Model

In keeping with objective 3 (model validation), the author claims that the survey results enhance confidence that the constructs tested for the final version of the CIO effectiveness model, Figure 24, provide a means for CIOs and nCIOs to identify where they agree/disagree on expectations for effective CIO behaviours. The clear shift in expectation for CIO behaviours, from CHGOB to RELOB as environments become increasingly dynamic and digital maturity increases demonstrates that CIOs agree that they are expected to change their behaviours. Whilst the lack of support for task orientated behaviours is surprising and unsurprising in equal measures, the author believes that these constructs are relevant to the model as they may enable CIOs and their stakeholders to further contextualise expectations for CHGOB and RELOB in their discussions on expectations in more traditional IT environments.

The new approach to combining definitions for skills (from Katz and Yukl) has also provided a means for enhancing descriptions of CIO skills in a new, more

meaningful way. As shown in Figure 24, agreement on the dimensions of skills inferred from Yukl's behaviours (i.e., task orientated skills, relationship orientated skills, etc.) provides additional insight to the more traditional descriptions of CIO skills (i.e., 'communicating', 'planning', etc) and, given the scale of the overall level agreement for the importance of these skills, suggests they represent a significantly enhanced articulation of expected CIO skills. Similarly, the attributes for CIO knowledge, not only significantly expands on (the more traditional) conceptualisations of business knowledge and IT knowledge, but also (for the first time) considers what CIOs are expected to know about their stakeholders. Lack of stakeholder knowledge, as the author is fully aware, can become a serious cause of misalignment in expectation, especially if the CIO has not attempted to learn as much as possible about their stakeholders before engaging them.

The results also show that the remaining three attribute groups, personal attributes, learning and motivation also relate to expectations for effective CIO behaviours. CIOs who are skilled and knowledgeable may still meet obstacles when attempting to enact expected behaviours, and/ or to influence a change in expectation if they are perceived as not having the expected rank, experiences, or qualifications. Similarly, if CIOs appear demotivated and/ or are unable to continually acquire the expected knowledge (through learning), then expectations for effectiveness may also diverge.

The results have also highlighted an important distinction about the nature of cause and/or effect between the five (grouped) attribute dimensions and the expected behaviours. Pre-survey, Figure 15, the author had sought to determine expectations about the perceived importance of each attribute in relation to the expected behaviours. Whilst the results have shown the degree of agreement/ disagreement about the perceived importance of the attributes, they have also highlighted that CIOs and their stakeholders may perceive this relationship in two different ways. I.e., CIOs and stakeholders may agree that the attributes are pre-requisite to expected behaviours and/ or they may agree that for CIOs already enacting expected behaviours, to become 'more effective', CIOs could be

expected to acquire/ enhance those new attributes. For example, CIOs who are already enacting CHGOB, may still need to learn more about a new IT product/ service to then be perceived as an ‘expert’ and hence deemed have become a more effective resource.

To represent this, the author has removed the directional arrows between the attribute constructs and the expected behaviours. However, as the results show that perceptions on effectiveness comprise of (at least) expectations for the CIOs most effective behaviours, the author has elected to keep the arrow between behaviours and expectations for effectiveness (i.e., supporting H1). The results also show that, expectations for effective behaviours also relate to changes in the environment i.e., expectations for behaviours are subject to change as circumstances change, and/ or the CIO becomes ‘successful’ at effecting or affecting those expectations. This relationship is represented by the arrow on the construct between scenario and (expectations for) CIO behavioural effectiveness.

6 DISCUSSION

Reflecting on this research, and to address research objective 4, the author summarises the approach taken, and the key findings whilst researching the development of a new means for helping CIOs effectively address changing stakeholder expectations for their roles in increasingly dynamic, digitally enabled business environments.

6.1 Summary of Approach

6.1.1 Problem

Whilst CIOs continue to face rapidly changing expectations from a growing list of stakeholders, they have few options to learn how to manage rapidly changing demands effectively. Whilst researchers have hinted at this dilemma for some years now, to date there has been insufficient research into how CIOs can address this problem. It is the authors belief, that whilst unproven, the continued increased in demands on CIOs is compounding role ambiguity to the extent where it is likely to be a key factor in continued, relatively high rates of CIO turnover. However, whilst the causes of turnover remain debatable, the effects of continued executive turnover on company performance are unquestionable.

6.1.2 Research Aim & Objectives

To address this problem, and in keeping with research objective 1, the author, aiming ‘To develop a new CIO effectiveness model to help CIOs and their stakeholders improve how they communicate dynamically changing expectations for the CIOs role’, conducted a systematic literature review to identify if (or how) this problem had been addressed through previous research.

6.1.3 Knowledge Gap

Despite identifying a significant amount of literature that examined exhaustive lists of expectations (which the author was able to categorise in terms of expectations for attributes antecedent to expected outcomes), the author determined that the body of knowledge had not, as yet, been able to provide a practically useful means of representing (or addressing) rapidly changing

expectations from growing numbers of stakeholders in increasingly dynamic environments. A key concern from the literature was that many studies had disregarded the effects of causal ambiguity and infinite regress when determining the relevance of a CIOs attributes to perceptions of their performance as a critical resource.

However, in the field of human resource development (HRD), the behaviouralists view of competencies appears to offer an alternative means for articulating CIO expectations; an articulation based on expectations for role behaviours as opposed to expectations contextualised in the RBV theory.

6.1.4 Alternative Theoretical Perspectives

In response to the issues associated with the continued use of RBV in the literature (described as limiting factor 2, on p.174), the author adopted the concept of expectation enactment, or role-making, a key component of ORT.

Role making, a key concept representing socialisation in organizational role theory, describes a process for continuous exchanges of expectations for role behaviours and role attributes between individuals and their stakeholders. Clarification of similarities or differences in expectations appears to offer opportunities for (in this case) CIOs to adjust how they are perceived by their stakeholders.

In considering issues relating to subjectively defined expectations for outcomes (limiting factor 3, on p.174), the author also developed an alternative way of describing how well stakeholders perceive how their expectations are being addressed by the CIO. Recalling the literature on CIO role (activity) effectiveness and management theory, the author adopted the term ‘effectiveness’ to now represent an assessment of how well CIOs can manage the role-making process i.e., effective role making occurs when CIOs are able to proactively achieve and maintain agreement on expectations for their most effective behaviours and attributes.

This prompted the development of the research question:

In increasingly dynamic environments, how to determine the degree of expectation alignment between CIOs and their stakeholders for a CIOs most important attributes when effectively managing rapidly changing expectations for the CIOs most effective behaviours?

To develop and validate a model representing a means for CIOs to be effective when assessing and addressing differences in expectations for their attributes and behaviours, the author reflected on the likely effects of his philosophical world view on the chosen method of scientific inquiry

6.1.5 Methodology

The author adopted a sequential explanatory design for conducting a multi-method quantitative investigation. An explanatory design was chosen for three reasons:

1. The volume of CIO research, starting in the early 1980s, provides a wealth of insight into expectations for attributes claimed to be antecedent to stakeholder expectations. This body of knowledge has provided a rich seam for descriptions of expectations, variables, and constructs with which to develop new theory
2. The author, having attended many CIO and IS leadership practitioner forums, notes agreement, or practitioner coalescence, about the importance of emerging digital technologies on the abilities of CIOs to deliver expected outcomes for their respective organizations. This level of agreement also indicates which factors are currently of interest to practitioners in today's digitally maturing environments; and
3. Whilst ORT and effectiveness are established concepts, they are new in their application to CIO role effectiveness in increasingly dynamic environments. This represents an opportunity to develop new, additional insights using established theory

To develop confidence that any resulting model would cater for the breadth of stakeholders and stakeholder groups that practising CIOs are likely to engage, the author elected to seek perspectives on the role from multiple sources; in terms

of the chosen methodology, this also suggested that multiple methods were likely to be required. However, the method selection was also informed by the realisation that whilst the author had access to an extensive network of practitioners, he was unlikely to be able to gain access to enough individual CIOs for 1:1 interview, or to partake in group workshops given the time demands on the CIOs role. Given these risks, and in keeping with the authors belief that results, arising from analysis of numerical data would reduce ambiguity for practitioners, the author elected to adopt a quantitative method.

6.1.5.1 Research Design

Reflecting on the philosophical constraints placed on studies in the literature (limiting factor 1, on p.174), the author adopted the context of pragmatism in the design of the inquiry into CIO effectiveness with practitioners. As a pragmatist, allowing for fallibility and personal experiences, the author determined that the process of inquiry should accommodate the derivation of agreement between practitioners and that agreement (or consistent disagreement) on expectations for behaviours and attributes, for increasingly dynamic scenarios, would constitute an acceptable truth for the author and his intended audience (practicing CIOs and their stakeholders). In planning the approach to inquiry, the author developed a research method intended to address a research question, that if answered, would reveal perspectives on expectations for behaviours and attributes (knowledge and skills).

Suggesting relationships between variables (i.e., constructs) for behaviours, knowledge, and skills, the author developed a conceptual framework. To progress the design of this framework into a new theoretical model, and in addressing the issues about inconsistently defined attributes from the literature (limiting factor 3, on p.174), the author adopted and developed taxonomies defining variables for behaviours (cf. Yukl), Skills (cf. Katz) and Knowledge (cf. Armstrong, Smaltz, etc.). To develop further confidence that the variables and constructs were representative of the expectations of current practitioners, the author assessed CIO expectations as advertised in UK CIO job adverts. Identifying and comparing five dimensions of advertised expectations (CIO role

purpose, candidate profile, knowledge, skills, and behaviours) with the literature, the author was able to: (i). develop a new theoretical model for CIO role effectiveness and propose a new taxonomy for describing increasingly dynamic, digitally maturing environments i.e., environments deemed to have a low level of digital maturity and those that have a high digital maturity. To validate this model, and to address the concern about studies seeking a wide range of stakeholder perspectives (limiting factor 4, on p.174), the author analysed CIO role perspectives for each type of environment, from multiple stakeholder perspectives; these perspectives were solicited through the use of two survey instruments completed by UKs CIOs and UK CIO stakeholders.

6.2 Key Findings

6.2.1 Job Advert Analysis & Theory Development

Literature review suggests various combinations of CIO attributes are required for CIOs to meet expectations for a raft of metrics describing business and/ or IT performance, a variety of descriptions for business-IT 'alignment' and/ or how well CIOs are completing the tasks or activities expected of them in their given roles. In keeping with objective 2, to build on the conceptual framework and further inform the development of the effectiveness model, the author compared these expectations with those identified in the CIO JA analysis.

6.2.1.1 Purpose

Analysis of phrase counts for the expectations relating to the 'Purpose' of advertised roles reveals that CIOs are expected to mainly focus on managing day-to-day operations and change, and not on leading strategic business change, including digital transformation. When comparing these findings with literature, it's clear that whilst researchers share the view that CIOs are associated with performance and strategic alignment, perspectives diverge as recruiters perceive a CIOs role being strongly associated with business change and business growth. Specifically,

1. Operational & Business Change: Whilst researchers made relatively little reference[327] to *enablement* or *delivery* of business change as being pertinent to the CIOs role, recruiters emphasised this heavily
2. Business Growth: whilst poorly defined in the data sample (9% of dimension count), business growth is more clearly defined by researchers in terms of improvements to firm output[328] and/or customer interaction[329]
3. Strategic Alignment: Whilst strategic alignment 'appeared' relevant both to CIO recruiters and researchers[330], recruiters were more descriptive and emphatic in associating the CIOs role with business growth and business change than researchers

Surprisingly neither researchers nor recruiters made significant reference to digital technologies and the CIOs role. For example, 222 counts of 8 phrases associated with digital technologies (4% of the total 'purpose' dimension), appear to reflect the views of researchers who found a '…*total absence of an influence of the IT leader*,' (p.2) (Wunderlich, 2018) in the development of digital business strategies.

Whilst 'purpose' is intended to represent an indication of the reason that the CIO role is being advertised, these results reinforce the authors concern that amongst practitioner community, CIO stakeholders also continue to hold expectations for the CIOs role (in terms of outcomes at least) largely in the context of the RBV i.e., that newly recruited CIOs will be assessed on their direct impact on a range of firm level measures. Further, whilst there appears to be a lack of JA data indicating expectations for increasingly dynamic environments, and reflecting on

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327 With the exception of CIOs being described as change agents (Weiss and Anderson, 2004) and (Gorgeon, 2010) and also in terms of helping the business improve its rate of IT assimilation

328 Interestingly one study that showed whilst complementing the Chief Marketing Officer (CMO), the CIO is perceived as a strategic asset as '…inclusion of a '…powerful technology leader…' (p.1) in the TMT increases firm output. (Taylor and Vithayathil, 2018).

329 CIOs can improve (external) customer interactions (Saldanha and Krirshnan, 2011a) by directly managing customer relationships (La Paz et al., 2010), by increasing customer satisfaction (Li and Tan, 2009) or improving customer value (Chen et al., 2015)

330 E.g., '*Strategic IS alignment has been reported as one of the major preoccupations of the CIO*', (Reinhard and Bigueti, 2013), (p.504)

the literature, the author suggests that an articulation of changing environments should comprise of (at least) consideration of:

1. Types of change – reactive vs. proactive change
2. Relative rates of change – i.e., occasional, ad hoc change vs. dynamic change
3. Breadth/ scale of change – i.e., the location and number of stakeholders involved, or impacted by the change (i.e., stakeholders in the IT function, in the business, in the supply chain, or even business customers)

6.2.1.2 Profile

Phrases analysed under the 'Profile' dimension reveals a focus on descriptions of 'rank' (i.e., previous job titles, or reporting line), and/ or generalisations about previous experiences (i.e., sector experience, team size, budget size, etc.). For recruiters, profile perceptions were heavily dominated by the phrase's 'Experience', 'Status' and 'Credibility'. However, the full extent of the emphasis only became clear from the auto-coding analysis which revealed:

1. Experience: whilst there were high phrase counts for experience (e.g., 'demonstrable experience', 'previous experience', 'extensive experience') recruiters failed to expand on the specifics of the desired experience, although phrases relating to 'digital strategy', 'technology strategy' and 'data strategy' did count (relatively) highly. Researchers also (in many cases) generalise 'experience' in terms of 'business strategy, management and operations', (p.469) (Applegate and Elam, 1992) and 'Technical Background' (Enns et al., 2003a), often interchanging (somewhat inconsistently) the term 'experience' with 'knowledge'
2. Status & Rank: 'Status' and 'Rank' are often interchanged by recruiters and researchers alike. Recruiters assume that rank equates to status, whilst researchers describe both in relation to the TMT e.g., hierarchical distance from the TMT (Armstrong and Sambamurthy, 1999), or inclusion in the TMT (Zafar et al., 2016).
3. Credibility: whilst recruiters have mistakenly substituted *capability* for experience and status, perhaps assuming that these attributes are a proxy

for capability, researchers have expanded significantly on descriptors of a CIOs profile and credibility. E.g., demonstrating the relevance/ importance of role demographics (age, education, sex, tenure, etc.) and/or 'Social Capital' (structural, cognitive, or relational capital)[331] to influence (widely) to bring about desired change[332]. A surprising aspect of the results was that, although professional and educational qualifications were combined into this single dimension, there was little evidence of recruiter interest in a CIOs formal training or 'education' (i.e., 2265 counts of 17 phrases only represented 3% of the total profile count)

As with phrases grouped under the profile dimension, the analysis reveals that there also appears to be a lack of interest in a CIOs experience of digital technologies. Under the profile dimension there were only 6 phrases (3% of the count) relating to digital (the highest counts being for 'digital strategy' and 'digital technology roadmap').

Whilst these findings appear somewhat inconclusive and partly subjective, the author believes that variables for 'personal attributes' will be of interest to practicing (in-post) CIOs and their stakeholders. Variables and constructs, especially those taken to represent a CIOs experience in terms of recognised qualifications (professional or otherwise) will, the author suggests, be particularly useful for CIOs planning to invest in developing new, digital capabilities (i.e., a demonstration of knowledge of a particular digital capability, such as 'big-data').

6.2.1.3 Behaviours

Analysis of phrases constituting the 'Behaviours' dimension reveals a significantly high level of inconsistency for descriptions of expected behaviours. Whilst being able to identify specific phrases describing expected behaviours, the author also

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331 In their study of CIO-TMT relationships (Karahanna and Preston, 2013) adopt these three dimensions of social capital as proposed by (Nahapiet and Ghoshal, 1998)

332 A variation to how CIOs use their characteristics and social capital to influence is how they use their 'structural power' to improve competitive strategy (Karimi et al., 1996), increased levels of IT coordination (Larson and Adams, 2010) and (Larson and Adams, 2014), its effects on leadership (Chen et al., 2010b) and IT (ERP) assimilation and hence firm performance (Shao et al., 2016)

had to infer an association with behaviour where phrases described roles (i.e., in terms of managing or leading). Specific phrases describing expected behaviours included ‘coaching,’ ‘collaborative,’ ‘influential,’ ‘directive,’ democratic,’, etc., The largest phrase count[333] being ‘leadership’ (83% of the total phrase count), was followed by CIOs behaving either sociably (4%) or collaboratively (2%).

However, whilst leadership appeared to be a significant behavioural attribute for recruiters, many of the phrases for this dimension were often generalised or non-sensical, e.g., CIOs required to behave as a ‘data leader’, a ‘strong-leader’ or a ‘true technology leader’, etc. To make more sense of these generalisations, the sample was reappraised using some of the CIO leadership themes available in the literature:

1. Demand/ supply leadership behaviours (cf. (Broadbent and Kitzis, 2005) appeared entirely inwardly focused in the sample e.g., phrases such as ‘operational leader’ or ‘functional leadership,’ etc. represented 26% of the phrase count
2. Transformational leadership (cf. (Kettinger et al., 2011) lens highlighted behaviours including ‘transformational leader’, ‘digital transformation leader’ but these only represented 3% of the phrase count
3. Analysis adopting ‘Social behaviours’ (cf. (Armstrong and Sambamurthy, 1999) as a theme revealed phrases such as ‘team management skills,’ strong people skills,’ social skills,’ which only represented 4% of the behaviour attribute count; and
4. A review of ‘Motivational’ behaviours’ (cf. (Trigo et al., 2009) revealed phrases such as ‘motivational skills’ and ‘motivating teams’, which only accounted for 2% of the count

[333] When considering the sample in the round, the phrase ‘leadership’ represented a significantly high percentage of the CIOs attributes (the largest count in fact, closely followed by day-to-day management skills (at 72% of the skills dimension) and ‘experience’ (79% of the ‘profile’ dimension)

Rather than lead in a strategic 'top-down' or market driven context, this comparison suggests that recruiters expect CIOs to focus inwardly[334], leading day to day management of, and changes to, operations and services. Whilst recruiters required CIOs to demonstrate 'Social' or 'Collaborative' behaviours (the second and third highest counts for 'behaviour'), they emphasised these largely in an operational management context, suggesting that the relative importance of them to the other attribute dimensions could be questionable.

References to behaviour in the context of 'digital' (e.g., 'digital change delivery leader,' 'increasing digitization lead', 'digital delivery leader') also appeared vague or non-sensical, representing 2% of the behaviour attribute count.

In a similar manner to the literature, whilst the term 'behaviour' is interpreted in many ways, it still appears to be closely associated with 'managing' and/ or 'leading'. Despite this, the author notes that whilst the term is inconsistently applied (resulting in highly subjective descriptions for behaviours), these results do not contradict, or detract from the taxonomy proposed by Yukl in 3.2.1.1.

6.2.1.4 Skills

The lack of clearly defined CIO skills in the literature meant that the author considered where recruiters had attempted to describe an expectation for skills. However, phrases relating to expected skills also comprised of many generalizations and, as with the behaviour's dimension, required to author to make a judgement on their relevance through inference. Recruiters favour two significant groups of CIO skills which relate well to Yukl's descriptions for the skills associated with task-oriented behaviours and change orientated behaviours. In the context to the JA, and to keep an open mind on the intended meaning of phrases that seemed to relate to advertised skills, the author conceptualised these into 'day to day (D2D) Managerial' skills (72% of the overall skills phrase

[334] The JA sample only contained two phrases relating to 'demand-side' leadership behaviours: 'leading customer experience' and 'customer-facing investment lead' (29 counts, representing less than 1% of the behaviour dimension phrase count).

counts)[335] and ‘Innovation and Change skills’ (25% of the overall skills phrase counts).

- D2D Managerial Skills: as top phrase counts associated with CIO managerial skills (e.g., in managing ‘key stakeholders’, ‘digital services’, ‘business processes’ and ‘relationships’) were plentiful (2470 different phrases) it was unclear whether recruiters attached different meanings to the same phrase or used different phrases to articulate the same meaning. For example, the phrases ‘driving service’, ‘delivering service’, ‘managing service levels’, ‘enabling services’ and ‘providing services.’ Whilst such phrases are suggestive of skills required for service management, it remains unclear whether CIOs should be skilled in motivating service teams, or directly managing service teams to deliver current services or to develop new services

Because of these inconsistent and generalised terminologies, CIO researchers have elected to: (i). adopt established managerial frameworks to describe CIO skills through their activities (Patten et al., 2009) or (ii) to develop their own logical groupings (Boehm et al., 2013). Researchers have paid considerable attention to a CIOs skill in ‘communicating’[336] or ‘influencing’[337]. However, both skills appear highly contingent on the CIOs circumstance i.e., communicating across and upwards when reporting into the board and influencing across and down when sitting within the board.

The second major group of skills in the JA analysis were grouped under Innovation and Change:

- High phrase counts for innovation and change skills (e.g., ‘digital transformation’, ‘project management’, ‘emerging technologies’, ‘development planning’ and ‘leading change) suggest a hight requirement

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335 Day to Day (D2D) Management skills includes those skills required to engage internal stakeholders and customers, to gather their requirements and seek support to manage cross-functional teams in delivering and enhancing day to day services through service management and/or pre-funded IT projects (i.e., within the pre-planned annual budget)

336 (Denford and Schobel, 2011)

337 (Chen et al., 2017)

for skills related to change through project management.' Whilst 20% of the phrases in this dimension related to technologies, e.g., 'developing technology', 'implementing technology strategy' and 'creating technology roadmaps', there was little in the way of specific descriptions of change related skills beyond phrases such as 'delivering projects' or 'delivering change.' Phrase counts for (changes to) service management represented 2% of the count and there were only 2 phrases (appearing once) in this dimension referring to 'technology horizon scanning', supporting the view that CIOs are only expected to be inwardly focused

Analysis of phrases in a third much smaller group of expectations for CIOs to skilled in strategy development and digital technologies suggests:

1. That CIOs are also expected to be skilled in business and/or technology strategy development (whilst researchers have generalised on attributes aiding business/ IT strategy alignment). However, analysis of L4 phrases revealed low counts for skills in Business Strategy development (3rd highest count but only 4% of total skill count) and Technology Strategy development (5th highest count but only 2.5% of total phrase count); relatively small counts in comparison for expectations around D2D managerial or change management skills; and
2. Digital Technologies: Perhaps the most striking observation, was that whilst recruiters cited skills in Innovation & Change (second highest phrase count), the analysis failed to reveal significant requirements for skills[338] in Business/ Digital Transformation (and/ or sponsorship of transformational change).

[338] Phrases such as 'Transformation' did appear in the sample, but largely as either a business context or a desired behaviour such as transformational leadership or change agent, not a skill

6.2.1.5 Knowledge

Researchers appear to agree[339] that CIOs require a combination of strategic business and strategic IT knowledge; however, this is not reflected in the JA sample:

1. Strategic Business Knowledge: whilst recruiters expect CIOs to have knowledge of business requirements, business systems, project (management), service management and stakeholder management, references to knowledge of the (wider) business (strategic or otherwise) appears largely absent (0.4% of the primary knowledge attributes); even within this low count, references to business knowledge (strategic or otherwise) were tiny; phrases such as 'strong process knowledge' and 'business knowledge' barely registered in the count at all. This is surprising as it appears to be in direct conflict with the researcher's perspective (who, for example suggest that strategic business knowledge is a prerequisite to successful IT deployment (Shao et al., 2016)), suggesting that CIOs are 'only' expected to maintain operational/technical knowledge[340]
2. IT Strategy: expectations for CIOs to have knowledge of IT Strategy, 386 counts of 27 phrases, represented less than 2% of the total knowledge dimension. Whilst recruiters expect CIOs to know about business systems, (2nd highest phrase count), technological knowledge was only articulated at the tactical or operational level i.e., in terms of 'change', 'delivery', 'development', 'services' and 'systems' (described through 780 counts of 39 phrases, only 2% of the total knowledge count), and, being strongly associated with knowledge of business requirements, project management and IT team capabilities
3. Digital Technology Knowledge: little reference was made to knowledge of specific digital technologies e.g., 2 counts of phrases for 'mobile,' 8 counts

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339 Researchers perceive CIOs to need knowledge of both business and IT strategy in nearly every study investigating CIO knowledge e.g., (Chen et al., 2017)

340 Researchers describe strategic business knowledge as '…*the person's understanding and appreciation of their firm's competitive forces and business strategies*,' (p.211) (Smaltz et al., 2006a) and they make distinctions between 'objective' knowledge and 'systems of knowing' (Preston and Karahanna, 2009)

of 2 phrase for ‘cloud technologies,’ and counts for knowledge of digital technology *management* also remained low (ranking 8th (663 counts of 23 phrases, or 2% of the total phrase count))

Similarly, whilst researchers were consistent in their perceptions of how CIOs should use their IT knowledge to exert influence in developing, applying, and exploiting IT strategies, researchers provide little evidence for specific knowledge of applications, infrastructure, networks, and security; additionally, there is no evidence requiring CIOs to have specific knowledge of digital technologies in the literature.

6.2.2 Survey Analysis - Hypotheses Testing

The JA analysis provided a great deal of insight into the scope of current expectations for UK CIOs. The analysis also enabled the author to infer the types of scenarios UK CIOs were being asked to operate in (largely through the phrases categorised in the dimensions Profile and Purpose). The analysis also not only developed confidence for hypothesising about potential correlative relationships between expectations for a CIOs behaviour, knowledge, and skill, it prompted the author to consider additional variables (for knowledge) and expectations for CIOs to maintain their motivation and to continually learn about newly emerging technologies without having had the opportunity to access such technologies in previous roles. This additional insight enabled the author to complete a design for the proposed CIO role behaviour effectiveness model and to develop an approach to capture differences in role expectations between CIOs and two groups of CIO stakeholders (nCIOs). In meeting objective 3, to capture a wide variety of expectation for behaviours and attributes, the author developed two survey instruments to solicit expectations from stakeholders who work closely with CIOs inside the same organization (i.e., Internal nCIOs) and from stakeholders outside of the CIOs organization (i.e., External nCIOs); in both groups, the author has attempted to capture perspectives from stakeholders who have developed a robust and representative set of expectations for effective CIOs behaviours in business environments of differing levels of digital maturity. The next section of this discussion now examines the results developed from those

two surveys (detailed in Appendix C.4 , Appendix C.5 and summarised in Figure 22 and Figure 23, validate the effectiveness model as far as possible.

6.2.2.1 H1 – Behaviours

H1 proposes that CIOs and nCIOs agree on the relative importance of the most effective CIO behaviours in digitally maturing environments.

As the level of digital maturity increases, more CIOs and nCIOs agree that CIOs should alter their behaviours from Change orientated behaviours (CGHOB) towards relationship orientated behaviours (RELOB). This is evidenced by the ratio of CIOs expecting to enact RELOB increasing from 42% to 64% and the ratio of nCIOs (combined) expecting CIOs to enact RELOB also increases from 32% to 59%. Conversely the ratio of CIOs and nCIOs expecting to enact CHGOB falls from 54% to 29% and from 53% to 34% respectively.

Whilst the results support the view, as business environments become increasingly dynamic, nCIOs and CIOs agree that the CIOs most effective behaviours are primarily Relationship orientated, those interested in helping CIOs enact more effective behaviours should not lose sight of the potential impact of other environmental factors during the role making process between the CIO and their nCIOs.

For example, if the second highest scores are considered, we see that in LDMe, 32% of nCIOs and 42% of CIOs expected CIOs to enact RELOB, whereas in HDMe, 34% of nCIOs and 29% of CIOs expected CIOs to enact CHGOB. Whilst the numbers of participants in the samples might indicate a lower level of preference for these behaviours, the author believes that these ratios are not insignificant to the study.

What would be the consequence of this in a ‘real-world’ setting? If we consider a scenario where nCIOs and CIOs may both agree that the CIO would be more effective by enacting RELOB in an LDMe (as opposed to CHGOB) then both parties will need to consider the relevance of the CIOs attributes in setting and managing each other’s expectations for behaviour.

In considering hypotheses H1, that CIOs and nCIOs agree on the relative importance of the most effective CIO behaviours in digitally maturing environments, the results suggest that variables used to describe CIO behaviours would enable nCIOs and CIOs to discuss perceptions of alignment/ misalignment in each other's expectations for CHGOB and/ or RELOB.

However, the results also revealed low counts for the remaining two behaviours. The number of participants expecting either External Monitoring (EMOB) or Non-technical Task oriented behaviours (NTTOB) were very low; in Low Digital Maturity environments (LDMe), only 4% of CIOs expected CIOs to enact EMOB (and none for NTTOB), whilst only 11% and 5% of nCIOs expected CIOs to enact EMOB or NTTOB respectively. The results show a similar trend in High Digital Maturity environments (HDMe), with only 4% and 2% of CIOs expecting to enact EMOB or NTTOB respectively, and 7% and 0% nCIOs expecting CIOs to enact EMOB or NTTOB respectively.

Whilst one can argue that the lack of expectation for task orientated behaviours (technical or otherwise) might be unsurprising (if one takes the view that board level executives may deem tasks a managerial activity), the lack of interest in EMOB is unexpected. Many practitioners associate 'digital' with the development of ever closer levels of understanding about the changing behaviours of customers. As environments become increasing dynamic the author expected to note an increase in expectation for CIOs to increase their level of external monitoring. Reasons for this may have centred on an expectation for CIOs to not only increase their level of understanding about customer changes, but to also develop deeper insights about newly emerging technologies and practices (referred to as 'explorative' behaviours in the literature).

These observations, the expected shift towards RELOB and the lack of expectation for EMOB and NTTOB, could relate to the effects of the local environment, as nCIOs and CIOs attempt to manage their changing expectations for CIO behaviours.

In her expectation enactment model (Figure 5), Fondas describes the effects of environment on enactment in terms of the influence of role-set characteristics,

the nature of the sender-receiver relationship and the effects of external 'organisational influences'; similarly, the importance of the environment on the CIO-CEO relationship is referenced by (Peppard et al., 2011), whilst (Yukl, 2012) refers to these effects in terms of 'situation variables' and Gerth acknowledges the effects of the organizations dynamics on CIOs enactment (Gerth and Peppard, 2016).

Whilst the author has attempted to capture data relating the CIOs environment (industry type) and the nature of the relationships they hold with their stakeholders (i.e., by nCIO 'type', CIO reporting line, etc.); the direct effects of these on expectations is indeterminate.

Whilst the results haven't revealed the causes of behavioural expectations, the constructs in the model have shown that expectations for behaviours can be identified (and agreed), thus fulfilling the aim of H1. Agreement on the most effective behaviours represents a step toward more effective role enactment for the CIO and their stakeholders. To understand how CIOs may become more effective at managing changing expectations for behaviours, the author now examines expectations of the CIOs attributes.

6.2.2.2 H2 – Attributes: Personal Attributes

H2 states that, CIOs and nCIO agree on the relative importance of the CIOs personal attributes that enable CIOs to enact the most effective behaviours in digitally maturing environments.

When comparing expectations for the CIOs personal attributes across both LDMe and HDMe, the results show that as environments become increasing dynamic, then the level of agreement about the importance of the CIOs personal attributes increases, i.e., in LDMe nCIOs and CIOs agree on 17/26 attributes and in HDMe this increases to 23/26. Noticeably, nCIOs and CIOs disagree on the effectiveness of different CIO attributes e.g., in LDMe, when expected to enact CHGOB, nCIOs and CIOs disagree on the:

- CIOs preferred length of tenure attributes (that CIOs are expected to have 2-3 years' experience in the role as CIO); and

- The importance of the CIOs reporting level

In HDMe, nCIOs and CIOs start to disagree on the importance of length of the CIOs digital experience (i.e., that CIOs are expected to have 7-10 years' experience).

The reasons for the disagreement on the CIOs expected tenure or their experience of digital technologies when enacting CHGOB appear inconclusive as there is agreement for CIOs to have both less and more experience in tenure and digital experience.

However, the observation on the relevance of the CIOs reporting level does suggest some interesting perspectives.

In LDMe, when reporting into the TMT, (i.e., sub-TMT, shown as RPTLVL in Figure 22 and Figure 23), then:

- CIOs expect RELOB to be most effective, whereas
- nCIOs expect the CIOs CHGOB would be most effective

Conversely, in HDMe, both agree that:

- Irrespective of the CIOs reporting level, a CIOs RELOB are expected to be most effective

Whilst the reasons for this aren't clear, it does suggest that CIOs who report into their TMT in LDMe may expect to be more effective if they can enact influential RELOB with members of the TMT, if this is the case, then this finding may support the observation that increased levels of CIO participation in the TMT not only increases levels of IT assimilation (Armstrong and Sambamurthy, 1999), IT innovation (Saldanha and Krirshnan, 2011a) and improves business-IT strategy alignment (Reinhard and Bigueti, 2013), but that more effective RELOB may be used to override issues arising from lack of positional power (Carter et al., 2011).

Secondly, nCIOs and CIOs maintain their disagreement that an academic qualification in business and technology is expected (ACDMJR in in Figure 22 and Figure 23) in either environment.

- CIOs do not expect that a qualification combining both business and technology is relevant (i.e., a zero score), whereas
- nCIOs expect CIOs to have this qualification when CIOs enact RELOB in either LDMe or HDMe

This finding lends support to the calls for the development of joint technology and business courses by (Applegate and Elam, 1992). The CIOs in the study who don't expect to hold such qualifications may have taken the view that the time that elapses between formal education and attaining an executive role largely renders academic knowledge obsolete.

This view may also explain why nCIOs and CIOs largely agree that, irrespective of the environment, CIOs are expected to have professional qualifications; however, there is an exception to this as nCIOs and CIOs disagree that CIOs should have business management certifications in LDMe.

As only 9% CIOs and 8% of nCIOs considered that the CIOs academic major and/or their professional certifications were irrelevant, the author considers that both parties agree that some level of qualification is important to CIOs effectiveness in managing their expectations or when enacting their behaviours; a stark contrast to the finding in the JA analysis, that academic qualifications (and professional qualifications) were largely absent from the sample of CIO job adverts.

The high level of agreement about the importance of the CIOs Personal Attributes modelled from the survey supports the hypotheses (H2) that CIOs and nCIOs agree on the relative importance of the CIOs personal attributes to their role effectiveness.

6.2.2.3 H3 – Attributes: Skills

H3 stated that, for the most effective behaviour in digitally maturing environments, CIOs and nCIOs agree on the relative importance of the most effective CIO skills. Like expectations for the CIOs personal attributes (H2), the numbers of respondents agreeing about the importance of CIO skills increases as environments become more dynamic. For example:

- In LDMe, the number of CIOs in the sample agreeing about the importance of skills rises from 50% to 75% as they migrate from CHGOB to RELOB

This increase is due to new agreements on:

- Conceptual skills - Envisioning Change and Strategic Planning
- Human skills - Advocating Change, collaborating with 3rd Party IT providers, Networking, Representing; and the
- Technical skill - External Monitoring.

This increased level of agreement supports the view that as environments become more dynamic, CIOs would be expected to increase their levels of engagement further afield from the IT department (e.g., with Cloud service providers, etc.) and in doing so would need to enact more effective RELOB when securing, new additional support for digital services.

The second key observation is that most CIOs and nCIOs maintain agreement about the importance of skills associated with CHGOB as CIOs shift towards RELOB.

Two other noticeable features materialise when considering the survey data on expectations for CIO skills: (i) the total absence of counts for the task orientated/ technical skill of Monitoring (MONITNG) and, (ii) continued disagreement on the change oriented/ human skill of Facilitating Learning (FACLRN in Figure 22 and Figure 23).

Despite very low counts for non-technical task orientated behaviours (NTTOB), skills associated with them did attract similar levels of scoring for both CHGOB and RELOB i.e., counts for Strategic Planning skills and Problem-solving skills across LDMe and HDMe were 71/106 (67%) and 13/106 (12%) respectively. Given that this demonstrates that nCIOs and CIOs consider these skills relevant to other behaviours, it makes the zero score for the task orientated skill of Monitoring more surprising.

One of the five answers to the survey question, ‘Which one of the following tasks made you most effective in this scenario?’ was intended to provoke a response

that reflected Yukl's definition for monitoring operations i.e. to assess if CIOs and/ or nCIOs expected CIOs to monitor if people were '…*carrying out their assigned tasks, the work is progressing as planned, and tasks are being performed adequately*,' (p.70) (Yukl, 2012), the survey question contained the optional answer 'Assessing whether work is being done according to plan'.

Whilst the lack of expectation for CIOs to monitor operations could be explained as a skill more relevant to managers and/ or CIO subordinates, the author believes this attribute to have some relevance to real-time monitoring of digitally enabled operations. However, the reason for this lack of expectation remains unclear.

Continued disagreement on expectations for CIOs to facilitate learning is also surprising given the prominence of this expectation in the literature[341]. Whilst the reasons for this are not clear, the author speculates that an increased reliance on external technology providers to provide digitally enabled services could mean that stakeholders, wishing to familiarize themselves with such technologies, maybe more inclined to learn about them from individuals outside of their organization rather than directly from the CIO or their IT teams.

6.2.2.4 H4 – Attributes: Knowledge

H4 stated that, for the most effective behaviour in digitally maturing environments, CIOs and nCIOs agree on the relative importance of CIO knowledge. As data for H2 and H3, the results show an increase in agreement on the importance of a CIOs knowledge as digital environments mature, although the scale of the change is reduced i.e., more CIOs and nCIOs agree about what they expect CIOs to know between LDMe and HDMe, 61% and 69% respectively.

Whilst this level of sustained agreement appears high, there are several important differences in expectations for a CIOs knowledge across the two environments.

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[341] Not only is the CIOs role of 'Educator' deemed one the salient roles for the CIO (considered one of the supply-side roles identified by (Smaltz et al., 2006a)), the role has increased in importance in organizations that seek to leverage IT as an enabler of business transformation (cf. (Al-Taie et al., 2018))

Firstly, when examining expectations for CIOs to have knowledge of strategic planning (STRGPLN in Figure 22 and Figure 23), nCIOs and CIOs agree that CIOs should know about alignment between the Business Strategy and the IT Strategy and IT plans in both LDMe and HDMe .

However, this result, whilst expected partially contradicts the findings in the JA analysis, where the author had noted extremely low counts of requirements for CIOs to know about business strategy.

Additionally, both parties maintain their disagreement that CIOs should know about their Information Systems Strategy (ISS); in LDMe CIOs do expect to know about their ISS when enacting CHGOB, but nCIOs disagree with this and expect the CIOs ISS knowledge to mostly apply when CIOs enact RELOB

The reason for this isn't clear; CIOs in the LDMe may equate the ISS (i.e., a systems development roadmap) with IT changes, whereas nCIOs may associate it more closely with business change (hence their preference for RELOB in a business change context).

However, this doesn't explain the CIOs change in expectations to know about ISS in HDMe. In HDMe, CIOs don't think that their knowledge of the ISS remains relevant (i.e., a zero score) whereas nCIOs expect this knowledge to relate to mostly to EMOB; a possible interpretation of this maybe that CIOs in HDMe perceive systems development as a highly dynamic pastime and as such wouldn't expect to develop a long term (multi-year) technology roadmap; conversely nCIOs may be suggesting that CIOs should concentrate on securing new IT capabilities by monitoring the external market; although, again, this is purely speculation on behalf of the author.

Secondly, when comparing expectations for a CIOs knowledge about their stakeholders (variables developed by the author) in LDMe (STKSAT, STKASP, STKITSK, STKITKN and ASKAGRS in Figure 22 and Figure 23), expectations that a CIOs knowledge about 3rd party IT service providers (3PITSP) increases when CIOs operate in HDMe. In LDMe, nCIOs and CIOs disagree whether CIOs were expected to know about the levels of 3rd party IT skills, IT knowledge or even

about any formal agreements with 3rd party IT service providers; and whilst nCIOs and CIOs had agreed that CIOs were not expected to know anything about levels of 3PITSP satisfaction, this came into dispute when CIOs are expected to enact RELOB in HDMe.

This expectation of an increase in CIO stakeholder knowledge as environments become more dynamic supports the view that in HDMe, CIOs and their stakeholders maybe becoming more reliant on 3rd party providers for the provision of digital services.

A similar pattern emerges when considering the level of agreement for CIOs to know more about the expectations and requirements of their major external stakeholders in HDMe. For example, in LDMe nCIOs and CIOs disagree that CIOs should expect to know about the requirements of regulatory authorities or the expectations of external auditors; however, in HDMe this disagreement changes to partial agreement and full agreement respectively.

Whilst nCIOs and CIOs are in total agreement about the relevance of a CIOs knowledge of their businesses products and services (BUSPRSR in Figure 22 and Figure 23) when enacting expected behaviours in both environments, there is less agreement about the need for CIOs to know about creating value from data (DTAVAL). In LDMe, nCIOs and CIOs disagree that CIOs need to know about data managed on their behalf by 3rd parties or about automatically generating and disseminating real-time insights about external trends. CIOs awarded a zero score to knowing about 3rd party created/ managed data and expected their knowledge of trend data to relate to RELOB, whereas nCIOs expected this knowledge to relate to CHGOB. This appears to make sense as CIOs and nCIOs may not see the need for CIOs to work closely with 3rd parties to manage data or to know about the automatic tracking of market trends in LDMe. This perspective is given further support considering that both parties reach an overall higher level of agreement for all the data knowledge attributes in HDMe.

The last two groups of knowledge attributes in the survey concerned expectations for CIOs to know about the capabilities of their IT resources (ITOPS, ITPRDAPS,

ITSRVS, TECHARCH) and about Project management (PRJMNG) in IT and the business.

For IT resources, nCIOs and CIOs agree on 60% of the CIOs knowledge attributes in each of the two environments.

When examining the ratio of counts for each knowledge attribute in IT operations (see graphs 4u and 4v in appendix C.4.4), it's clear that in LDMe:

- nCIOs expect CIOs to know most about IT Operations Strategy and IT Change Management when enacting CHGOB, whereas
- CIOs expect to know more about IT Change Management and IT Performance Management when enacting CHGOB

Whilst in HDMe,

- nCIOs once again expect CIOs to know most about IT Operations Strategy and IT Change Management when enacting RELOB, but
- CIOs expect to know most about IT Operations Strategy and IT Performance Management when enacting RELOB

Whilst these results confirm the view that nCIOs and CIOs expect CIOs to enact CHGOB and RELOB in LDMe and HDMe respectively, these counts highlight that nCIOs expect CIOs to focus more on IT Change Management as environments become increasing digitally mature, whereas CIOs expect to focus more on IT Performance Management as they migrate to HDMe; this observation suggests that CIOs maybe overly preoccupied by IT performance whereas nCIOs would expect CIOs to concentrate more on change as environments become more dynamic.

The main area of dispute for expectations about IT resources across the two environments seems to be about expectations for the CIO to know about the IT capabilities of the businesses competitors in LDMe, which, in a similar way to knowledge of data value in an LDMe is unsurprising i.e., in LDMe CIOs are heavily preoccupied, as the results show, with knowing about the capabilities of

IT and the business and would not expect to pay so much attention to the businesses competitors.

Whilst there appears to be partial agreement on the expectation for CIOs to know about IT Resource Planning (ITRESPL) in both environments, deeper analysis shows that both parties expect this knowledge to relate to multiple behaviours i.e., RELOB, CHGOB and EMOB; however, it should be noted that overall scores for expectation of IT resources planning were relatively low (less than 5%) for both parties in both environments; this may represent on opportunity for more collaborative planning.

Another notable observation for IT resource knowledge, is the agreement in expectations for the CIO to know about Technical Architectures (TECARCH). In HDMe, the author notes an increase in the numbers of nCIOs and CIOs expecting CIOs to know about the technical architectures of all parties (i.e., those provided by inhouse IT, by 3PITSP, those used by the business and by the business customers); this increase in expectation is reassuring and supports the view that nCIOs and CIOs expect an expansion in understanding about the IT capabilities of resources outside of the immediate IT department.

In a similar manner, for the final CIO knowledge attribute, Project management, more nCIOs and CIOs that CIOs should know more about Sponsoring and Managing Programmes and Projects in HDMe; however, there appears to be one aspect of dispute.

nCIOs and CIOs disagree that CIOs should be expected to know about Managing IT Projects that mostly impact IT (as opposed to managing IT projects that mostly impact the business and/ or business customers) in both environments. In LDMe, CIOs expect this knowledge to relate to RELOB, whereas nCIOs don't think this is important at all (attracting a zero score); however, in HDMe CIOs appear to change their mind, also awarding this a zero score, whereas nCIOs now expect this knowledge to relate to CIOs enacting CHGOB and their EMOB.

One way to interpret this result is that as environments increase their level of digital maturity, CIOs may expect projects affecting their own IT estates to

dimmish as more services migrate to the Cloud, whereas nCIOs may expect the levels of business change to increase during the transition to digital technologies and hence expect CIOs to know more about change and/ or IT capabilities residing outside of the organisation.

While there are areas of disagreement and partial agreement, the overall increase in agreement in expectations for a CIOs knowledge between LDMe and HDMe is apparent. These findings therefore support the hypotheses (H4) that CIOs and nCIOs agree on the relative importance of CIO knowledge in digitally maturing environments.

6.2.2.5 H5 – Learning & Development

H5 stated that, for the most effective behaviour in digitally maturing environments, CIOs and nCIOs agree on the relative importance of CIO learning preferences. The CIO attributes that attracted the greatest level of disagreement were grouped under expectations for CIO learning (H5, grouped in terms of subject matter (SUBJTS) and sources for learning about these subjects, KNWSRC).

When considering expectations for the subjects that CIOs should learn most about, more nCIOs and CIOs agreed that CIOs should learn about more efficient data management. However, the level of agreement dropped for CIOs to learn about Improving Business Performance (IMPBUSPFM) or about Customer Needs and Trends (CSTMRS) in HDMe, and nCIOs and CIOs couldn't agree on the expectation for CIOs to learn about new IT Products and Applications (ITPRDSAPPS) or new IT Infrastructures and Networks (ITINFR/NETS) in either environment.

This seems rather puzzling, as one may expect that both groups would expect CIOs to learn more about the effects of increasingly complicated products and infrastructures on both the business and its customers.

The results show, irrespective of the environment, that CIOs only expect to learn about IT Products and Applications when enacting CHGOB, whereas nCIOs expect this learning to relate more to RELOB. One possible explanation for this

could be to do with how nCIOs and CIOS perceive change in relation to complex IT products and structures.

For example, nCIOs may associate IT hardware and change from the perspective of the resultant impact on business processes and practices, requiring a focus on consultation, negotiation and relationship building. Alternatively, CIOs may associate IT hardware and change from the perspective of changes to infrastructure and configuration i.e., something that requires a stronger focus on hardware than on people.

When considering the sources of learning about the above subjects (KNWSRC in Figure 22 and Figure 23), the results show that in LDMe CIOs and nCIOs don't agree that CIOs should learn from the CIOs IT Managers; CIOs don't expect to do this at all, scoring zero, whereas nCIOs expect this to help CIOs enact both CHGOB and EMOB.

In HDMe the numbers of nCIOs and CIOs agreeing increases when expecting CIOs to learn more from Customers; both CIOs and nCIOs agree that this would be important in relation to the CIOs CHGOB and RELOB.

However, as environments mature, most nCIOs and CIOs continue to disagree about CIOs learning from external think tanks (such as universities, or government agencies). In LDMe CIOs don't think this is important, whereas more nCIOs relate the importance of this source to NTTOB). However, in HDMe, CIOs change their minds and expect that this source is important when enacting RELOB, whereas nCIOs no longer think this is important. Initial interpretation of the results for the sources of CIO learning appears somewhat confusing. However, a closer examination of the counts behind these results (graphs H5a and H5b in appendix C.4.5) reveals that,

In LDMe:

- Most CIOs don't expect to learn from their IT Managers, but they do expect learn from Business Managers and Leaders when enacting CHGOB, and from their External Peer Networks when enacting RELOB, however,

- Most nCIOs expect CIOs to learn from their External Peer Networks *and* from their customers when enacting CHGOB; whilst they expect CIOs to learn from their External Peer Networks *and* from 3PITSP when enacting RELOB

Whereas in HDMe:

- More CIOs expect to learn from their External Peer Networks when enacting CHGOB, whereas more nCIOs
- Expect CIOs to learn from Business Managers and Customers when enacting CHGOB, whilst they expect CIOs to learn from their External Peer Networks and Customers when enacting RELOB

This suggests that nCIOs in LDMe expecting CIOs to enact CHGOB think it is important for CIOs to seek knowledge from further afield, perhaps with an expectation to bring knew knowledge into the business from Customers and the CIOs own External Peer Networks; conversely CIOs enacting CHGOB appear less 'ambitious' in learning in LDMe, preferring to seek new knowledge from within their organizations i.e., from their Business Managers. This doesn't hold true through when CIOs expect to enact RELOB in LDMe, with CIOs casting their net wider to seek knowledge from their Peer Networks.

In an LDMe environment, this 'swing' towards an external focus for learning, when exchanging CHGOB for RELOB it likely dependent on the subject the CIO wishes to learn about. For example, CIOs in an LDMe who enact CHGOB could be looking to learn more about the current impacts of IT on the business (i.e., business performance), whereas CIOs enacting RELOB may be seeking knew knowledge about the potential impact of new IT from the collective experiences in their external peer networks.

When considering HDMe, nCIOs expect CIOs to switch their learning toward Business Managers, whilst CIOs expect to make an opposite move and reduce learning from their Business Managers and learn from their External Networks more.

Again, these expectations may relate to the subject matter the CIO is expecting to learn about. For example, nCIOs may expect CIOs to increase their understanding about the effects of a newly implemented IT product, and to do so, would focus on business managers, whereas CIOs may which to continue comparing the effects of a newly implemented product with the experiences of their peer networks.

Whilst these explanations appear sound, they are subjective. When combining this with the overall low level of agreement for CIO learning, the author suggests that hypotheses H5, that CIOs and nCIOs agree on the relative importance of CIO learning preferences in increasingly dynamic environments cannot supported by these results.

6.2.2.6 H6 – Assessment, Ambition & Motivation

H6 stated that, for the most effective behaviour in digitally maturing environments, CIOs and nCIOs agree on the relative importance of CIO assessment, ambition, and motivation. The results show that the overall level of agreement on expectations for CIO Motivation (H6 – CIO Assessment (ASSMT), Ambition (AMBIT) and Motivation (MOTIV)) increases slightly in HDMe, from 47% to 53%.

In LDMe, nCIOs and CIOs agree that CIOs should be assessed on both Meeting IT Performance Targets (ITPFM) and Delivering Tangible Business Benefits (TANBUSBEN), for both CHGOB and RELOB. In HDMe, nCIOs and CIOs increase their overall level of agreement that CIOs should be assessed on delivering new capabilities (on time and to budget) and fulfilling (multi-year) strategies, again when enacting either CHGOB or RELOB.

An examination of the counts behind these findings (see tables H6a, H6b in appendix C.4.6) reveals that:

In LDMe:

- More CIOs expect CIOs to be assessed on delivering tangible benefits when enacting RELOB, but when enacting CHGOB, more CIOs expect to be assessed on delivering tangible benefits, fulfilling strategic objectives, *and* achieving business performance targets; whereas

- Whilst more nCIOs agree with CIOs that CIOs should be assessed on delivering tangible benefits when enacting RELOB, nCIOs also expected CIOs to be assessed by fulfilling strategic business objectives when enacting CHGOB

The fact that most CIOs expecting to enact RELOB hold a relatively high expectation for delivering tangible benefits supports the view that they perceive a strong association between effective relationship development and perceptions for delivering tangible benefits; this view appears supported by nCIOs.

It is also interesting to note that in LDMe, nCIO expectations for CIOs to be assessed by fulfilling strategic objectives when enacting CHGOB appears contrary to the CIOs expectations for delivering against the more 'tactical' metrics.

In HDMe, whilst the two same metrics (i.e., fulfilling strategic objectives and delivering tangible benefits) retain their prominence, nCIOs and CIOs change their association of these from CHGOB towards RELOB; this supports the overall trend for this change in behaviours between LDMe and HDMe.

These results suggest that whilst CIOs expectations for assessment remains consistent between LDMe and HDMe, nCIOs radically shift their expectation from CHGOB to RELOB for the same two metrics.

Results for changing expectations in the factors that help CIOs fulfil their ambitions are consistent in that nCIOs and CIOs agree that a CIOs ambitions, when enacting either RELOB or CHGOB are expected to be fulfilled by staying abreast of the latest developments in technologies (TCHDEV), actively seeking constructive feedback to become more effective in current role (CONFBCK) and by having more in-work opportunities to apply their current knowledge (IWRKOPP) in either LDMe or HDMe.

However, where there had been disagreement for regularly changing employer and changing reporting line in LDMe, nCIOs and CIOs developed a partial agreement in HDMe. In LDMe CIOs expect these two attributes to relate mostly to RELOB whereas nCIOs expect them to relate to CHGOB.

The reason for these differences may stem from differing perspectives on changing employers or reporting line; for the CIO this is likely to be a highly personal process requiring a great deal of focus on individual relationships, whereas for nCIOs this is likely to be perceived as process of change rather than a relationship orientated process (potentially) involving conflict and emotion.

The final category of attributes, testing H6, are those that describe expectations for a CIOs motivation (MOTIV) across LDMe and HDMe. CIOs and nCIOs maintain their level of agreement for expecting CIOs to be motivated by achieving Personal Development Goals (PDVPGLS) and receiving recognition from the Top Management Team (RCGTMT). And they maintain their level of partial agreement for being motivated by receiving recognition from Customers (RCGCSTMRS) and from CIO Peers (RCGPEER) when enacting combinations of RELOB or CHGOB. Perhaps the most noticeable (and only) area of disagreement was in expectations for CIOs to be motivated by Personal Financial Goals (PFINGLS). In LDMe, CIOs expected this to relate to RELOB and CHGOB and in HDMe, to mostly relate to RELOB; in both environments though, nCIOs scored this zero, considering it irrelevant to CIO motivation, preferring to award the highest scores to expectations for CIOs to mostly be motivated by TMT recognition and Customer recognition for RELOB and TMT recognition and for PDP development goals for CHGOB.

With only one attribute remaining in dispute across the two environments (with two attributes changing from disagreement to partial agreement), the overall increase in agreement in expectations for a CIOs motivation supports hypotheses six that CIOs and nCIOs agree on the relative importance of CIO assessment, ambition, and motivation with the most effective CIO behaviours in digitally maturing environments.

6.3 Model Validity

Research objective 4 articulated an expectation for the author to develop confidence about the validity of the model and its (ultimate) use by practitioners. In keeping with this, the author claims that these results lend support to the authors proposal that it is possible, and practically useful, to model changing

expectations for the CIO as their environments become increasingly dynamic. The methodological choice for developing constructs as a two-step process, utilizing multiple sources, has provided the author with a high degree of confidence that the results are valid. This confidence is not only bolstered by the richness of the data from the JA analysis but also by the presence of a highly representative sample providing responses to the survey instruments.

6.3.1 Methodology

Whilst the use of multiple sources for collating CIO job adverts (JA) helped ensure a representative spectrum of expectations could be captured, the use of automated data collation was, as indicated in 4.2.1, somewhat laboured (especially collation involving automated, emailed job adverts); to help address this the development and application of pre-defined CIO role selection criteria proved highly useful. This approach not only ensured that advert selection was representative and consistent, but it also enabled the development of a useful coding system with which to develop new dimensions for categorizing practitioner expectations for the CIO.

In terms of the sample used in the survey. Researchers conducting qualitative or quantitative studies on CIO expectations have largely focused on soliciting expectations either from the CEO, from stakeholders commonly grouped together as members of the TMT, 'the business' and/ or 'the IT department'. For this study, the author intended to avoid vagaries introduced by references to generalised stakeholder groups by attempting to identify the nature of the relationship each responder held with the CIO. As shown in Figure 17, this approach yielded responses from a broad spectrum of stakeholders including those who described themselves as 'internal customers' of the CIO, as stakeholders 'external' to the CIOs environment (e.g., 3rd party service providers, such as consultants or CIO recruiters) and stakeholders who mentor CIOs.

6.3.2 Research Design

The adoption of ORT and *pragmatism* also appears to have been highly beneficial in the design of new theory and the subsequent inquiry into the testing of that

theory. JAs represent current practitioner expectations for the CIO. The JA study therefore provided a representation of the 'truth' for both advertisers and potential candidates; for the author this manifested in the 5 dimensions of purpose, profile, behaviours, skills, and knowledge. Finding that this truth aligned well with the key constructs in ORT (i.e., expectations for behaviour and attributes), the author was able to gain confidence that the variables proposed in the model would be acceptable, meaningful and (hence) useful amongst practitioner communities.

In soliciting data on these variables through the survey instruments, the author remained mindful about the degree of acceptance of these variables in the sense that they were both meaningful and relevant to both CIOs and nCIOs. To monitor if this was indeed the case, the author noted the number of surveys that were started and not completed. For the CIO survey, 118 surveys were started and 36 of these were abandoned before being completion (i.e., 69% completion rate), whilst for the nCIO surveys, 138 surveys were started and 32 abandoned before completion (i.e., 77% completion rate). Whilst the reasons for abandonment are unclear, the author believes that these response rates indicate practitioner acceptance of the variables in use. During the process of managing the survey responses, the author noted that three participants had emailed clarification questions. Two nCIO responders wanted to clarify which (of many) CIOs they should consider when responding to the survey whereas one CIO wanted clarification about the relevance of previous and current positions as a CIO, best illustrated by their comment:

> *There are some highly blended roles across the IT industry with some very loosely defined roles and highly distinct and defined roles. I ran a project for Tesco's IT house in WGC some years ago. The software roles and IT management roles were very fluid and changed shape every 18-24 months. There was also a serious problem with role definitions across the industry. I have found this more recently on a major software project in Japan.*

This very small number of requests for clarification also provides the author with confidence that the survey instruments were meaningful and acceptable to the responders.

6.3.3 Useability

To develop a new CIO role effectiveness model which, for increasingly dynamic environments, articulates: (1). Changing expectations for the most effective role behaviours; and (2). The importance of the CIOs individual 'attributes' in helping CIOs effectively manage changing expectations for their most effective behaviours

In keeping with the above research question, and:

1. in consideration of the lack of research into CIO (capability) development in the IS leadership literature (limiting factor 5, on p.174), and
2. to gain confidence that the resulting model represents a valid means for practitioners to 'articulate' changing expectations

the author reflects on the practical usefulness of applying this model to CIOs and their stakeholders.

Whilst this model appears useful to CIOs (for self-development purposes), the author believes that it would also prove a useful means for various CIO stakeholders, e.g., those involved in:

1. describing current, or future CIO role descriptions for CIOs
2. assessing the effectiveness of CIOs; and
3. developing professional and personal development interventions for CIOs

emphasising that the effectiveness model represents a *means* for assessing and developing role effectiveness, as opposed to representing a prescriptive framework for assessment and development, the author expects that variables used in the model may need to evolve as expectations for new, technology enabled capabilities continue to emerge.

6.4 Research Question

In increasingly dynamic environments, how to determine the degree of expectation alignment between CIOs and their stakeholders for a CIOs most important attributes when effectively managing rapidly changing expectations for the CIOs most effective behaviours?

Reflecting on the whether the research question has been fully addressed, the author claims that, the new effectiveness model does indeed articulate:

1. Changing expectations for most effective role behaviours. The model has enabled a comparison of expectations for behaviour across two, increasingly dynamically environments; and
2. The importance of the CIOs individual 'attributes' in helping CIOs manage changing expectations for their most effective behaviours. The model has enabled a comparison of perspectives on the importance of the attributes classified in terms of the CIOs Demographics, Knowledge, Skills, Learning and Motivation in relation to expectations for: (i). the most effective behavior in (ii) increasingly dynamic environments.

6.5 Contribution to Knowledge

Literature has (to date) been unable to offer a unifying model for the CIO due to perceptions about the highly contingent nature of the role. In the pursuit of a unifying model, CIO researchers have persevered in trying to establish causal, or deterministic relationships between expanding lists of CIO attributes and changeable stakeholder expectations for outcomes. However, claims arising from these studies can be problematic for practitioners as they disregard the:

1. likely effects of causal ambiguity on expected outcomes as stakeholders attempt to assess the performance of the CIO as a critical resource
2. highly inconsistent, subjective descriptions of expectations for CIO attributes (or capabilities) and outcomes
3. changing expectations of an increasingly broad range of internal and external stakeholders; and

4. the practicalities of CIOs being able to learn to address rapidly changing expectations

These observations have transpired in a highly confused (or ambiguous) depiction of CIOs; a confusion that, as a result of increasingly dynamic environments, had led to increasingly unreasonable expectations for individual CIOs to embody multiple attributes in a single role. This expectation has reached the point where researchers are suggesting that the role should be split across multiple individuals i.e., the Chief Digital Officer, the Chief Technology Officer, the Chief Transformation Officer, the Chief Marketing officer, etc.

To address these problems, the author, adopting a pragmatic viewpoint, conducted a sequential explanatory design for conducting a multi-method quantitative investigation. Examining perspectives on the CIOs role from CIO job adverts to develop an effectiveness model, the author found that, aligning well with many of the expectations in the literature, expectation classification from the JA analysis (i.e., Purpose, Profile, Behaviours, Skills, and Knowledge) did not (in itself) provide sufficient detail with which to develop a unifying model. However, the testing of the newly developed effectiveness model did show that it could cater for multiple contingencies, accommodating:

1. increasingly dynamic environments
2. multiple stakeholders internal and external to the CIOs organisation
3. the changing expectations of these stakeholders; and
4. articulation of expectation alignment for a CIOs most effective behaviours and their most important attributes

These findings, derived from an inquiry contextualized by pragmatism, demonstrate that:

1. Effectivity, agreement that a CIO is addressing changing expectations, as opposed to performance, alignment, and role enactment (activities), as a concept is useful as it avoids the issue of causal ambiguity associated with RBV; and
2. Role-making is also useful as it,
    a. Provides a framework for comparing differing perspectives on the role (i.e., CIO, nCIO) in dynamically changing environments

b. Focuses on 1:1 expectation for the individuals most effective behaviours rather than expectations for organizational performance (thus avoiding doubts arising from subjective assessments of CIO performance)
c. Avoids overly complicated descriptions for the CIOs role as role descriptions are based on defined behaviours and attributes, avoiding the need to develop ever more complex descriptions of roles and role types; and
d. Accommodates the individuals' characteristics and organizational influences as described by Fondas (Figure 5)

In addition to this, the model also enables CIOs in the same environments to compare the expectations they hold for themselves against those held by their stakeholders. Improved visibility of degrees of alignment in expectations provides CIOs with multiple new insights into how they can address alignment mismatches to become more effective.

As this new articulation for the CIOs role will:

1. reduce role ambiguity
2. improve CIO motivation and (ultimately)
3. positively offset relatively high rates of CIO turnover as (recorded over the last 40 years)

the author claims that the development of this new CIO effectiveness model represents a major, new contribution to the literature on IS leadership.

7 CONCLUSIONS

As far as the author is aware, the body of knowledge on IS leadership has, to date, failed to identify the relevance of individual CIO attributes when managing changing expectations for their most effective behaviours in increasingly dynamic environments.

This research has adopted role making, the process that describes expectation enactment, as the basis for a new model of effective CIO expectation management in increasingly dynamic, digitally enabled business environments.

Subsequent testing of this model reveals that changing expectations for a CIOs most effective behaviours, between a CIO and various (internal/ external) CIO stakeholders have been defined and assessed in environments with a low level of digital maturity and in environments with a relatively higher level of digital maturity.

Whilst the research has also revealed the extent of agreement in expectations for a CIOs skills, knowledge, personal attributes, and motivations in association with their expected behaviours in each environment, it has not provided a clear understanding about expectations for what CIOs are expected to learn, or where CIOs are expected to learn from. Whilst the reason for this isn't clear, the author speculates that CIOs and their stakeholders are likely to hold differing views on the importance of specific subjects to their organizations at given point in time. For example, CIOs may be inclined to favour learning about technical subjects over business subjects, whereas CIO stakeholders could hold the opposite perspective.

Despite this, these findings provide a strong indication that the CIO effectiveness model represents a practically useful tool for examining and (hence) addressing issues (e.g., role conflict) and opportunities (e.g., to identify opportunities to reshape unrealistic or inappropriate expectations) arising from a misalignment in expectations between the CIO and their stakeholders. For example, CEOs expecting CIOs to enact effective relationship orientated behaviours when being introduced to new customers, may not only expect the CIO to not know about

their business products and services, but to also be skilled at encouraging innovation and collaboration. In this example, if the CEO and CIO have not checked these expectations with each other beforehand, then the chances of a successful meeting may diminish somewhat.

The author claims that agreement (or disagreement) on alignment, as enabled by this model, will come to represent 'truth' for both parties; a mutually advantageous circumstance if both parties can agree on now to address such misalignments. Whilst the research and the model does not claim to represent a singularly prescriptive definition for CIO effectiveness (as attempted by previous researchers), it has yielded a tool that can be used by CIOs and their mentors when:

1. planning to define and establish expectations for the most effective behaviours with their stakeholders and/ or,
2. when planning to alter expectations of the CIOs attributes, and/or
3. to help CIOs identify personal development plans to improve their capabilities and behaviours for their given circumstance

When considering the real-world problem, that CIOs have limited opportunities to learn to address rapidly changing expectations for their role, the author claims that the act of role-making provides a practically useful means for CIOs to learn how to become more effective. The author expects that this is new approach to learning and expectation management will reduce CIO demotivation and ultimately, extend their tenure.

The research has contributed a new representation for modelling role making and expectations management for CIOs in increasingly dynamic environments. Considering this, the author considers that the research aim has been fully met.

8 LIMITATIONS & RECOMENDATIONS

In keeping with objective 5 of this research, the author has identified several potential limitations of this study, and (hence) opportunities for future research.

In the JA analysis, the author acknowledges that the sample only contained UK based/ advertised roles. As such, differing perspectives, potentially influenced by national cultures have not been accounted for.

The sample of JAs also potentially represents an unintended, singular perspective on expectations for the CIO role i.e., the perspectives and biases of the individual tasked with writing and advertising the roles. As such, the author acknowledges that the job adverts may not be wholly representative of expectations of the organization recruiting for the role.

The author has therefore assumed that recruiters have fully captured/ represented the requirements of their 'clients, where the clients involved in the process were also fully qualified and authorised to provide the job descriptions.

Additionally, the author has not been able to determine the relative quality (completeness or accuracy) of publicly advertised CIO job descriptions in comparison to those developed by more specialist executive head-hunters. Despite attempts to secure such adverts, the author was unable to complete this process and as a result may have based the JA findings on relatively sub-standard job adverts.

In developing the effectiveness model, the author acknowledges Yukl's own description of the limitations to his constructs of leadership behaviours. Stressing that his taxonomy '…*should not be viewed as the final solution for classifying leadership behaviour*,'(p.79) (Yukl, 2012) and that he expects that future research may discover additional components and/ or sub-divisions of the constructs used in this study.

Whilst data collection (for the JAs and the survey) spanned a period of nearly three years, the author does not perceive this work as a longitudinal study and as such, potentially captures expectations at a certain, relatively fixed point in

time. In other words, should the JA analysis and/ or the survey be repeated on a regular (annual) basis, the author would expect to identify differing opinions for the CIOs role. This maybe particularly applicable if predictions for a demise in the CIOs role were to come true; for example, a role spit with the CDO (or any one of several combinations of role change) could alter the relevance of certain knowledge attributes considerably.

Given these limitations the author suggests that subsequent research in this field, could entail:

1. The use of additional data sets that represent a more diverse range of stakeholder expectations. Increased diversity could help identify alternative expectations for the CIOs role, which, could lead to the identification of additional and/ or alternative attributes
2. Longitudinal studies that track changing expectations about the adoption and exploitation of (yet unknown) new business technologies or the effects of such technologies on increasingly dynamic changes in stakeholder expectations for the CIOs role; and
3. Trials that monitor the use of this effectiveness model for practising CIOs in the context of personal development and/ or to professionalise the role. Such trials could be used to develop and/ or refine the constructs in the model to improve understanding about the effects of the local environment on the process of expectation alignment

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APPENDICES

Appendix A Literature Review:

A.1 Literature Review Step by Step Process & Evaluation Criteria

#	Step	#	Sub-Step
2	Documented Key Words		
2	Ran Searches in SCOPUS, ABIINFORM and EBSCOHOST	2a	CIO Definition - General
		2b	Role Definition - Specific
		2	Role Impact - Organisational
		3	CIO Performance/ Reward
3	Downloaded Results into worksheets		
4	Combined Worksheets together for each source (e.g., SCOPUS Duplicates)		
5	Removed Duplicates for each source		
6	Combined onto Totals Worksheet		
7	Removed Duplicates across whole list		
8	Searched for "CIO" and "Chief Information Officer" in Title and then again Abstract		
9	Removed Invalidates		
20	Searched for "IS Leader*" in Title and then again in abstract		
22	Searched for "IT Leader*" in Title and then again in abstract		
22	Searched for "CEO" CMO" CFO" "CISO" "CDO" "CTO" CKO (and words) in Title (only)		

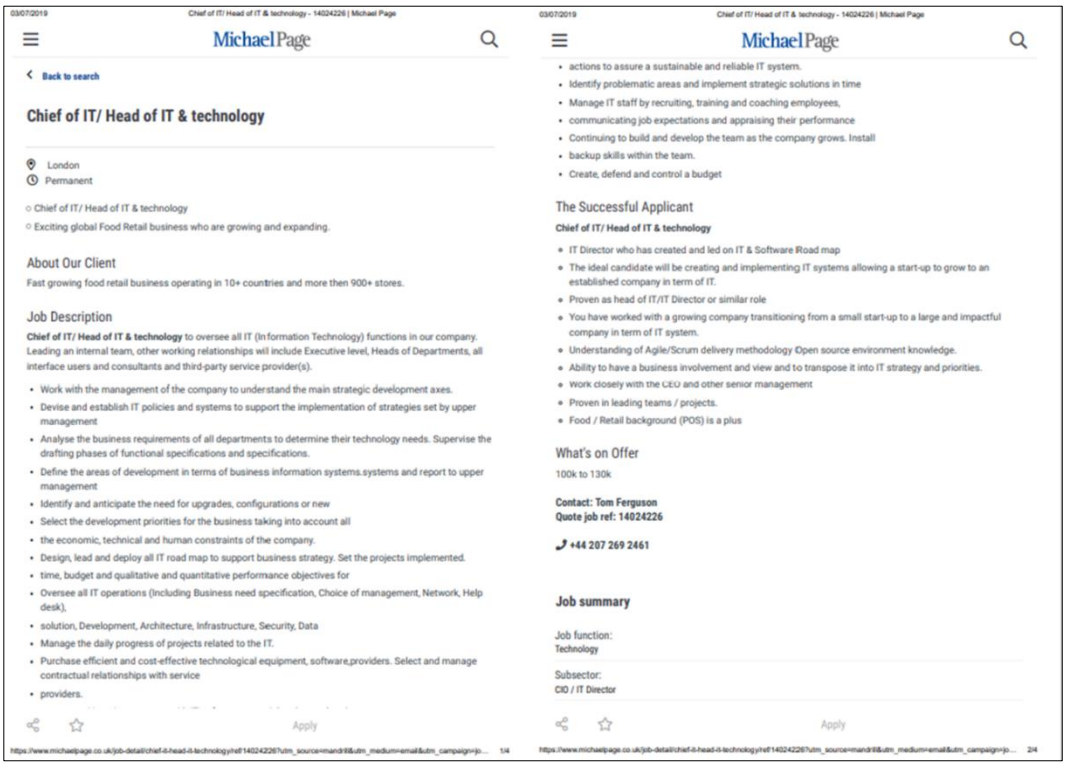
#	Step	#	Sub-Step
23	Removed Invalidates AND Add Categories (e.g., IMPACT/ ROLE/ DIGITAL/ JURISDICTION, etc.)		
24	New worksheet COMBINED FINAL		
25	Combined Positioning Study Refs and Removed Duplicates		
26	Searched for "CIO" and "Chief Information Officer" in Title and then again Abstract		
27	Removed Invalidates		
28	Searched for "IT Leader*" in Title and then again in abstract		
29	Removed Invalidates		
20	Downloaded Refs		
22	Uploaded to NVIVO		
22	Quality Checks:	a	Source Peer Reviewed Journal or BOOK?
		b	NOT a conference paper more than 3 years old
		c	Was the research problem stated?
		d	Was the research empirical?
		e	Was the contribution to theory made clear?
		f	Conclusions – not aligned to problem, objectives
		g	Limitations
23	Word Counts on:	a	Which Theories

#	Step	#	Sub-Step
		b	CIO Role descriptions (Type/ Characteristics/ Competencies/ Skills, etc.
		c	CIO impact on firm
		d	CIO Assessment
		e	CIO reward
24	Documented Findings		

Appendix B Investigation 2: UK CIO Recruiter Expectations

B.1 Example Job Adverts

B.1.1 Professional Recruiters



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Job Description

Chief of IT/ Head of IT & technology to oversee all IT (Information Technology) functions in our company. Leading an internal team, other working relationships will include Executive level, Heads of Departments, all interface users and consultants and third-party service provider(s).

- Work with the management of the company to understand the main strategic development axes.
- Devise and establish IT policies and systems to support the implementation of strategies set by upper management
- Analyse the business requirements of all departments to determine their technology needs. Supervise the drafting phases of functional specifications and specifications.
- Define the areas of development in terms of business information systems.systems and report to upper management
- Identify and anticipate the need for upgrades, configurations or new
- Select the development priorities for the business taking into account all
- the economic, technical and human constraints of the company.
- Design, lead and deploy all IT road map to support business strategy. Set the projects implemented.
- time, budget and qualitative and quantitative performance objectives for
- Oversee all IT operations (Including Business need specification, Choice of management, Network, Help desk),
- solution, Development, Architecture, Infrastructure, Security, Data
- Manage the daily progress of projects related to the IT.
- Purchase efficient and cost-effective technological equipment, software,providers. Select and manage contractual relationships with service
- providers.

Apply

https://www.michaelpage.co.uk/job-detail/chief-it-head-it-technology/ref140242267utm_source=mandrill&utm_medium=email&utm_campaign=jo... 1/4

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- actions to assure a sustainable and reliable IT system.
- Identify problematic areas and implement strategic solutions in time
- Manage IT staff by recruiting, training and coaching employees,
- communicating job expectations and appraising their performance
- Continuing to build and develop the team as the company grows. Install
- backup skills within the team.
- Create, defend and control a budget

The Successful Applicant

Chief of IT/ Head of IT & technology

- IT Director who has created and led on IT & Software Road map
- The ideal candidate will be creating and implementing IT systems allowing a start-up to grow to an established company in term of IT.
- Proven as head of IT/IT Director or similar role
- You have worked with a growing company transitioning from a small start-up to a large and impactful company in term of IT system.
- Understanding of Agile/Scrum delivery methodology Open source environment knowledge.
- Ability to have a business involvement and view and to transpose it into IT strategy and priorities.
- Work closely with the CEO and other senior management
- Proven in leading teams / projects.
- Food / Retail background (POS) is a plus

What's on Offer

100k to 130k

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Quote job ref: 14024226

+44 207 269 2461

Job summary

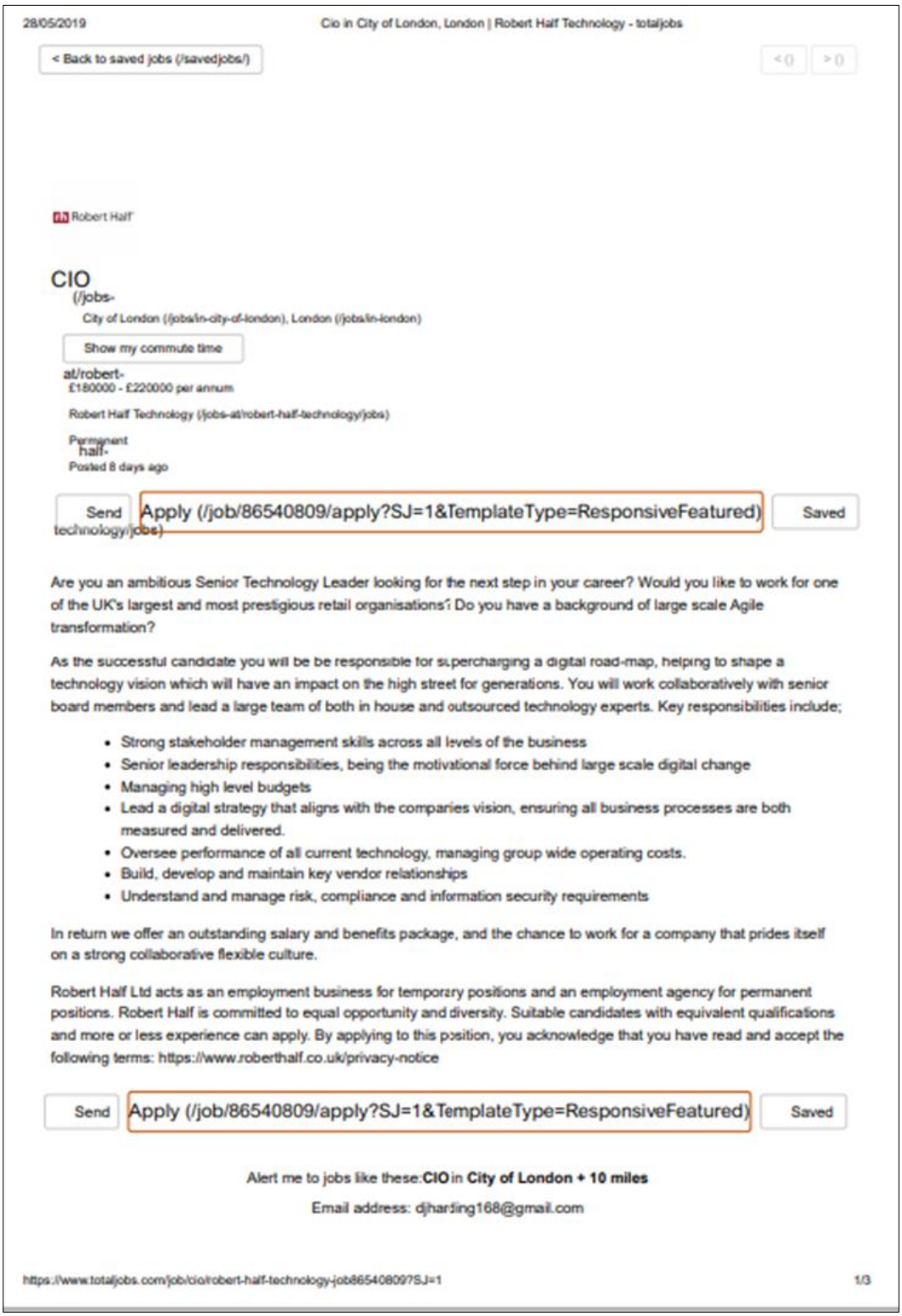
Job function:
Technology

Subsector:
CIO / IT Director

Apply

https://www.michaelpage.co.uk/job-detail/chief-it-head-it-technology/ref140242267utm_source=mandrill&utm_medium=email&utm_campaign=jo... 2/4

B.1.2 Job Boards



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technology/jobs)

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As the successful candidate you will be be responsible for supercharging a digital road-map, helping to shape a technology vision which will have an impact on the high street for generations. You will work collaboratively with senior board members and lead a large team of both in house and outsourced technology experts. Key responsibilities include;

- Strong stakeholder management skills across all levels of the business
- Senior leadership responsibilities, being the motivational force behind large scale digital change
- Managing high level budgets
- Lead a digital strategy that aligns with the companies vision, ensuring all business processes are both measured and delivered.
- Oversee performance of all current technology, managing group wide operating costs.
- Build, develop and maintain key vendor relationships
- Understand and manage risk, compliance and information security requirements

In return we offer an outstanding salary and benefits package, and the chance to work for a company that prides itself on a strong collaborative flexible culture.

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Send Apply (/job/86540809/apply?SJ=1&TemplateType=ResponsiveFeatured) Saved

Alert me to jobs like these:**CIO** in **City of London + 10 miles**

Email address: djharding168@gmail.com

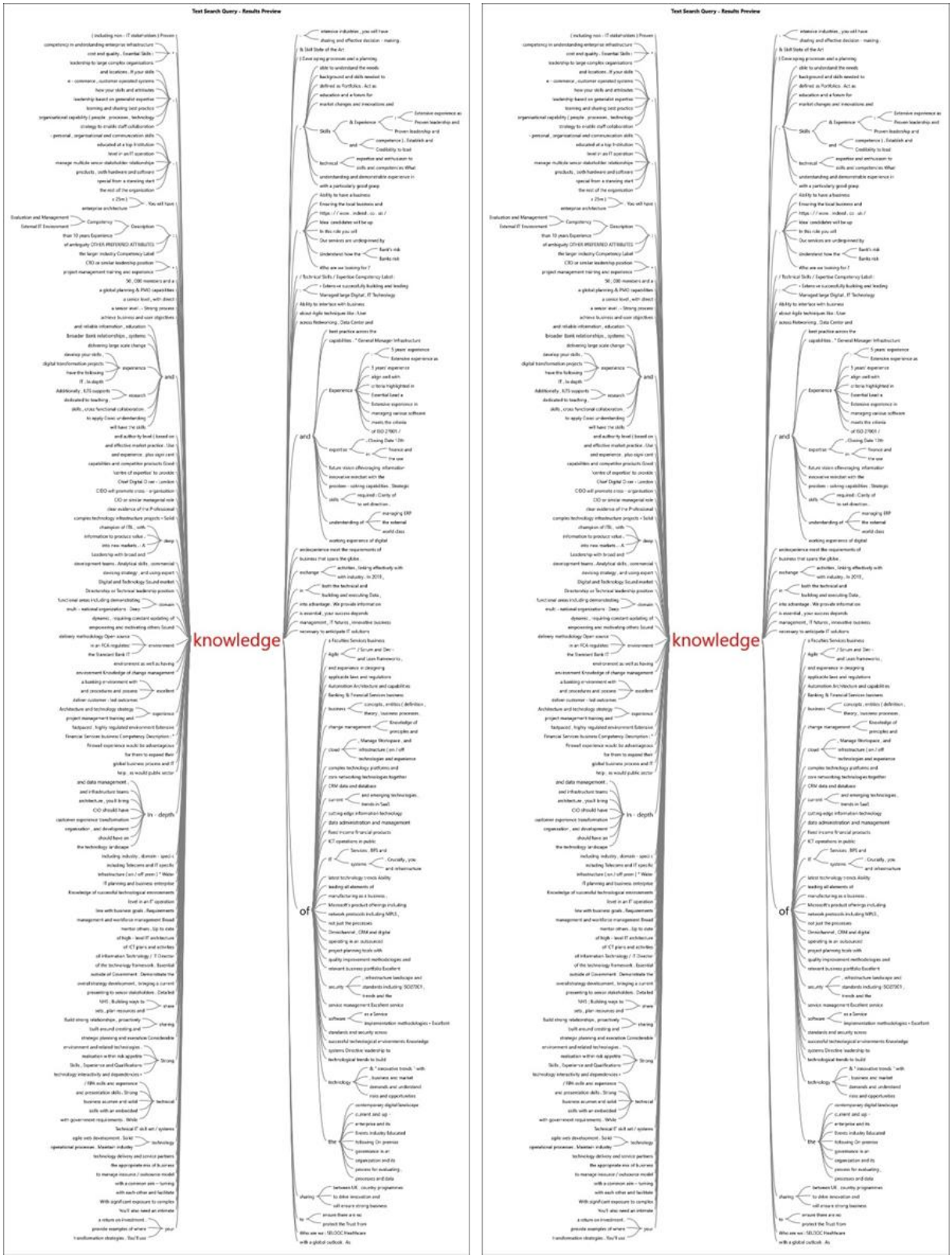
https://www.totaljobs.com/job/cio/robert-half-technology-job86540809?SJ=1 1/3

B.2 Word Frequency Counts and Categorisation

*Sorted by category/frequency count

Rank	Original Word	Length	Potential Code	Count	Weight (%)	Rank	Original Word	Length	Potential Code	Count	Weigh
1	Management	10	Skill	2506	3.38	36	People	6	Skill	293	0.4
2	Technology	10	Knowledge	2314	3.08	37	Communication	13	Skill	292	0.3
3	Business	8	Knowledge	1181	1.67	38	Strategic	9	Knowledge	284	0.4
4	Operations	10	Knowledge	1147	1.19	39	Benefits	8	Multi Atts	281	0.3
5	Chief	5	Status	998	1.43	40	Building	8	Skill	281	0.2
6	Digital	7	Knowledge	991	1.44	41	Functions	9	Knowledge	265	0.1
7	Experience	10	Social Capital	965	1.37	42	Improve	7	Multi Atts	244	0.3
8	Leadership	10	Behaviour	746	0.91	43	Successful	10	Multi Atts	244	0.2
9	Directing	9	Skill	688	0.35	44	Infrastructure	14	Knowledge	239	0.3
10	Leading	7	Skill	681	0.41	45	Capabilities	12	Skill	238	0.3
11	Strategy	8	Multi Atts	637	0.92	46	Performance	11	Multi Atts	237	0.1
12	Effective	9	Knowledge	565	0.56	47	Industry	8	Knowledge	230	0.3
13	Projects	8	Knowledge	531	0.50	48	Stakeholders	12	Skill	230	0.3
14	Strong	6	Behaviour	525	0.56	49	Consulting	10	Knowledge	228	0.3
15	Skills	6	Skill	520	0.67	50	Supports	8	Behaviour	226	0.1
16	Governance	10	Skill	508	0.28	51	Large	5	Multi Atts	225	0.2
17	Innovation	10	Knowledge	489	0.45	52	Teams	5	Skill	220	0.3
18	Systems	7	Knowledge	481	0.53	53	Ability	7	Skill	219	0.3
19	Customer	8	Knowledge	477	0.55	54	Software	8	Knowledge	204	0.2
20	Delivery	8	Knowledge	460	0.67	55	Trust	5	Skill	203	0.2
21	Deliver	7	Knowledge	444	0.59	56	Financial	9	Knowledge	198	0.2
22	Developing	10	Skill	437	0.44	57	Investment	10	Knowledge	196	0.2
23	Change	6	Knowledge	436	0.60	58	Excellent	9	Multi Atts	188	0.2
24	Planning	8	Skill	433	0.44	59	Resources	9	Skill	183	0.2
25	Transformation	14	Knowledge	422	0.60	60	Continuous	10	Multi Atts	164	0.2
26	Marketing	9	Knowledge	398	0.58	61	Current	7	Multi Atts	162	0.1
27	Senior	6	Status	398	0.58	62	Applications	12	Knowledge	157	0.2
28	Security	8	Knowledge	380	0.27	63	Enable	6	Skill	157	0.2
29	Global	6	Knowledge	369	0.53	64	Relationships	13	Skill	151	0.2
30	Responsibilities	16	Multi Atts	342	0.49	65	Products	8	Knowledge	149	0.1
31	Solutions	9	Multi Atts	314	0.36	66	Drive	5	Behaviour	144	0.1
32	Partners	8	Multi Atts	308	0.45	67	Professional	12	Behaviour	137	0.1
33	Demonstrable	12	Behaviour	305	0.26	68	Budget	6	Multi Atts	123	0.1
34	Technical	9	Knowledge	304	0.21	69	Network	7	Behaviour	120	0.1
35	Knowledge	9	Knowledge	302	0.33	70	Proven	6	Multi Atts	119	0.1
						71	Portfolio	9	Knowledge	114	0.1

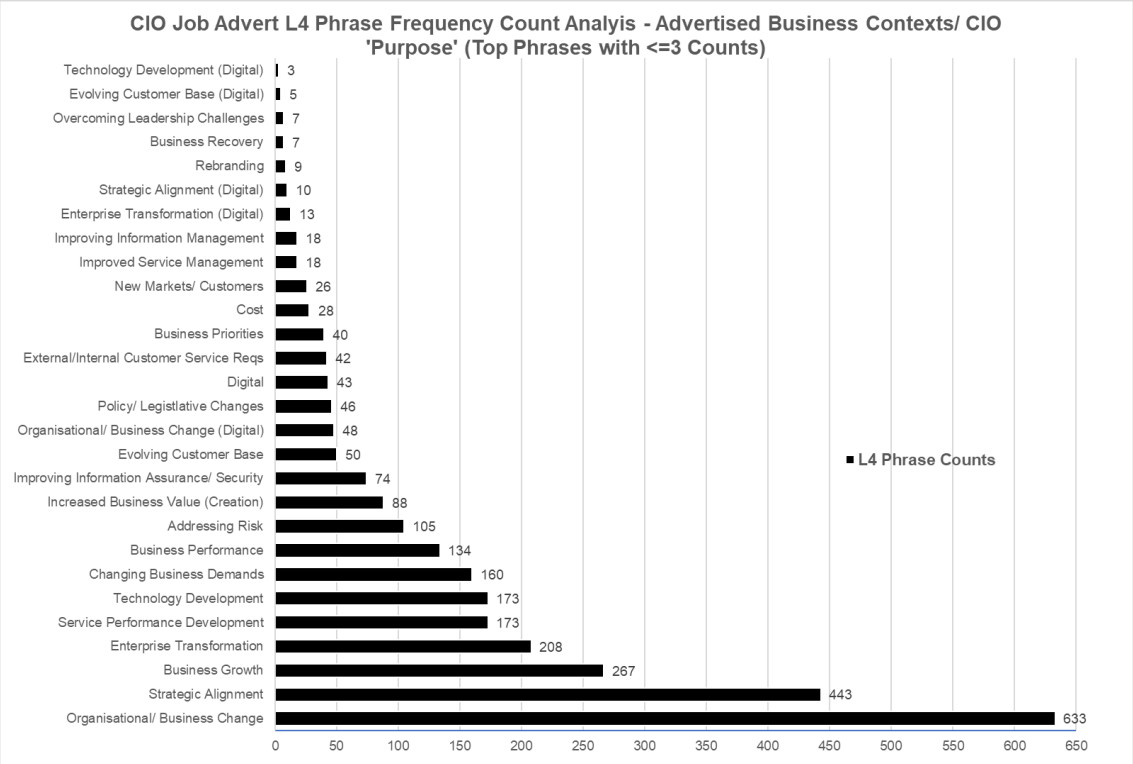
B.3 Example Tree Diagrams (Text Query ‘Knowledge’ and ‘Skills’) on Top 75 Words/ Min Length 5



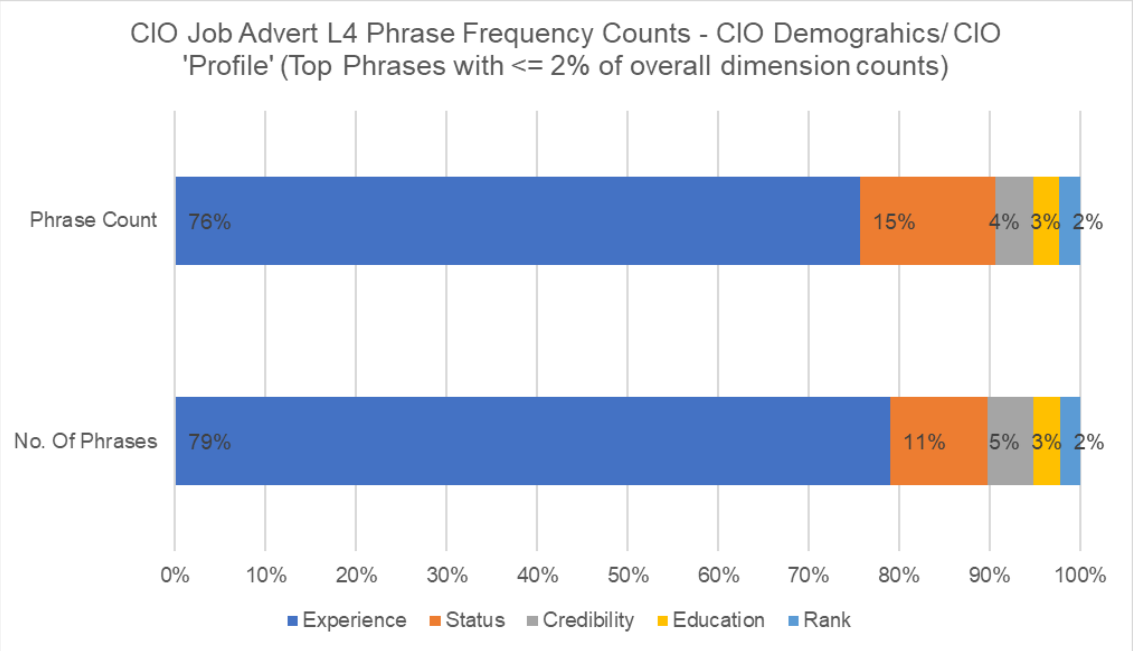
B.4 CIO Job Advert L2/ L2 Auto Code Results Summary

Auto-Code L_1	**# L_2**	**Most Frequently Occurring L_2**
Technology	278	1. Technology strategy 2. Emerging Technologies 3. Technological Platforms
Business	266	1. Business Growth 2. Business Processes 3. Business Continuity
Management	214	1. Project Management 2. Managing Relationships 3. Change Management
Services	190	1. Digital Services 2. Service Improvements 3. Service Delivery
Experience	186	1. Demonstrable Experience 2. Previous Experience 3. Extensive Experience
Teams	141	1. Development Teams 2. Leadership Team 3. Senior Management Team
Leader	107	1. Senior Leaders 2. Transformation Leader 3. Lead Member
Leadership	94	1. Senior Leadership 2. Exceptional Leadership Skills 3. Leadership Team
Delivery	90	1. Service Delivery 2. Regional Delivery Capabilities 3. Project Delivery
Strategy	89	1. Digital Strategy 2. Data Strategies 3. Technology Strategy
Customer	87	1. Customer Engagement 2. Outstanding Customer Service 3. Overall Customer Experience
Skills	87	1. Interpersonal Skills 2. Communication Skills 3. Management Skills
Project	85	1. Project Management 2. Multiple Projects 3. Critical Projects
Systems	80	1. Information Systems 2. Information Management Systems 3. Business Systems
Development	78	1. Development Teams 2. Development Planning 3. Developing Technology Transformation Strategies
Data	77	1. Data Strategies 2. Data Security 3. Data Management
Change	73	1. Transformational Change 2. Change Management 3. Organisational Change
Organisation	72	1. Complex Organisation 2. Similar Size Organisation 3. Financial Organisation
Level	70	1. Seniority Level 2. Board Level 3. Agreed Service Level Standards
Senior	70	1. Senior Stakeholders 2. Seniority Level 3. Senior Leadership
Processes	67	1. Business Processes 2. Management Processes 3. Process Improvements
Information	66	1. Information Systems 2. Information Security 3. Information Management Systems
Company	64	1. Company Name 2. Company Development 3. Companies Information Technology Services
Environment	62	1. Complex Environment 2. Financial Environment 3. Inclusive Work Environment
Transformation	61	1. Digital Transformation 2. Transformational Change 3. Transformational Leader
Key	60	1. Key Stakeholder 2. Key Responsibilities 3. Key Business Stakeholders
Plans	60	1. Strategic Planning 2. Development Planning 3. Excellent Planning
Opportunity	54	1. Exciting Opportunity 2. Outstanding Opportunity 3. Commercial Opportunities
Jobs	53	1. Similar Jobs People 2. Report Job 3. Original Job
Stakeholder	51	1. Key Stakeholders 2. Senior Stakeholders 3. External Stakeholders

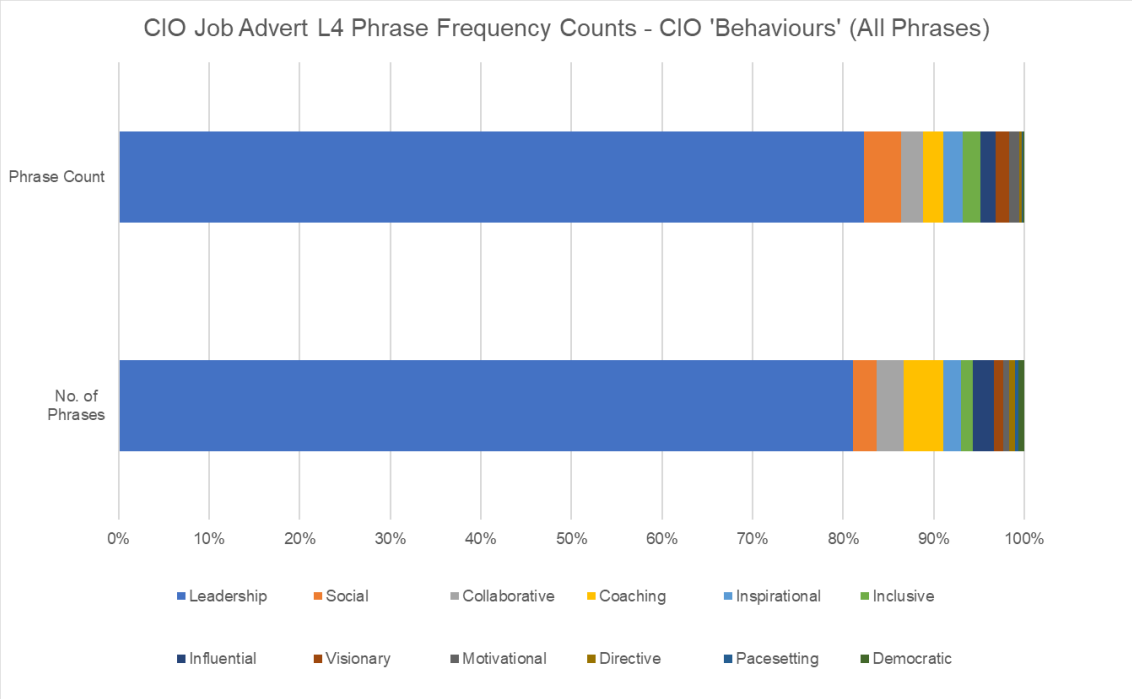
B.5 CIO Job Advert L4 Phrase Frequency Counts – Business Context/ CIO 'Purpose'



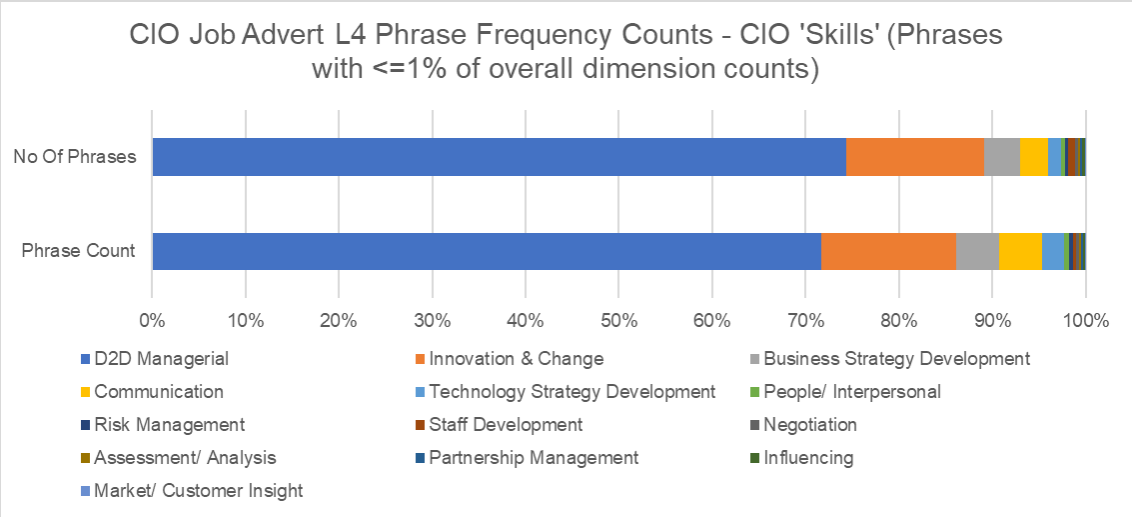
B.6 CIO Job Advert L4 Phrase Counts – CIO Demographics/ CIO 'Profile'



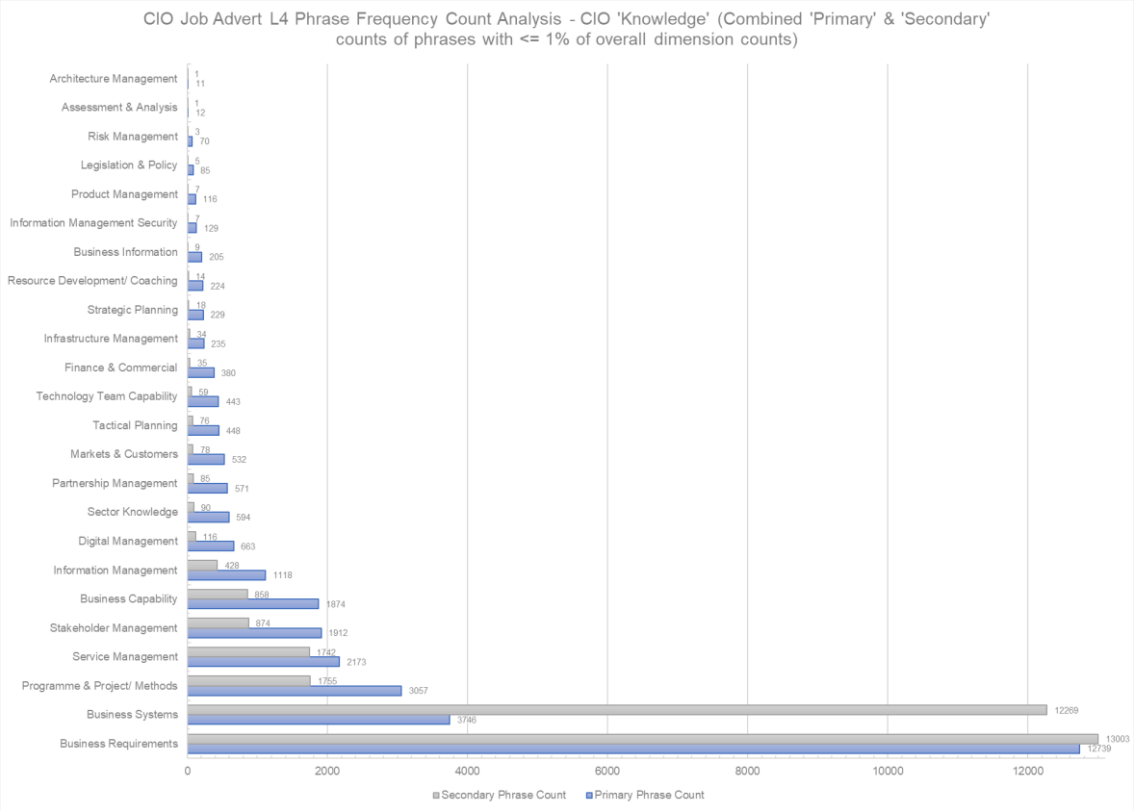
B.7 CIO Job Advert L4 Phrase Counts – CIO ‘Behaviours’



B.8 CIO Job Advert L4 Phrase Counts – CIO ‘Skills’



B.9 CIO Job Advert L4 Phrase Counts – ‘Knowledge’ (Primary/ Secondary combine counts)



Appendix C Expectations Survey

C.1 Survey – Volunteer Email/Message

Hi X -

Thank you again for agreeing to issue the two CIO effectiveness surveys.

The research, the core of a PhD at Cranfield University, aims to improve our understanding of (i) the ongoing relevance of the Chief Information Officer (CIO) in response to the rise of digital technologies (ii) how CIOs may need to adapt to this newly emerging and fast changing environment and (iii) what personal attributes they can apply/ enhance to achieve/ maintain their effectiveness (e.g., their skills, etc.).

These two surveys have been designed to collect data on these personal attributes from two perspectives i.e., practising CIOs and individuals who have experience of working closely with CIOs in a variety of positions. This second group – which I call CIO Associates - is likely to include:

- Line Managers of CIOs (potentially CEOs or CFOs)
- Colleagues of CIOs, likely to be members of the 'top management team ' (or the TMT, CFO, CDO, CMO, COO, etc.)
- Direct subordinates of CIOs (e.g., IT Directors)
- CIO recruitment specialists and
- CIO coaches and/or mentors

By comparing these multiple perspectives against the CIOs own view of their role, we aim to make recommendations as to how CIOs and their associates (i.e., the group listed above) can adjust their behaviours to harmonise expectations and improve overall CIO role effectiveness.

The links to the two surveys below will take the respondents to a questionnaire designed in Qualtrics. The questionaries are anonymous (i.e., we do not ask for attributable personal data) but respondents (including yourselves) have an option at the end of the survey to request additional information if they choose to provide their contact details.

In terms of security, the responses will remain in the Cranfield environment until they are downloaded and analysed using a variety of statistical tools, again hosted by Cranfield. The researcher (i.e., me) will be the only person with access to this data until it eventually forms part of the research thesis due for submission in January 2022. After this date, it is likely that the analysis and (anonymised) results will form part of a subsequent academic publication.

Ideally, and if practically achievable, I hope to collate data from a wide spectrum of respondents (i.e., multi-country, industry types, organisational size, etc.). However, the volume, spread of data received will inform the focus of the subsequent analysis.

My 'deadline' for starting analysis of this data is 30th September i.e., it's unlikely I can process responses received after that date.

Finally, this request for survey completion will go out to a variety of stakeholders in the above groups, including other organisations and to individuals. The current intention is to also publicise this survey through LinkedIn (including a variety of groups).

The links to the two different surveys are:

CIO Practitioners

Associates of CIOs

If you are able to issue the survey, and only if practical, if would be very useful to know (i) how the survey was issued and (ii) whom it was issued to (iii) when it was issued.

Should you have any questions about the above please do not hesitate to contact me at this email address.

Thanks in advance –

David J. Harding

C.2 Survey - Chief Information Officer Version

Note: This Questionnaire is in Intended for those who have WORKED AS A PRACTISING CIO (OR Equivalent)

Alternatively, if you have worked closely with CIOs (irrespective of role) please request access to the alternative questionnaire

Informed Consent

Research Title: Chief Information Officer Effectiveness

Name of the researcher: David Harding

Researcher's contact details:

Email: xxxxx@cranfield.ac.uk

Mobile: xxxxxxxxxx

Date: July 2022

Research Outline: This survey has been designed to collect data on aspects of the role of Chief Information Officers. The research aims to analyse this data to draw conclusions about differing perspectives on 'attributes' (i.e., skills, knowledge, behaviours, etc.) for the CIOs role; this could suggest how CIO roles may need to evolve in order to remain effective when tackling the challenges and opportunities presented by digital technologies.

Consent to Participate: To maintain research standards, and to comply with Cranfield University's codes of practice and ethics, we need your permission to use the data you provide for inclusion in this study. As such, we

would like to ask you to read the following the statements carefully before providing your consent to take part in the survey.

Part 2: Request consent to participate and note the ability to withdraw

2. I confirm that I have been informed about this research project and I agree to take part.

2.. I understand that any personal information I provide will be treated with confidence and my name will not be used in any report, publication, or presentation.

3. Whilst my name/email address maybe an initial identifier, the researcher will use a unique participant number following successful completion of the survey. The researcher(s) will record data against my participant number instead of recording my name/email. The file linking my name to my participant number will be accessible only to the main researchers, and will be securely destroyed after December 22nd, 2022

4. I understand that I can withdraw from this project at any stage by informing the researcher, for whom contact details have been provided. I also understand that I can withdraw my data for a period of up to 28 days from today, as after this time it will not be possible to identify my individual data from the aggregated results as explained above.

Part 2: Confirm the security of data storage.

5. I understand that the data I provide will be used by Cranfield University for the purpose of research. The data will be stored on the University's network that

can only be accessed by authorised users, in line with UK Data Protection Act 2028.

Part 3: List datasets being created and what will happen to each

6. I understand that this survey will be administered via this online tool (Qualtrics).

7. The researcher can only access this tool through a Cranfield University portal, using a unique account identifier.

8. Competed survey data will be downloaded from this online application to a dedicated, protected area on Cranfield's secure network, which only the researcher has access to.

9. All data will be fully anonymised by the researcher and once anonymised, it will be included in analysis for inclusion in the study.

20. All data (and any backups) will also be securely deleted as soon as they are no longer required

22. Anonymised data will be created, by removing or replacing identifiers such as name, age, and location. This anonymised data may be quoted from or published in full, in support of findings (e.g., in journal articles, conference papers).

☐ I understand that the aggregated data will be published in support of the research findings

☐ I confirm that I have read and understand the information provided on this form and give my consent to taking part in this research

Section H2

Tell us a little about you...

D2 Are you working as a CIO (or equivalent) at the moment?

- ○ Yes
- ○ No

D2 In which country/region do you have most experience of working as a CIO?

- ○ UK
- ○ Western Europe
- ○ Central/ Eastern Europe
- ○ Southern Asia
- ○ East Asia
- ○ Africa
- ○ Mediterranean & Middle East
- ○ North America
- ○ South America
- ○ Global

D3 For how many years have you worked as a CIO?

- ○ 2-3
- ○ 4-6
- ○ 7-20
- ○ 20+

D4 As a CIO, on average how many years did you remain in each position?

- ○ <2
- ○ 2-2
- ○ 2-3
- ○ 3-5
- ○ 5+

D5 Throughout this period, how many years' experience do you have of working with digital products/ services?

- ○ 2-3
- ○ 4-6
- ○ 7-20
- ○ 20+

D6 In which ONE of the following sectors have you had **most** experience of working as a CIO?

- ○ Mining
- ○ Oil
- ○ Gas
- ○ Chemicals
- ○ Construction
- ○ Government
- ○ Agriculture
- ○ Utilities
- ○ Real Estate
- ○ Education
- ○ Food Services
- ○ Manufacturing
- ○ Healthcare
- ○ Transportation
- ○ ICT & Media
- ○ Retail
- ○ Banking

- ○ Insurance
- ○ Professional Services
- ○ Other

D7 If Other, please describe:

_____

D8 As a CIO, which one of the following do you generally report into?

- ○ Chief Executive Officer (CEO)
- ○ Chief Financial Officer (CFO)
- ○ Chief Digital Officer (CDO)
- ○ Chief Marketing Officer (CMO)
- ○ Other

D9 If Other, please describe:

_____

D20 As a CIO, what size of IT budget have you typically been responsible for?

- ○ Up to £2m
- ○ £2m-£20m
- ○ £22m-£25m
- ○ £26m-£50m
- ○ £52m-£99m
- ○ £200m-£249m
- ○ £250m-£499m
- ○ £500m-£2bn
- ○ £2bn+

D22 As a CIO, how many direct reports have you typically been responsible for?

- ○ 0-50
- ○ 52-200
- ○ 202-250
- ○ 252-500
- ○ 502-2000
- ○ 2002-5000
- ○ 5000+

D23 Select your highest level of academic qualification:

- ○ Doctorate
- ○ Masters
- ○ Bachelors
- ○ HND/ Equiv.
- ○ A-Level/ Equiv.

D24 For this academic qualification, which subject did you major in?

- ○ Engineering & Technology
- ○ Accounting & Finance
- ○ Business & Management Studies
- ○ Computer Science & Information Systems
- ○ Other

D25 If Other, please describe:

_____

D26 As a CIO, what relevant professional qualifications have you gained?

- [ ] Information Security (e.g., CISSP, CISM, CGEIT)
- [ ] Networks (e.g., CompTIA, Cisco)
- [ ] Governance/Management (e.g., COBIT 5)
- [ ] IT Services (e.g., ITIL)
- [ ] Microsoft (e.g., MCSE)
- [ ] Project Management (e.g., PMI-ACP, PMP)
- [ ] Architectures (e.g., TOGAF 9)
- [ ] Cloud (e.g., AWS, Azure)
- [ ] CRM/ ERP (e.g., Salesforce, ServiceNow, SAP, etc.)
- [ ] Other?

D27 If Other, please describe:

_____

D28 What is your gender?

- ○ Male
- ○ Female
- ○ Non-Binary
- ○ Prefer not to say

D29 How old are you?

- ○ 20-29
- ○ 30-39
- ○ 40-49
- ○ 50+

Section H2

Ways of Working

In the following section, we ask you to consider those activities that you have found/ find MOST effective when fulfilling your role. We recognise that many CIOs have developed their capabilities by operating across a broad-spectrum environments. We would therefore invite you to consider the most recent or most typical scenario you have worked in as you complete this questionnaire.

SC2

Which ONE of the following scenarios best describes the focus of the most

recent/ typical business technology strategy you have worked with? Where the organisation sought to...

- ○ Establish in house IT Services that react to business requirements
- ○ Continuously reduce the costs of inhouse IT Services that are driven by business requirements
- ○ Establish in house/ outsourced IT Services that react to business and customer requirements
- ○ Establish in house IT Services that predict/ address business requirements
- ○ Establish in house/ outsourced IT Services that predict/ address business and customer requirements

---

SC2 How would you describe the organisational culture of that scenario? The majority of employees...

- ○ Felt as empowered as the leadership team
- ○ Preferred to work in teams rather than individually
- ○ Preferred structure and certainty rather than ambiguity and uncertainty
- ○ Aggressively pursued individual recognition and award rather than cooperating for the greater good
- ○ Preferred to change and adapt rather than stand-still
- ○ Were encouraged to develop and fulfil their own goals rather than being told what to do

---

B0 In this scenario, which one of the following helped you be most effective? When you were focusing on...

- ○ Relatively technical tasks
- ○ Relatively non-technical tasks
- ○ Effective working relationships
- ○ Continuous improvements and change
- ○ Developing/ disseminating knowledge

S2 Which one of the following tasks made you most effective in this scenario?

- ○ Setting long term objectives and planning multi-year activities and resources needed to meet them
- ○ Setting annual objectives and planning activities and resources needed to meet them
- ○ Explaining what needs to be done, how to do it and what results are expected
- ○ Assessing whether work is being done according to plan
- ○ Identifying the causes of problems and providing direction to resources on how to cope with them

---

S2 And when developing working relationships, which one of the following did you find most effective?

- ○ Showing positive regard to help and encourage people cope with stressful situations
- ○ Increasing people's confidence and capabilities to facilitate career advancement
- ○ Praising and rewarding people for effective performance or making significant contributions
- ○ Giving people more autonomy to influence or make decisions about their work
- ○ Exchanging specialist knowledge and information to engender synergistic, collaborative relationships

---

S3 When dealing with change in this scenario, which one of the following was most effective?

- ○ Influencing people to accept the need for change
- ○ Articulating an inspiring and motivating vision of what's attainable
- ○ Creating a climate of safety and mutual trust to encourage suggestions of new/novel ideas
- ○ Facilitating collective learning from both successes and failures
- ○ Actively facilitating changes relating to IT systems

S4 And finally in this Ways of Working section, for your scenario, which one of the following did you find most effective?

- ○ Exchanging information, identifying resources, and gaining support by networking with peers
- ○ Identifying and analysing information from Competitors to identify opportunities and threats
- ○ Representing your team/ organisation to superiors and peers
- ○ Interacting with Customers to develop insights for developing new products and services
- ○ Interacting with 3rd party providers to develop insights for developing new products and services

---

Section H3

What you Know

In this next section we are looking to understand, of the knowledge you have developed over your career, what has proved to be most important in helping you to be effective in your role. As before, please continue to consider the most recent/ typical scenario you have worked in when answering these questions.

H4 Working with Stakeholders

K2 In your scenario, which one of the following was most important to know about?
Levels of...

- ○ Customer (dis)satisfaction with IT
- ○ Business Leader (dis)satisfaction with IT
- ○ Business Manager (dis)satisfaction with IT
- ○ IT Manager (dis)satisfaction with IT
- ○ Incumbent 3rd Party (dis)satisfaction with IT

K2 In terms of aspirations, the most important thing to know most about were the aspirations of...

- ○ Customers
- ○ Business Leaders
- ○ Business Managers
- ○ IT Managers
- ○ Incumbent 3rd Party IT Providers

K3

It was most important to know about the IT skills gap in...

- IT
- ...and incumbent 3rd Party IT Providers
- ...and Business Operators and Managers
- ...and Business Leaders
- ...and Customer(s)

K4

It was most important to know about the IT knowledge gap in...

- IT
- ...and incumbent 3rd Party IT Providers
- ...and Business Operators and Managers
- ...and Business Leaders
- ...and Customer(s)

K5 When you formalised agreements with stakeholders, you found it most important to know about formalising/ managing agreements with...

- ○ Direct reports (e.g., personal development plans, etc.)
- ○ 3rd party IT providers (e.g., legally binding contracts)
- ○ Business Managers (e.g., service levels)
- ○ Business Leaders (e.g., meeting strategic objectives)
- ○ Customers (e.g., service provision)

H5 Business Operations

K6 To be effective in your scenario, which one of the following was it most important to know most about?
The organisations...

- ○ Digital Customer Strategy
- ○ Digital Business Strategy
- ○ Information Systems Strategy
- ○ Degree of alignment between Business & IT Strategy's
- ○ Degree of alignment between Business Strategy & IT Plan(s)

K7

I found that it was most important to know most about the requirements and priorities of...

- ○ Regulatory Authorities
- ○ Customers
- ○ Business Leaders & Managers
- ○ Inhouse IT Managers
- ○ 3rd Party IT Providers

K8 Typically, to be effective, I found that I needed to know most about the expectations of…

- ○ External Auditors and their Powers to penalise
- ○ Customer and their operational capabilities
- ○ Business Leaders/ Managers and their operational capabilities
- ○ Inhouse IT and their operational capabilities
- ○ 3rd Party IT Providers and their operational capabilities

---

K9 In terms of business products and services, it’s been important to know most about...

- ○ Risks associated with the businesses supply chain
- ○ Capabilities of Competitor(s) to the Business
- ○ The threat of new/ alternative business products/ services entering the marketplace
- ○ Ongoing relevance of current business products/ services to customers
- ○ Ongoing relevance of current business products/ services in meeting business objectives

---

K20 When creating value from data, I found that I needed to know most about the cost/ benefit of...

- ○ improving the quality of current business data
- ○ ...and creating, storing, and providing controlled access to quality data created by the business
- ○ …and creating, storing, and providing controlled access to quality data created by 3rd parties
- ○ …and automatically generating and disseminating real-time insights about business performance
- ○ …and automatically generating and disseminating real-time insights about external trends

---

H6 IT Operations

K22 In your most recent/ typical scenario, when considering IT Operations, which did you need to know most about?

- ○ IT Performance Management
- ○ ...and IT Change Management
- ○ ...and IT Operational Design
- ○ ...and IT Resources Planning
- ○ ...and IT Operations Strategy

K22

Again, in your most recent/ typical scenario, when considering IT Products and Applications, which did you need to know most about?
IT Products and Applications...

- ○ provided by IT
- ○ ...and provided by (incumbent) 3rd Party Providers
- ○ ...and used by the Business
- ○ ...and used by Business' Customers
- ○ ...and used by Business' Competitors

K23

And for IT services, which one of the following did you need to know MOST

about?
IT Services...

- provided by IT
- ...and those provided by (incumbent) 3rd Party Providers
- ...and those used by the Business
- ...and IT Services used by Business' Customers
- ...and IT Services used by Business' Competitors

K24 For IT Infrastructures, what was important to know most about? About IT Infrastructures...

- provided by IT
- ...and those provided by (current) 3rd Party Providers
- ...and those used by the Business
- ...and IT Infrastructures used by Business' Customers
- ...and IT Infrastructures used by Business' Competitors

K25 Finally, in this knowledge section, when you dealt with major changes, which one of the following did you need to know most about?

- ○ Sponsoring Portfolios of Programmes and Projects
- ○ Sponsoring Programmes
- ○ Managing IT Projects mostly impacting Customers
- ○ Managing IT Projects mostly impacting the Business
- ○ Managing IT Projects mostly impacting IT

Section H7 Looking to the Future

Personal Development: In this final section, we have just a few questions about personal development. This will help us understand your options and motivations for remaining effective in your role.

K26 I mostly like to learn about…

- ○ More effective Data Management
- ○ Improving Business Performance
- ○ IT Products and Applications
- ○ IT Infrastructure and Networks
- ○ Customer needs and trends

K27 In order to learn and develop new capabilities, I mostly interact with…

- ○ Inhouse IT Managers and Teams
- ○ IT Vendors/ 3rd Party IT Provider Specialists
- ○ Business Managers and Leaders
- ○ Customers
- ○ External peer network(s)
- ○ Other?

K27a If Other, please explain:

_____

PD2 Which personal performance metric is most important? The fulfilment of pre-agreed…

- ○ long term (multi-year) strategy
- ○ in-year improvements in business performance
- ○ new capabilities being delivered on time/ on cost
- ○ in-year improvements in IT performance
- ○ new capabilities generating planned, tangible benefits

PD2 What motivates you most?

- ○ Achieving Personal Development Goals
- ○ Achieving Personal Financial Goals
- ○ Recognition from the Top Management Team
- ○ Recognition from Customers
- ○ Recognition from your (external) Peers

PD3 What do you think is most important in helping you fulfil your ambitions?

- ○ Staying on top of latest developments in IT
- ○ Actively seeking constructive feedback to become more effective in current role
- ○ Having more in-work opportunities to apply your current knowledge
- ○ Changing employer on a regular basis/ every few years
- ○ Changing current reporting line

PD4 What type of additional certifications/ qualifications do think you need to become more effective in the CIO role?

- ☐ Professional
- ☐ Academic

PD5 Please briefly explain your answer above:

_____

NS2 Thank you for taking the time to complete this survey. Your answers will be processed in the strictest confidence and make a significant contribution to this research. In token of my appreciation I would like to ask:

☐ Would you be interested in being amongst the first to receive a copy of the anonymised survey results?

☐ Would you be interested in being amongst the first to receive a copy of the research once it is finalised?

☐ Would you be interested in a short, free consultation regarding your answers and/or your current position?

NS2 To receive any of the above, please enter your Full Name, Job Title AND preferred email address here:

○ First Name/ Surname Name_____

○ Job Title _____

○ Email Address _____

Sig Thank you again, Best Regards,
David J. Harding

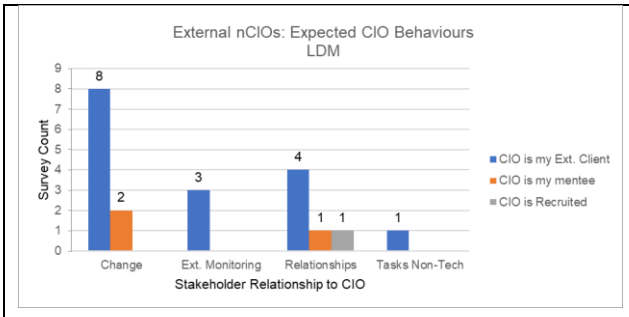
C.3 CIO LinkedIn Groups

LinkedIn Group:	No. of Members
APM PMOSIG	4029
BCS IT Leaders Forum	2669
Bedfordshire/Luton/Hertfordshire & Buckinghamshire Business	992
BUSINESS AGILITY & AGILE TRANSFORMATION – Leaders Group	7255
Capgemini Alumni Network	27396
CDO/CIO/CTO Leadership Council	32204
Chief Digital Officer | ChiefDigitalOfficer.net	4963
Chief Information Officer (CIO) Network | Technology I Jobs	247725
CIO Committee	2202
CIO Exchange - CIO, CTO, CISO, CDO, CAO	7085
CIO Forum	80923
Cranfield CIM > EI > KM > ESI > M&IS	87
Cranfield School of Management Official Alumni Network	6202
Cranfield University Official Alumni Network	5234
Education Management Professionals	97080
Ernst & Young Employees and Alumni	60877
EY UK&I Supply Chain & Operations Alumni	80
Harvard Business Review Discussion Group	2275954

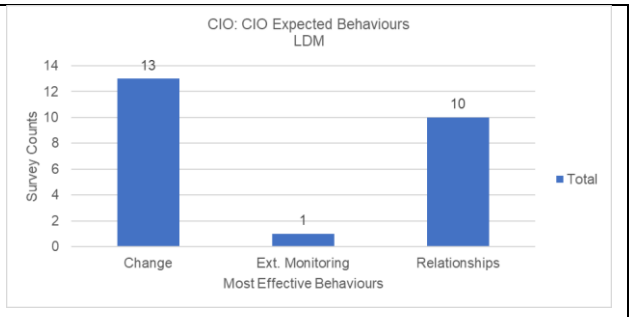
LinkedIn Group:	**No. of Members**
High-Risk Gateway RTMs & RTLs & DACs	234
IT & Operations Transformation	8725
IT Leadership ▶ Cloud Operations | DevOps | Security & Compliance | Engineering | Automation | RPA	247553
Leadership & Leadership Development	53246
Leadership Think Tank	422392
MSP Practitioners	4539
Non-Executive Directors' Association	3722
Strategy & Transformation Professionals Network	6628
The Global CIO & Executive IT Group (An MIT Sloan CIO Group)	6427
The Institution of Engineering and Technology (IET)	58605
University of Bedfordshire Business School	2822
Warwick Business School – University of Warwick	27652
Total Members (Aug' 2022)	3493248

C.4 Detailed Survey Results

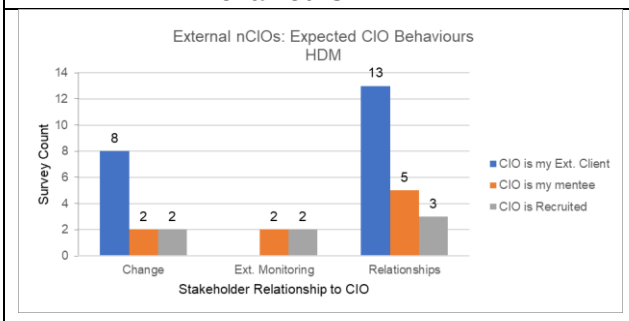
C.4.1 H1 - CIO Behaviours



H1a. External nCIO expectations on CIO Behaviours in LDM

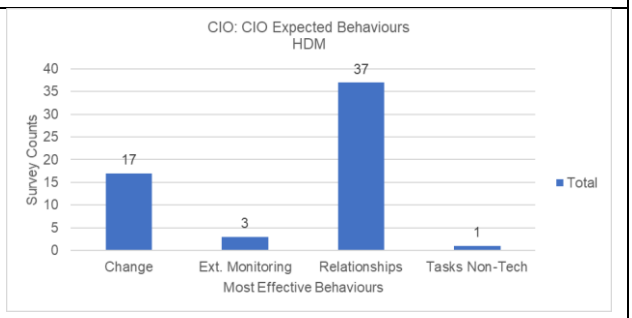


H1a/ H1c. CIO expectations on CIO Behaviours in LDM

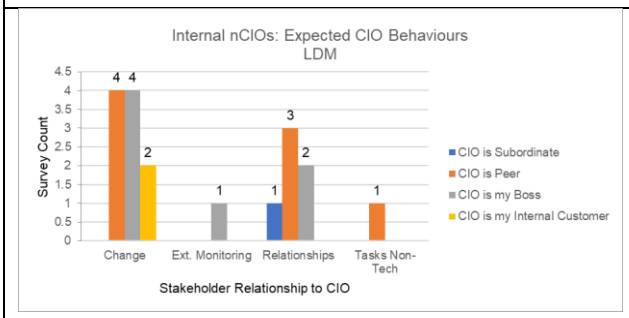


H1b. External nCIO expectations on CIO Behaviours in HDM

H1c. Internal nCIO expectations on CIO Behaviours in LDM

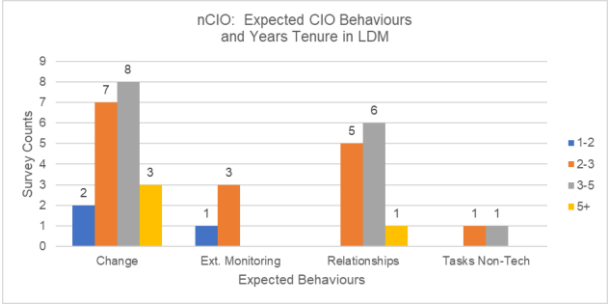


H1b/ H1d. CIO expectations on CIO Behaviours in HDM

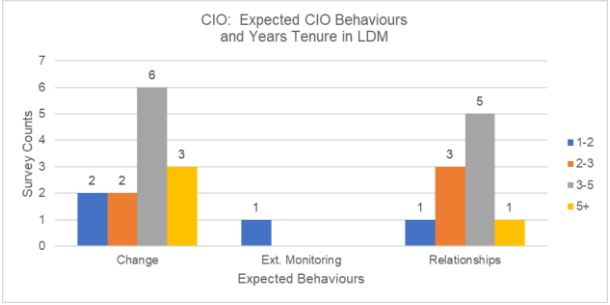


H1d. Internal nCIO expectations on CIO Behaviours in HDM

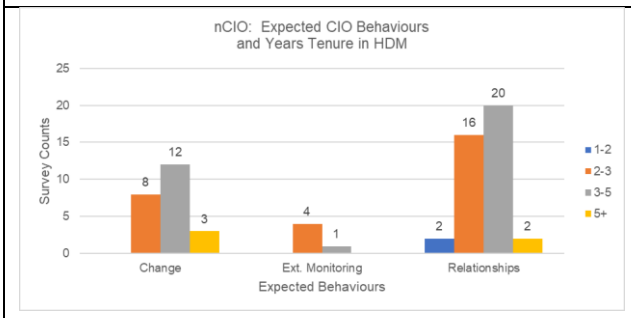
C.4.2 H2 - CIO Behaviours & Personal Attributes



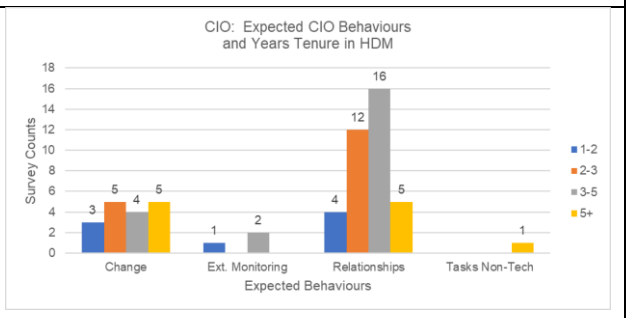
H2a. nCIO expectations on CIO Tenure in LDM



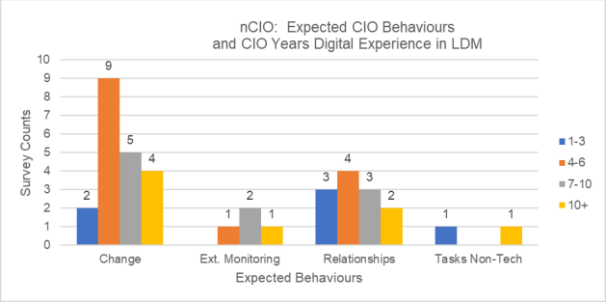
H2a. CIO expectations on CIO Tenure In LDM



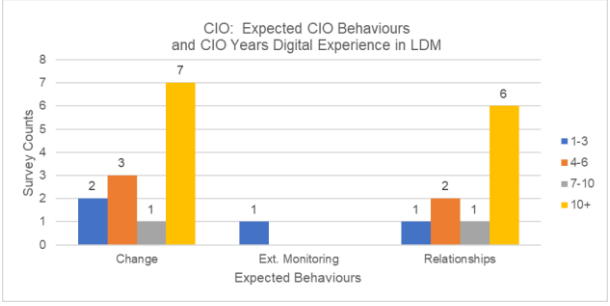
H2b. nCIO expectations on CIO Tenure in HDM



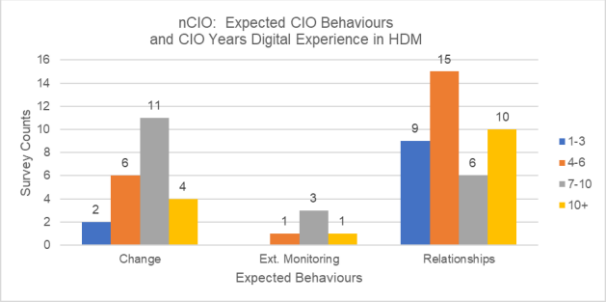
H2b. CIO expectations on CIO Tenure In HDM



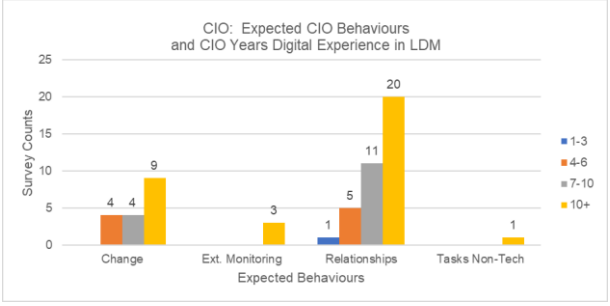
H2c. nCIO expectations on CIO Dig Exp in LDM



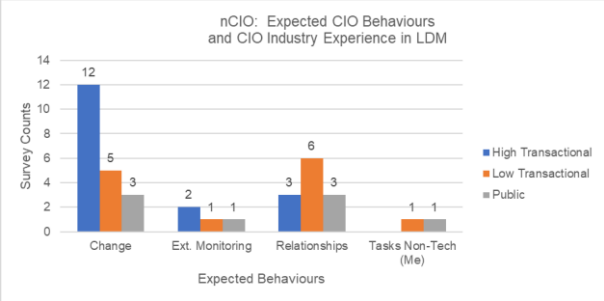
H2c. CIO expectations on CIO Dig Exp in LDM



H2d. nCIO expectations on CIO Dig Exp in HDM

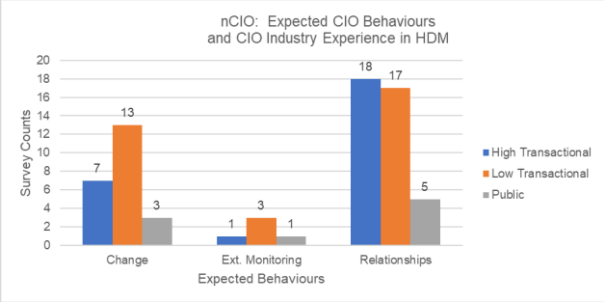


H2d. CIO expectations on CIO Dig Exp in HDM

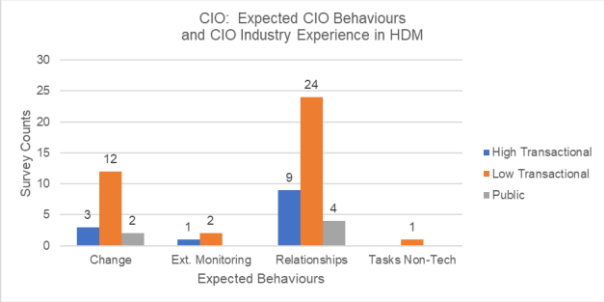


H2e. nCIO expectations on CIO Behaviours by Industry Experience in LDM

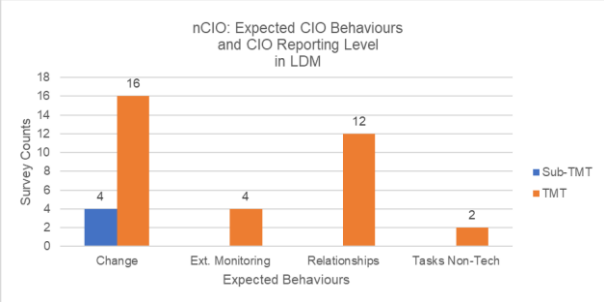
H2e. CIO expectations on CIO Behaviours by Industry Experience in LDM



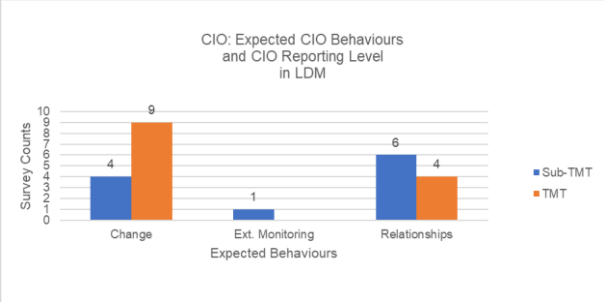
H2f. nCIO expectations on CIO Behaviours by Industry Experience in HDM



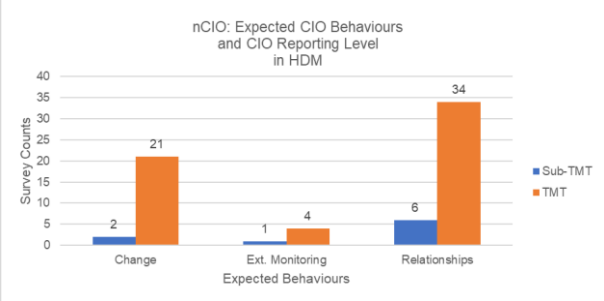
H2f. CIO expectations on CIO Behaviours by Industry Experience in HDM



H2g. nCIO expectations on CIO Behaviours by CIO Reporting Level in LDM

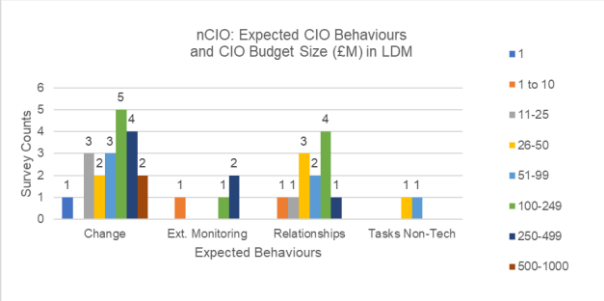


H2g. CIO expectations on CIO Behaviours by CIO Reporting Level in LDM

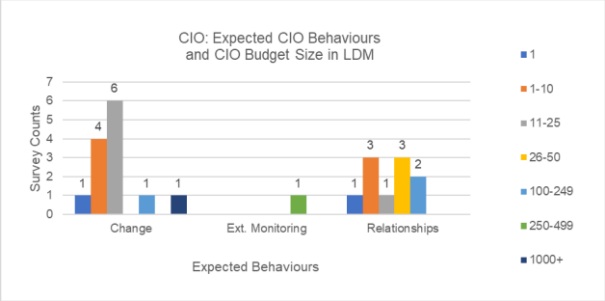


H2h. nCIO expectations on CIO Behaviours by CIO Reporting Level in HDM

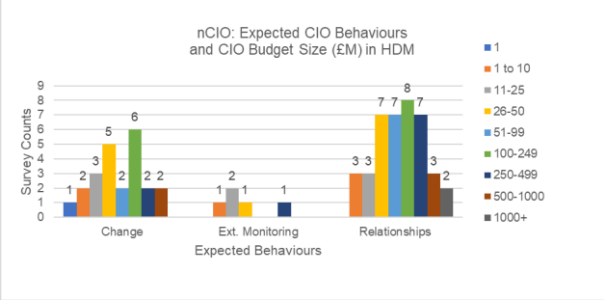
H2h. CIO expectations on CIO Behaviours by CIO Reporting Level in HDM



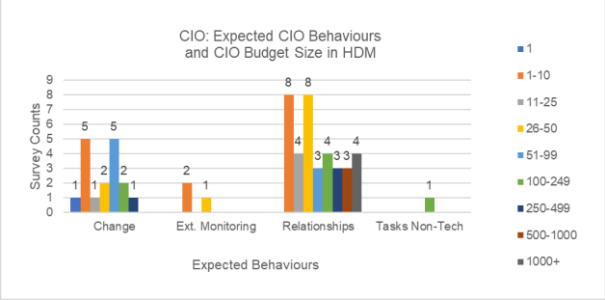
H2i. nCIO expectations on CIO Behaviours by CIO Budget in LDM



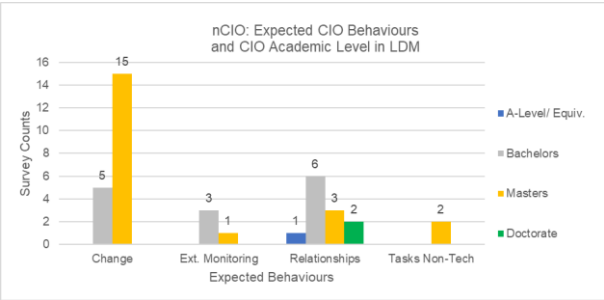
H2i. CIO expectations on CIO Behaviours by CIO Budget in LDM



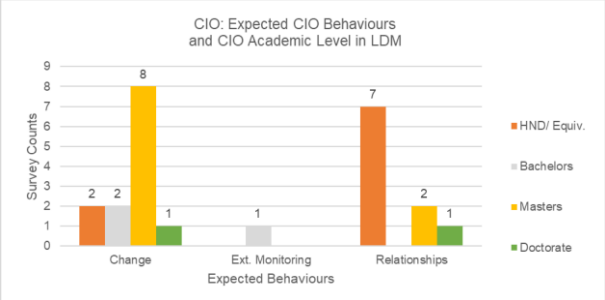
H2j. nCIO expectations on CIO Behaviours by CIO Budget in HDM



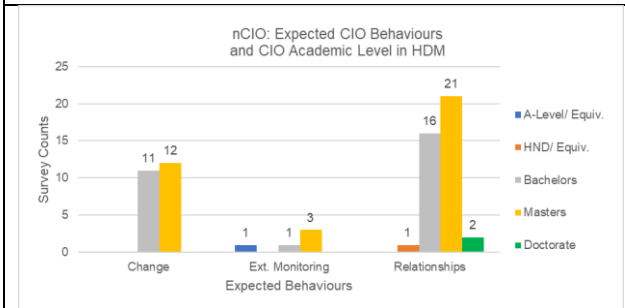
H2j. CIO expectations on CIO Behaviours by CIO Budget in HDM



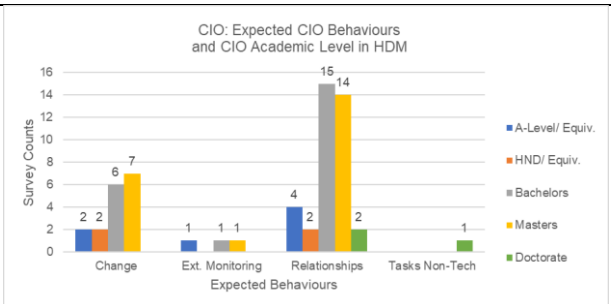
H2k. nCIO expectations on CIO Behaviours by CIO Academic level in LDM



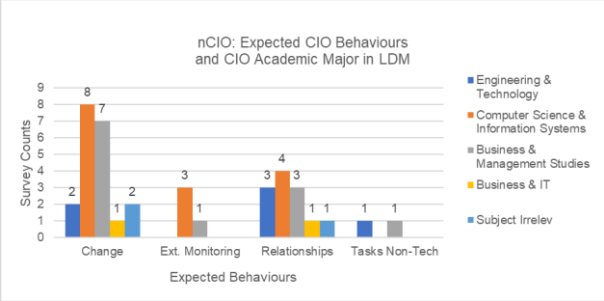
H2k. CIO expectations on CIO Behaviours by CIO Academic level in LDM



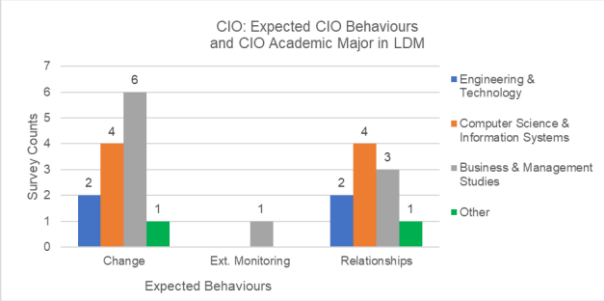
H2l. nCIO expectations on CIO Behaviours by CIO Academic level in HDM



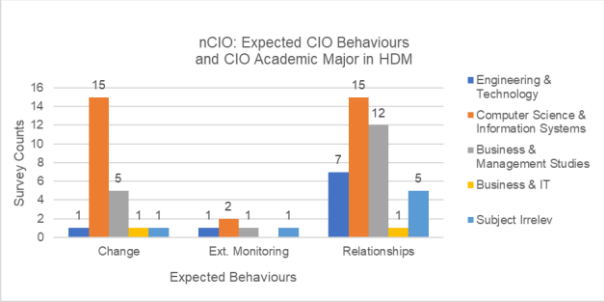
H2l. CIO expectations on CIO Behaviours by CIO Academic level in HDM



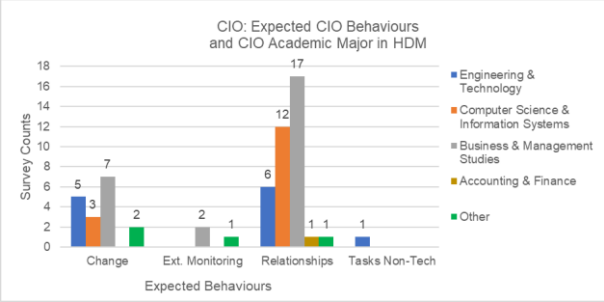
H2m. nCIO expectations on CIO Behaviours by CIO Academic Major in LDM



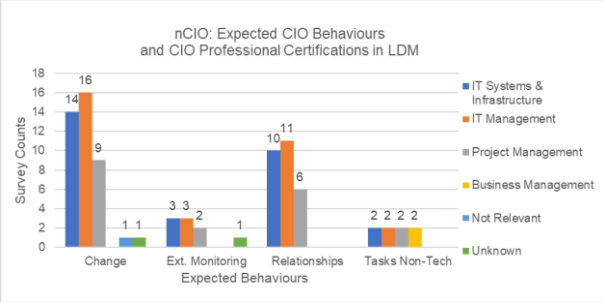
H2m. CIO expectations on CIO Behaviours by CIO Academic Major in LDM



H2n. nCIO expectations on CIO Behaviours by CIO Academic Major in HDM

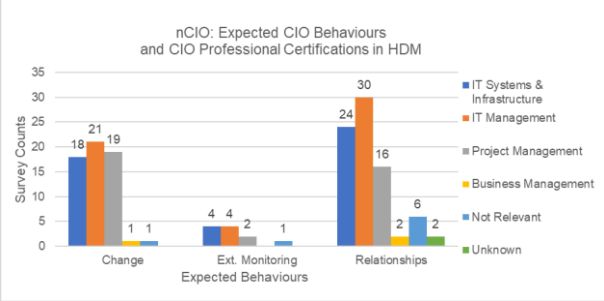


H2n. CIO expectations on CIO Behaviours by CIO Academic Major in HDM

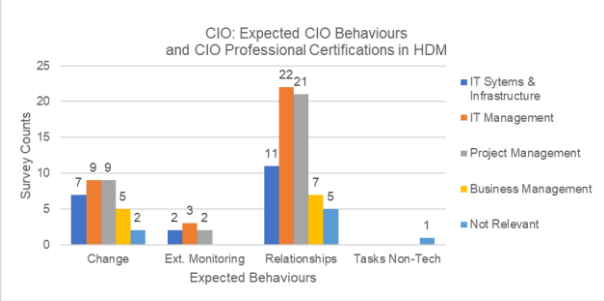


H2o. nCIO expectations on CIO Behaviours by CIO Professional Certification in LDM

H2o. CIO expectations on CIO Behaviours by CIO Professional Certification in LDM



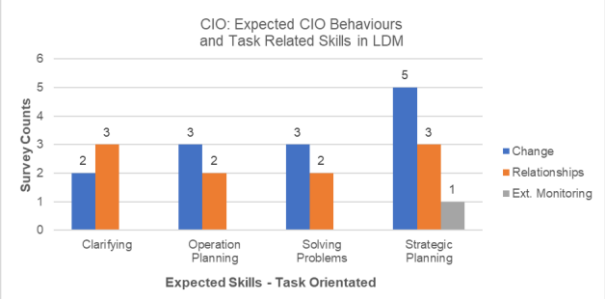
H2p. nCIO expectations on CIO Behaviours by CIO Professional Certification in HDM



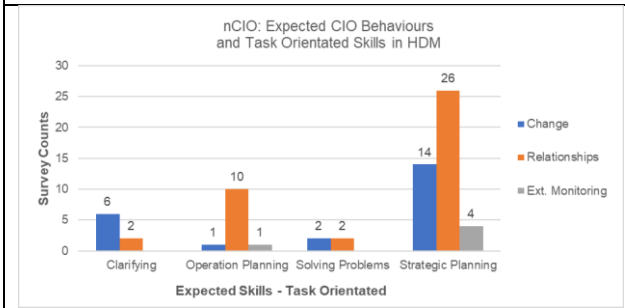
H2p. CIO expectations on CIO Behaviours by CIO Professional Certification in HDM

C.4.3 H3 - CIO Skills & Behaviours

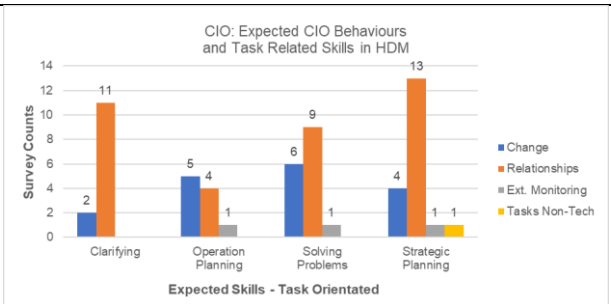
H3a. nCIO expectations of CIO Behaviours and Task Orientated Skills in LDM



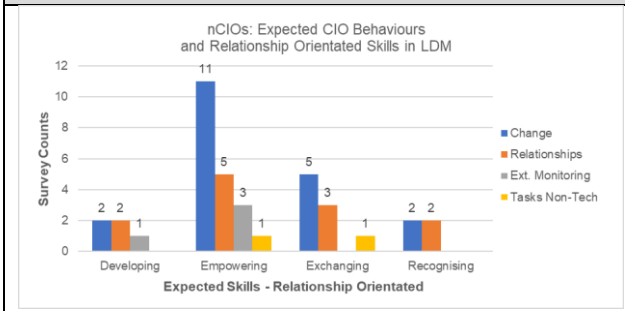
H3a. CIO expectations of CIO Behaviours and Task Orientated Skills in LDM



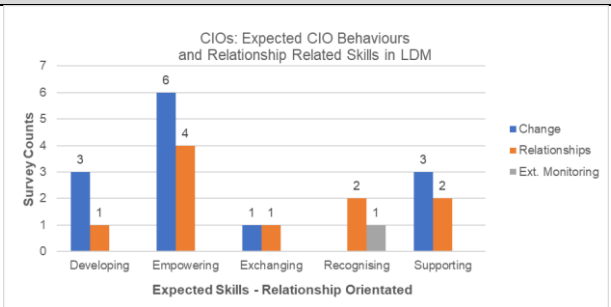
H3b. nCIO expectations of CIO Behaviours and Task Orientated Skills in HDM



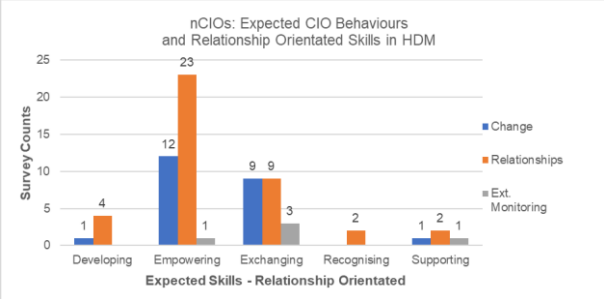
H3b. CIO expectations of CIO Behaviours and Task Orientated Skills in HDM



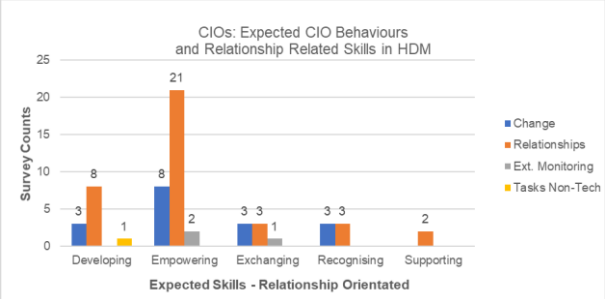
H3c. nCIO expectations of CIO Behaviours and Relationship Orientated Skills in LDM



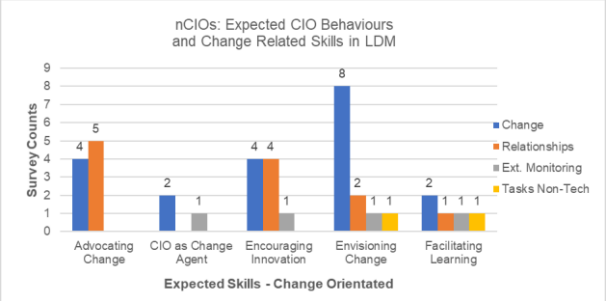
H3c. CIO expectations of CIO Behaviours and Relationship Orientated Skills in LDM



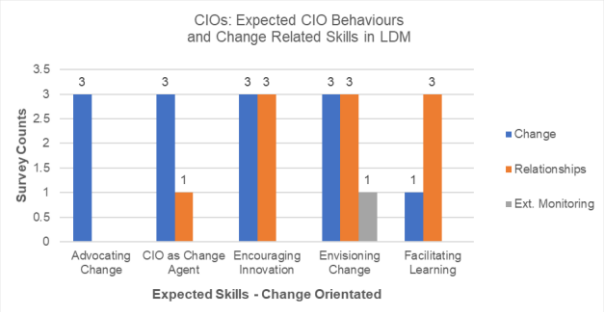
H3d. nCIO expectations of CIO Behaviours and Relationship Orientated Skills in HDM



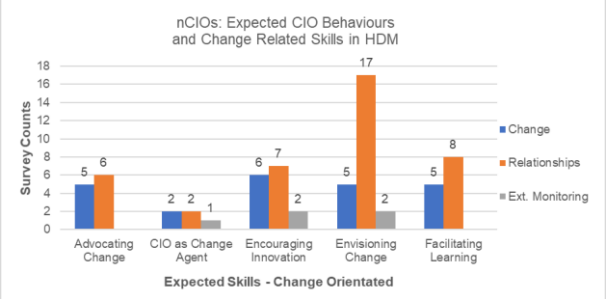
H3d. CIO expectations of CIO Behaviours and Relationship Orientated Skills in HDM



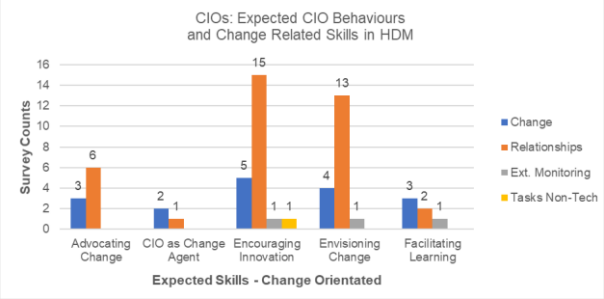
H3e. nCIO expectations of CIO Behaviours and Change Orientated Skills in LDM



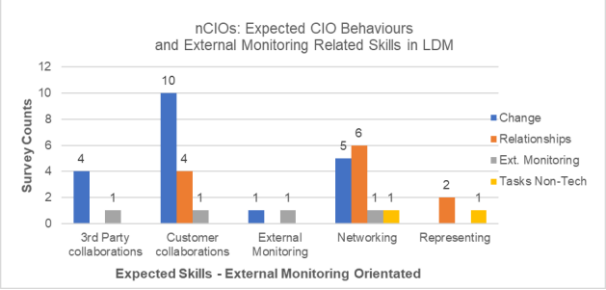
H3e. CIO expectations of CIO Behaviours and Change Orientated Skills in LDM



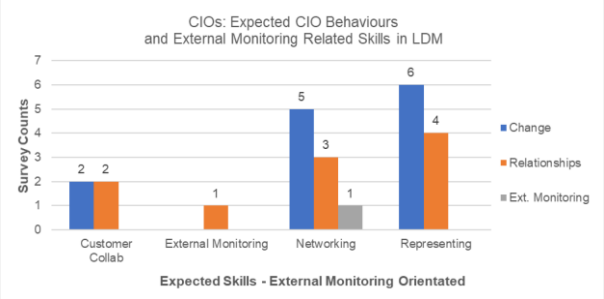
H3f. nCIO expectations of CIO Behaviours and Change Orientated Skills in HDM



H3f. CIO expectations of CIO Behaviours and Change Orientated Skills in HDM



H3g. nCIO expectations of CIO Behaviours and External Monitoring Orientated Skills in LDM



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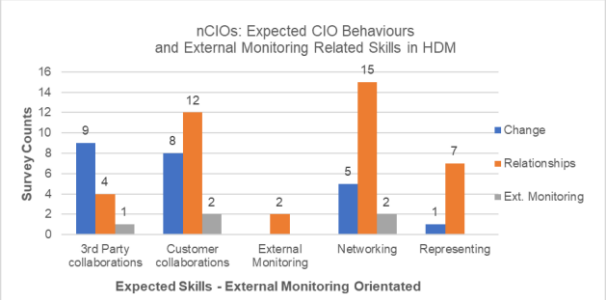
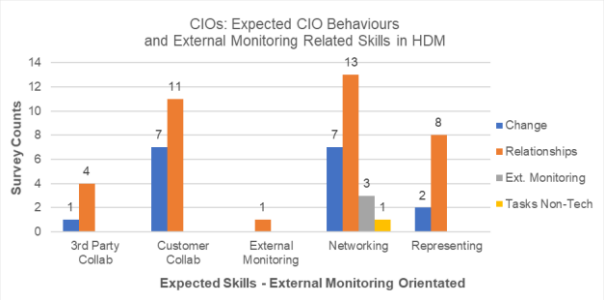
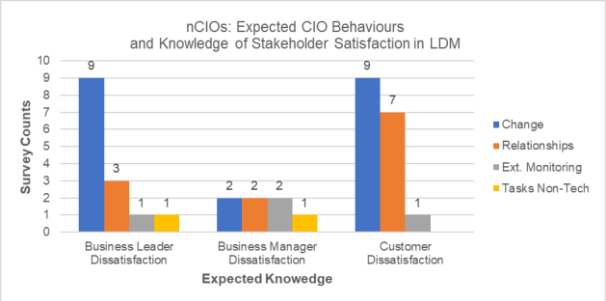


H3h. nCIO expectations of CIO Behaviours and External Monitoring Orientated Skills in HDM

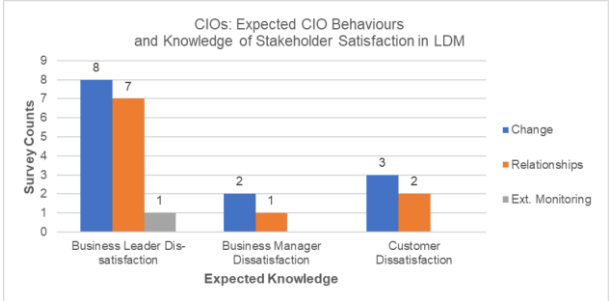


H3h. CIO expectations of CIO Behaviours and External Monitoring Orientated Skills in HDM

C.4.4 H4 - CIO Knowledge & Behaviours



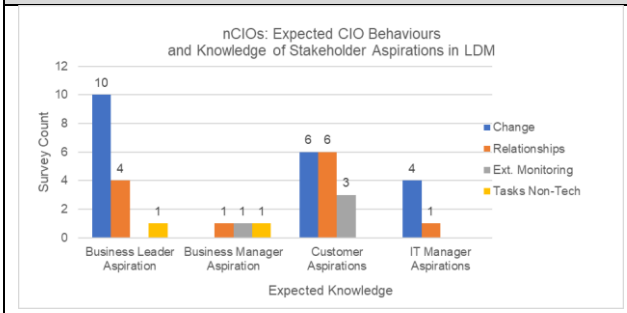
H4a. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Satisfaction in LDM



H4a. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Satisfaction in LDM

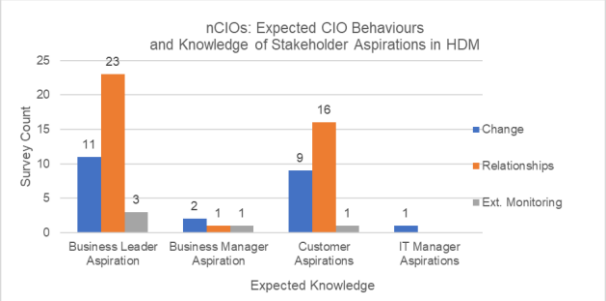
H4b. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Satisfaction in HDM

H4b. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Satisfaction in HDM

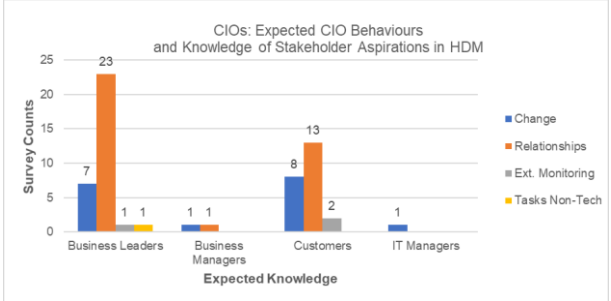


H4c. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Aspiration in LDM

H4c. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Aspiration in LDM

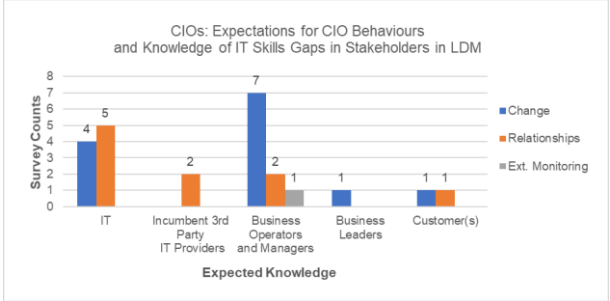


H4d. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Aspiration in HDM



H4d. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Aspiration in HDM

H4e. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Skills Gap in LDM



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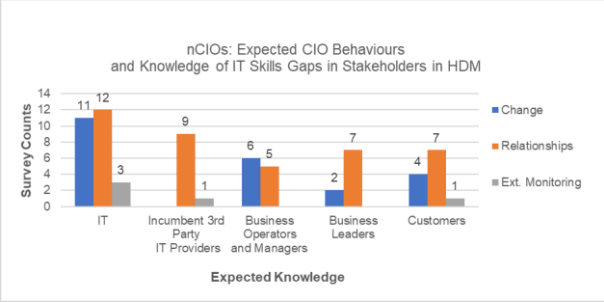
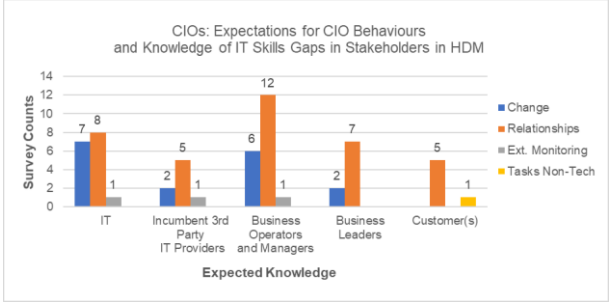
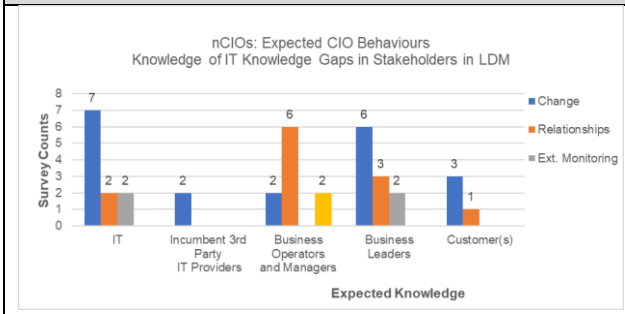


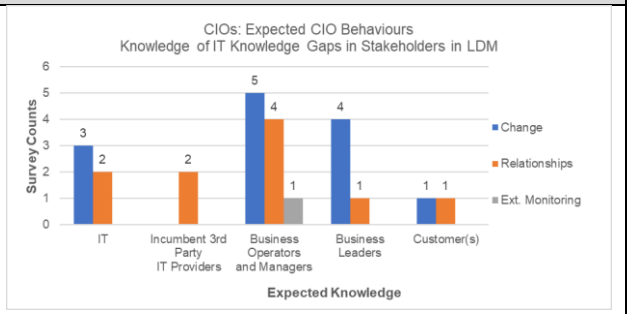
H4f. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Skills Gap in HDM



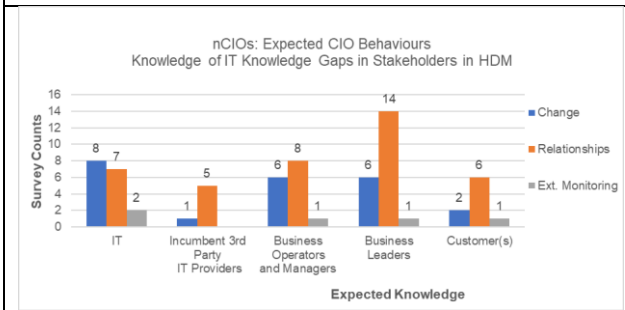
H4f. CIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Skills Gap in HDM



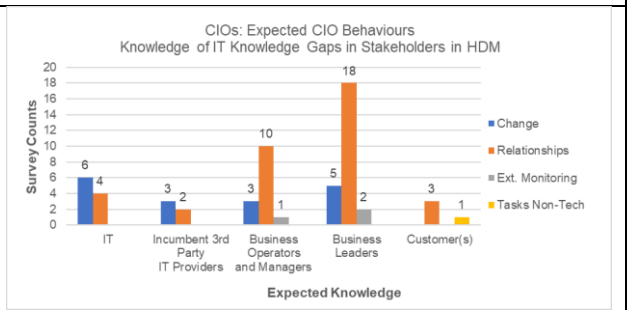
H4g. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Knowledge Gap in LDM



H4g. CIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Knowledge Gap in LDM

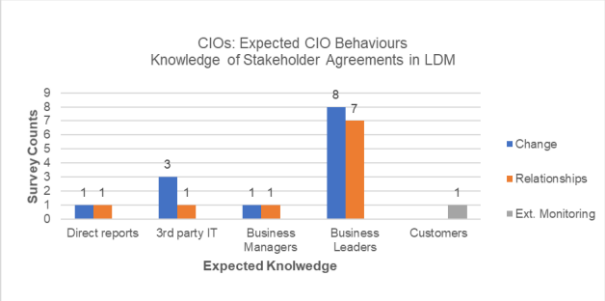


H4h. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Knowledge Gap in HDM



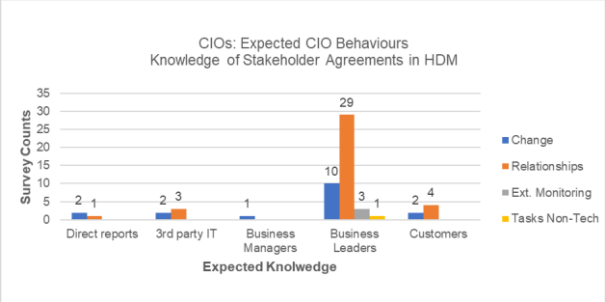
H4h. CIO expectations of CIO Behaviours and Knowledge of Stakeholder IT Knowledge Gap in HDM

H4i. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Agreements in LDM

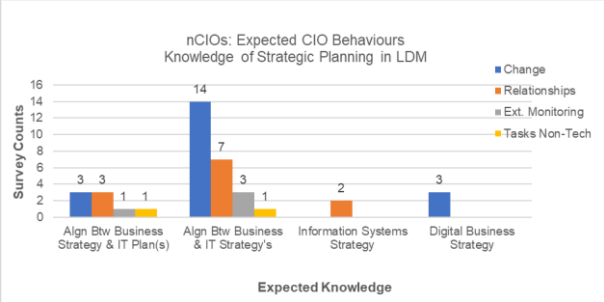


H4i. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Agreements in LDM

H4j. nCIO expectations of CIO Behaviours and Knowledge of Stakeholder Agreements in HDM

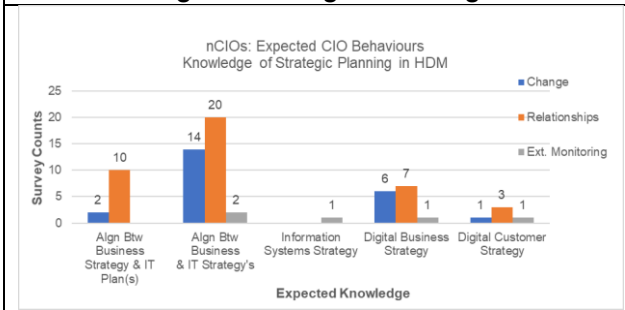


H4j. CIO expectations of CIO Behaviours and Knowledge of Stakeholder Agreements in HDM



H4k. nCIO expectations of CIO Behaviours and Knowledge of Strategic Planning in LDM

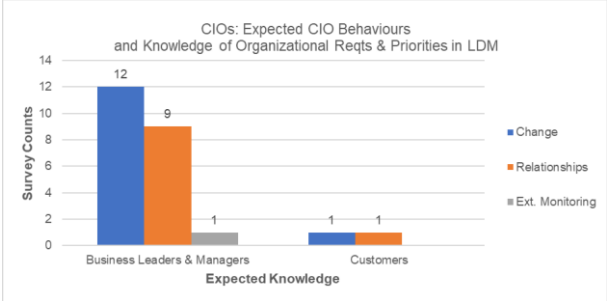
H4k. CIO expectations of CIO Behaviours and Knowledge of Strategic Planning in LDM



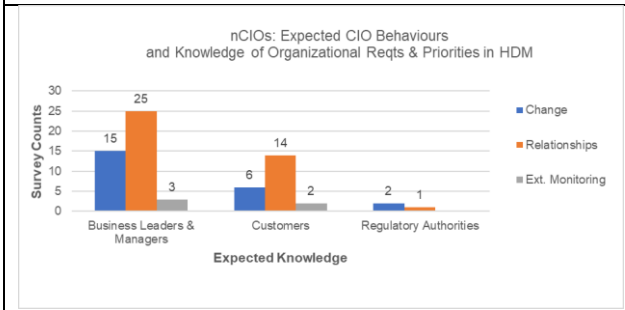
H4l. nCIO expectations of CIO Behaviours and Knowledge of Strategic Planning in HDM

H4l. CIO expectations of CIO Behaviours and Knowledge of Strategic Planning in HDM

H4m. nCIO expectations of CIO Behaviours and Knowledge of Organizational Requirements and Priorities in LDM

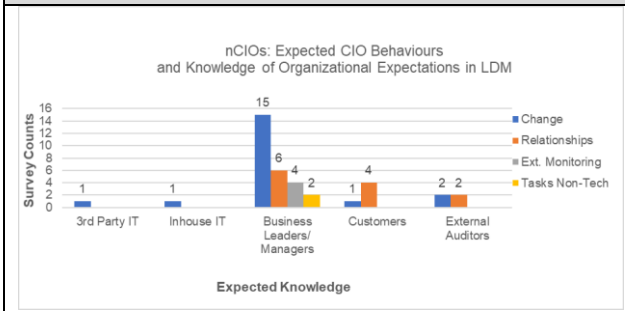


H4m. CIO expectations of CIO Behaviours and Knowledge of Organizational Requirements and Priorities in LDM



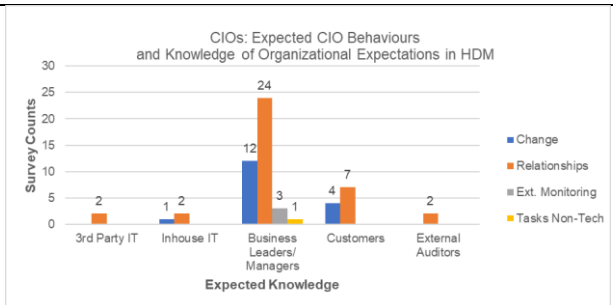
H4n.nCIO expectations of CIO Behaviours and Knowledge of Organizational Requirements and Priorities in HDM

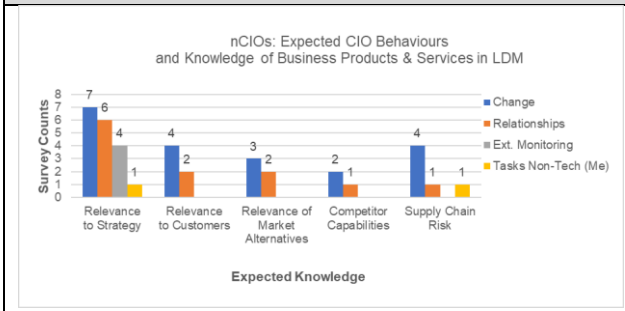
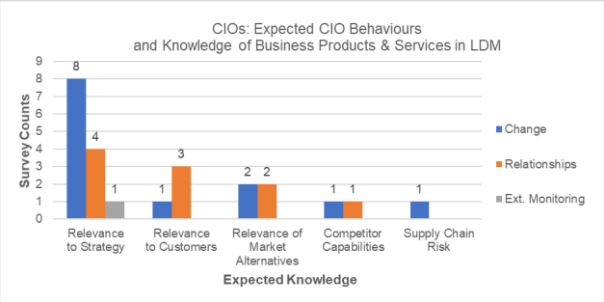
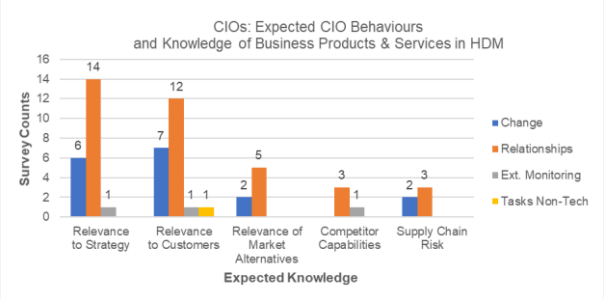
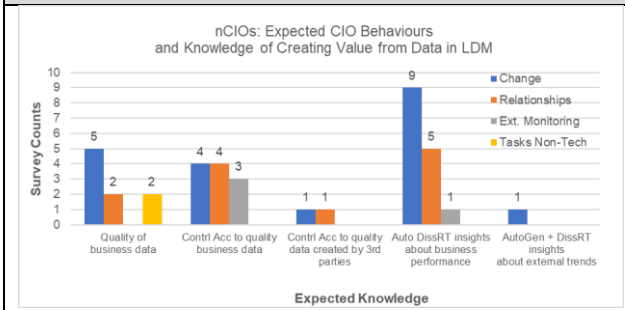
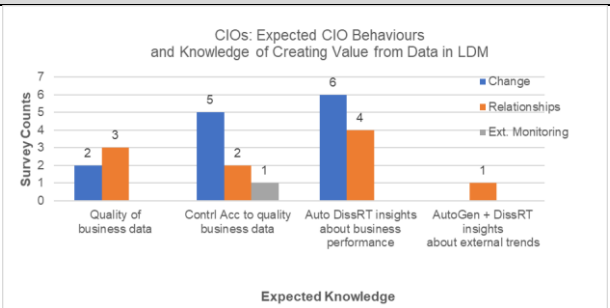
H4n.CIO expectations of CIO Behaviours and Knowledge of Organizational Requirements and Priorities in HDM

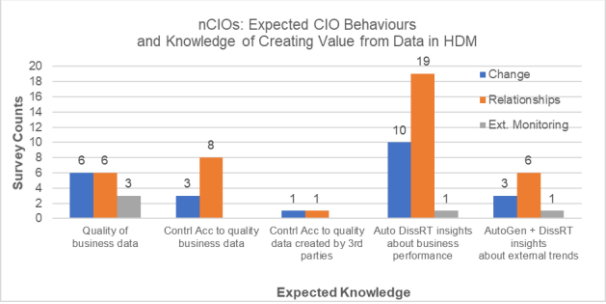


H4o. nCIO expectations of CIO Behaviours and Knowledge of Organizational Expectations in LDM

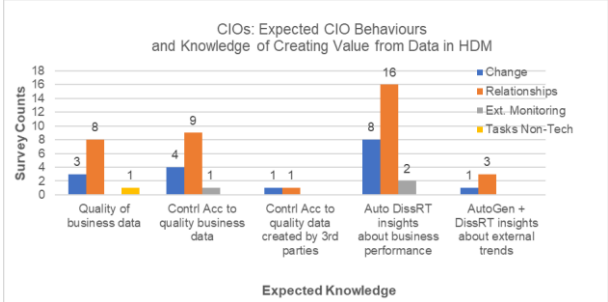
H4o. CIO expectations of CIO Behaviours and Knowledge of Organizational Expectations in LDM



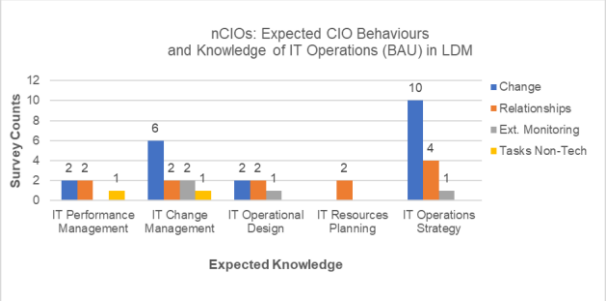
H4p. nCIO expectations of CIO Behaviours and Knowledge of Organizational Expectations in HDM	H4p. CIO expectations of CIO Behaviours and Knowledge of Organizational Expectations in HDM
	
H4q. nCIO expectations of CIO Behaviours and Knowledge of Business Products and Services in LDM	**H4q. CIO expectations of CIO Behaviours and Knowledge of Business Products and Services in LDM**
	
H4r. nCIO expectations of CIO Behaviours and Knowledge of Business Products and Services in HDM	**H4r. CIO expectations of CIO Behaviours and Knowledge of Business Products and Services in HDM**
	
H4s. nCIO expectations of CIO Behaviours and Knowledge of Creating Value from Data in LDM	**H4s. CIO expectations of CIO Behaviours and Knowledge of Creating Value from Data in LDM**



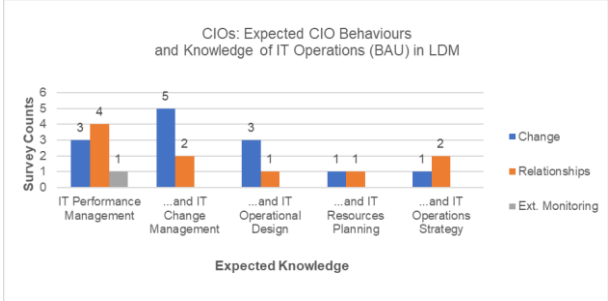
H4t. nCIO expectations of CIO Behaviours and Knowledge of Creating Value from Data in HDM



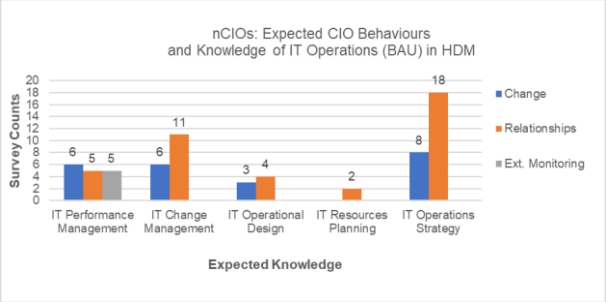
H4t. CIO expectations of CIO Behaviours and Knowledge of Creating Value from Data in HDM



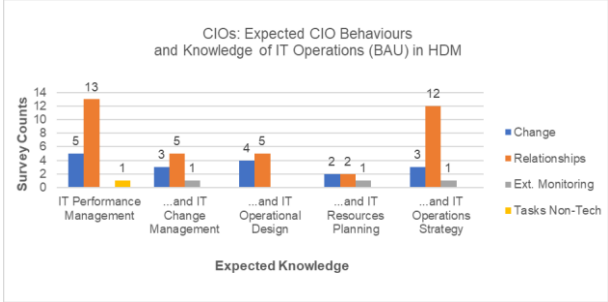
H4u. nCIO expectations of CIO Behaviours and Knowledge of IT Operations in LDM



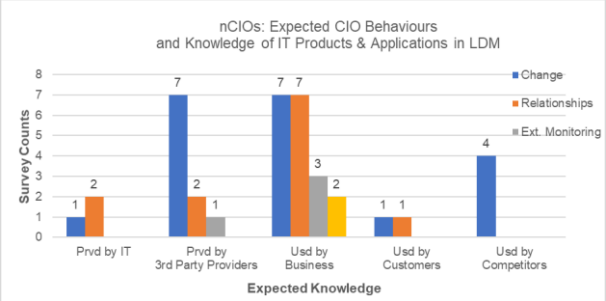
H4u. CIO expectations of CIO Behaviours and Knowledge of IT Operations in LDM



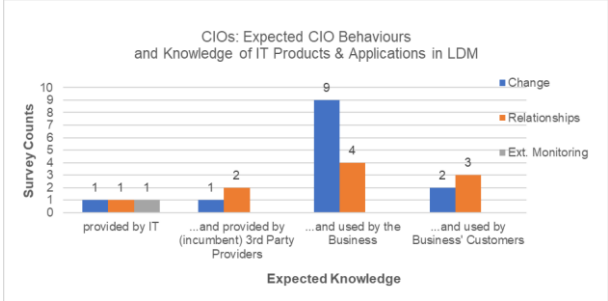
H4v. nCIO expectations of CIO Behaviours and Knowledge of IT Operations in HDM



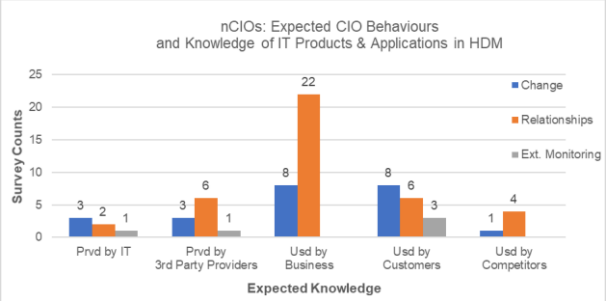
H4v. CIO expectations of CIO Behaviours and Knowledge of IT Operations in HDM



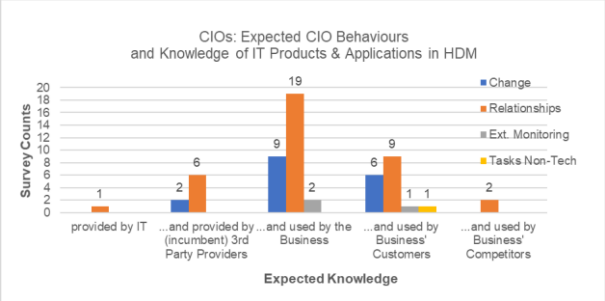
H4w. nCIO expectations of CIO Behaviours and Knowledge of IT Products and Applications in LDM



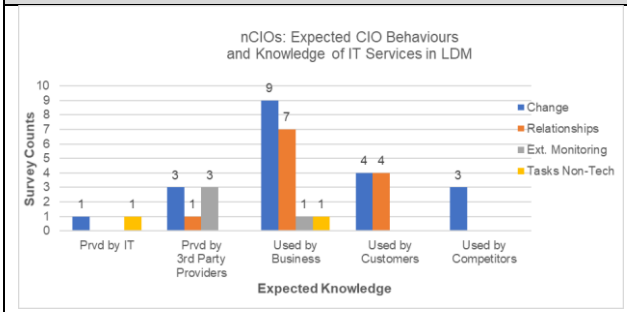
H4w. CIO expectations of CIO Behaviours and Knowledge of IT Products and Applications in LDM



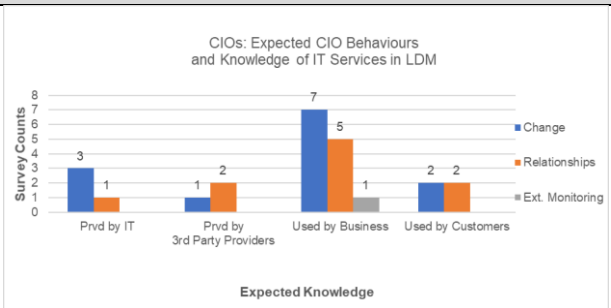
H4x. nCIO expectations of CIO Behaviours and Knowledge of IT Products and Applications in HDM



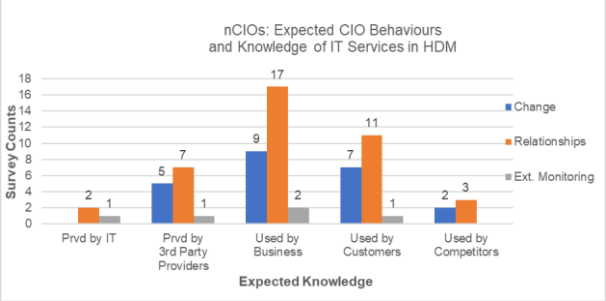
H4x. CIO expectations of CIO Behaviours and Knowledge of IT Products and Applications in HDM



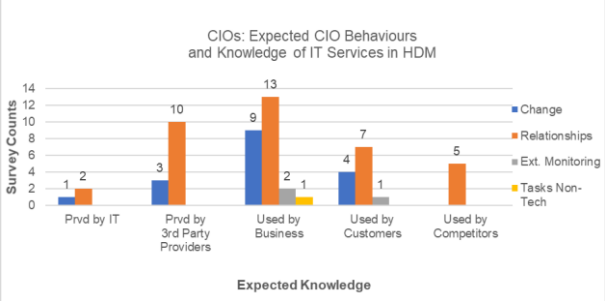
H4y. nCIO expectations of CIO Behaviours and Knowledge of IT Services in LDM



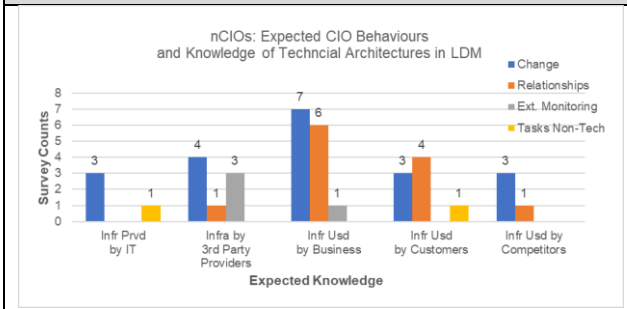
H4y. CIO expectations of CIO Behaviours and Knowledge of IT Services in LDM



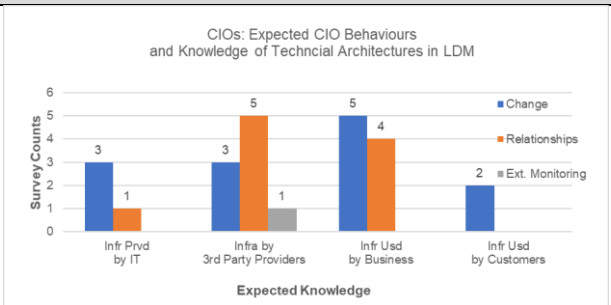
H4z. nCIO expectations of CIO Behaviours and Knowledge of IT Services in HDM



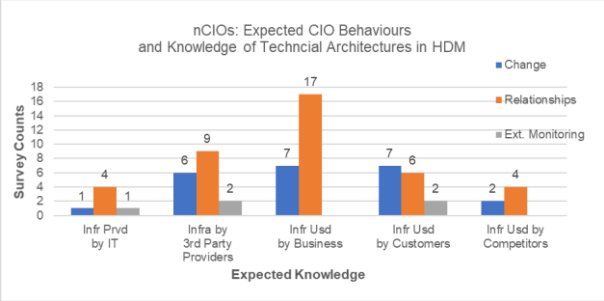
H4z. CIO expectations of CIO Behaviours and Knowledge of IT Services in HDM



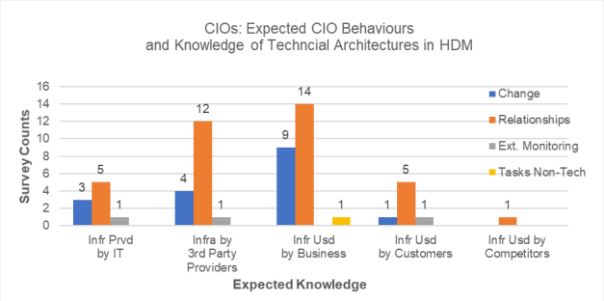
H4aa. nCIO expectations of CIO Behaviours and Knowledge of Technical Architectures in LDM



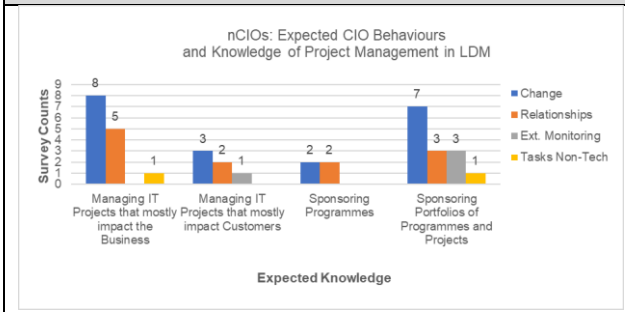
H4aa. CIO expectations of CIO Behaviours and Knowledge of Technical Architectures in LDM



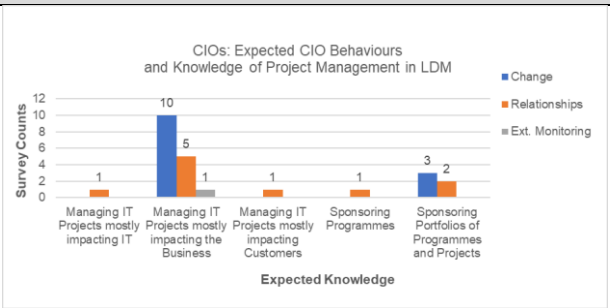
H4ab. nCIO expectations of CIO Behaviours and Knowledge of Technical Architectures in HDM



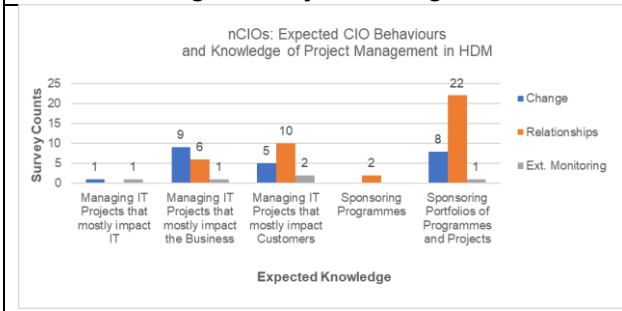
H4ab. CIO expectations of CIO Behaviours and Knowledge of Technical Architectures in HDM



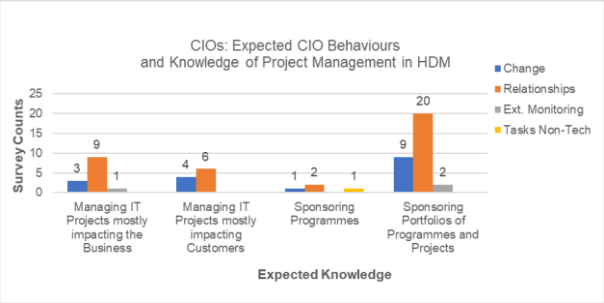
H4ac. nCIO expectations of CIO Behaviours and Knowledge of Project Management in LDM



H4ac. CIO expectations of CIO Behaviours and Knowledge of Project Management in LDM

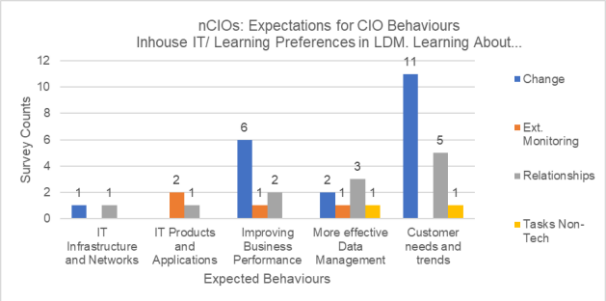


H4ad. nCIO expectations of CIO Behaviours and Knowledge of Project Management in HDM

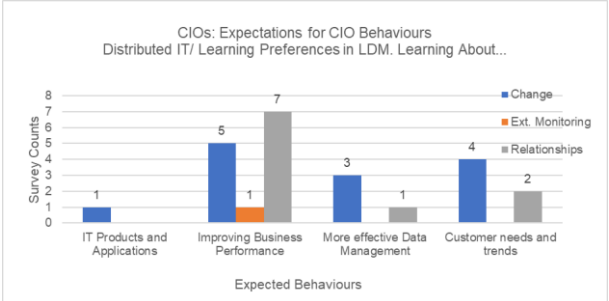


H4ad. CIO expectations of CIO Behaviours and Knowledge of Project Management in HDM

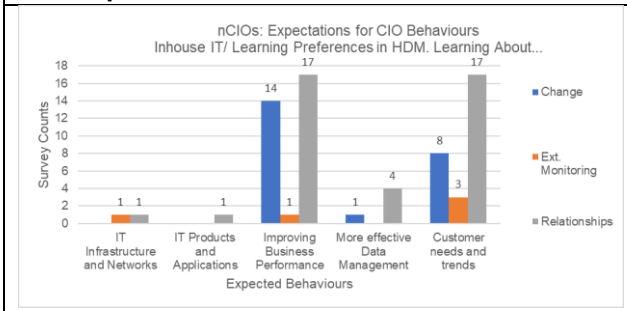
C.4.5 H5 - CIO Learning & Behaviours



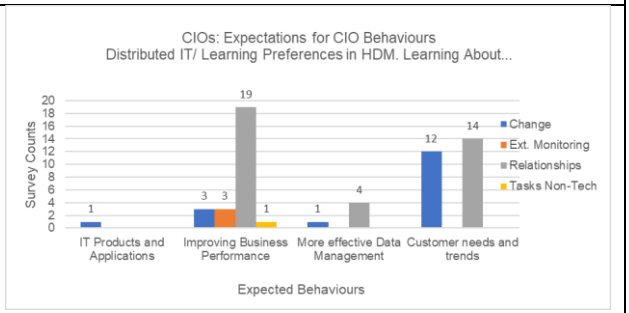
H5a. nCIO expectations of Subjects CIOs expect to learn and behaviours in LDM



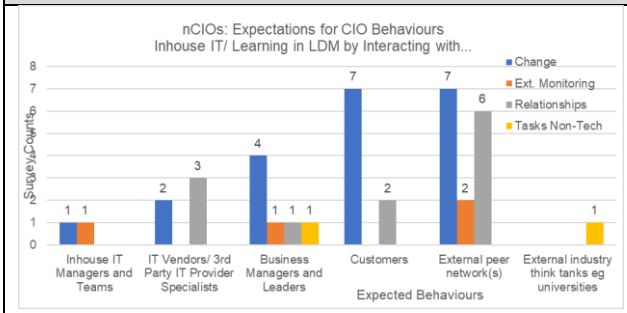
H5a. CIO expectations of Subjects CIOs expect to learn and behaviours in LDM



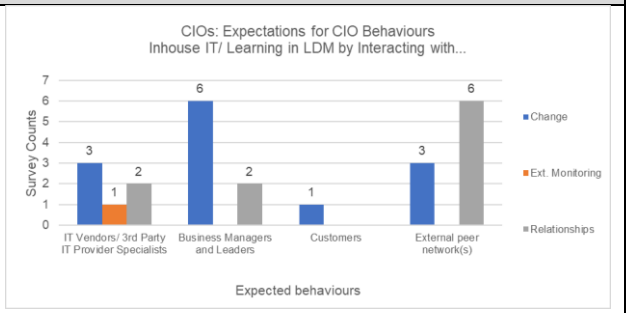
H5b. nCIO expectations of Subjects CIOs expect to learn and behaviours in HDM



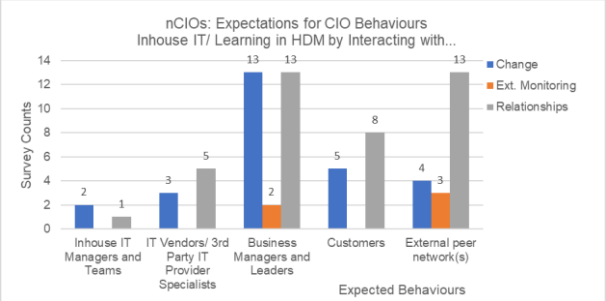
H5b. CIO expectations of Subjects CIOs expect to learn and behaviours in HDM



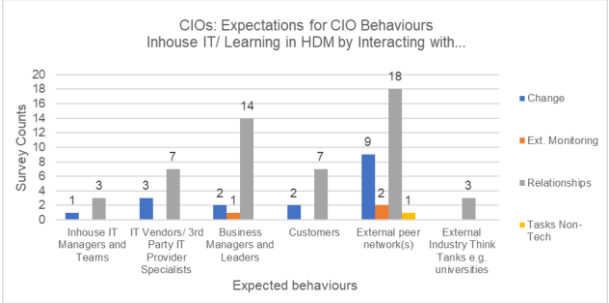
H5c. nCIO expectations of sources of CIO learning and behaviours in LDM



H5c. CIO expectations of sources of CIO learning and behaviours in LDM

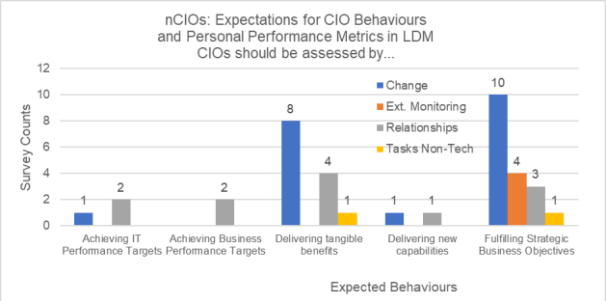


H5d. nCIO expectations of sources of CIO learning and behaviours in HDM

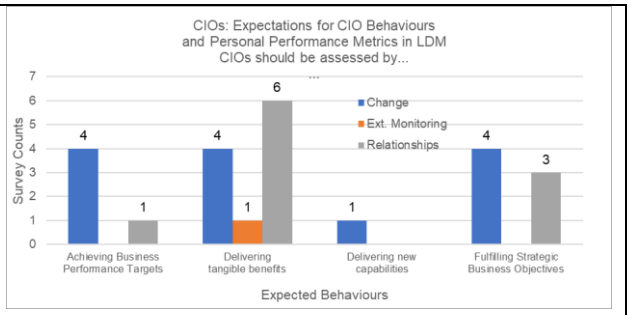


H5d. CIO expectations of sources of CIO learning and behaviours in HDM

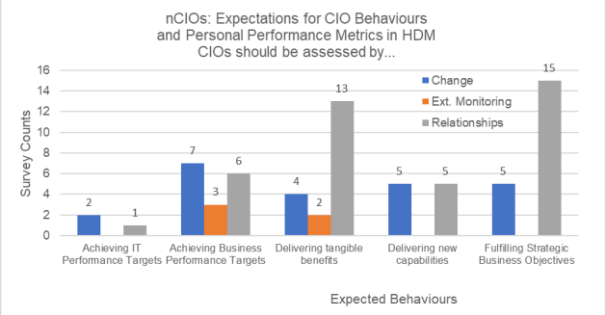
C.4.6 H6 - CIO Motivation & Behaviours



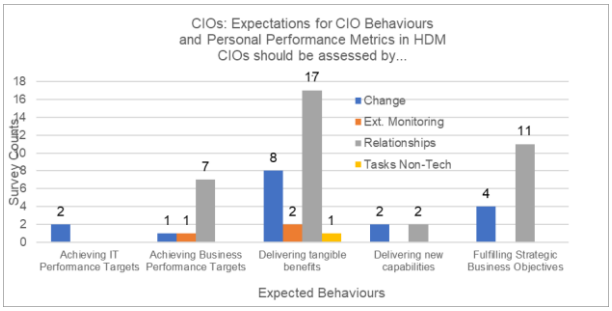
H6a. nCIO expectations of CIO assessment and behaviours in LDM



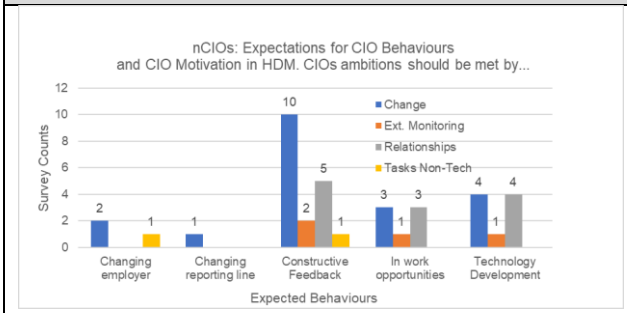
H6a. CIO expectations of CIO assessment and behaviours in LDM



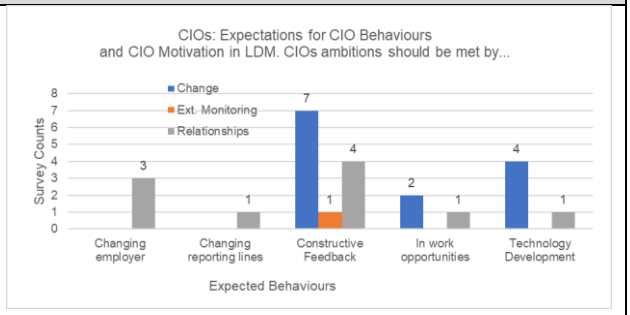
H6b. nCIO expectations of CIO assessment and behaviours in HDM



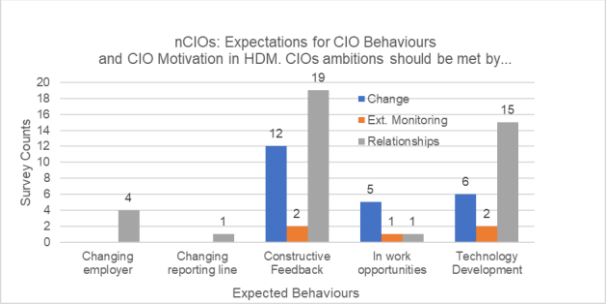
H6b. CIO expectations of CIO assessment and behaviours in HDM



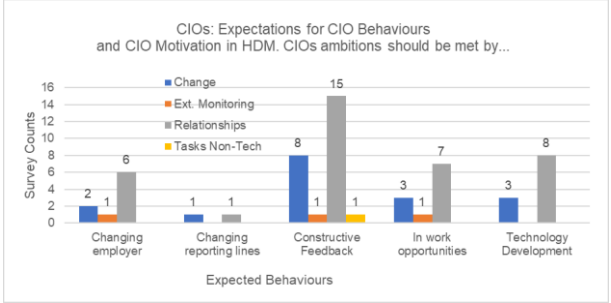
H6c. nCIO expectations of CIO ambitions and behaviours in LDM



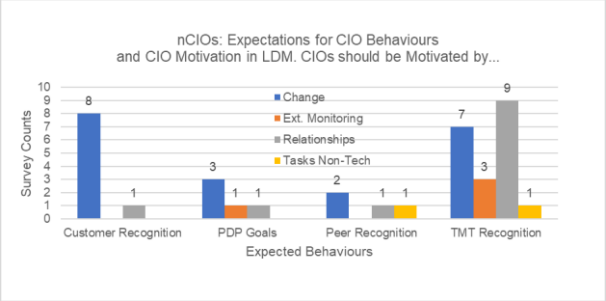
H6c. CIO expectations of CIO ambitions and behaviours in LDM



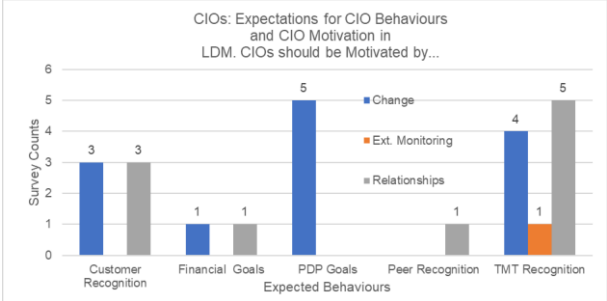
H6d. nCIO expectations of CIO ambitions and behaviours in HDM



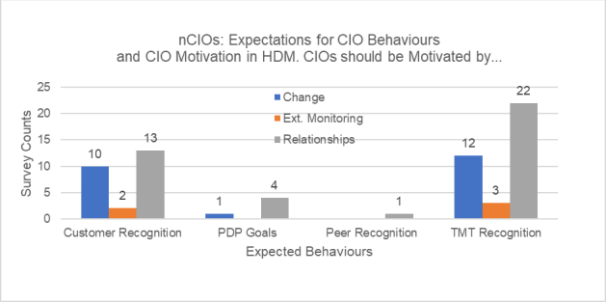
H6d. CIO expectations of CIO ambitions and behaviours in HDM



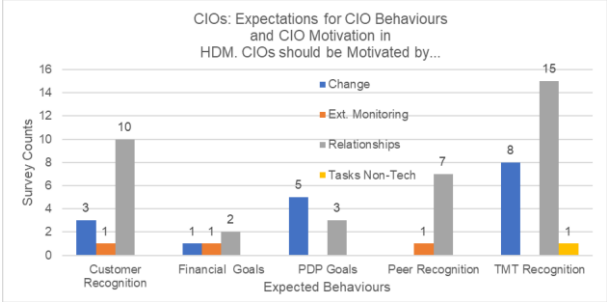
H6e. nCIO expectations of CIO motivations and behaviours in LDM



H6e. CIO expectations of CIO motivations and behaviours in LDM



H6f. nCIO expectations of CIO motivations and behaviours in HDM



H6f. CIO expectations of CIO motivations and behaviours in HDM

C.5 Stakeholder Agreement Analysis

C.5.1 H1 – Agreement on CIO Behaviours

H1	CIOs and nCIOs agree on the relative importance of the most effective CIO behaviours in digitally maturing scenarios					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
						Results					
#	Hypotheses	C#	Construct	Theme	Env't	External Client	External Mentee	Recruitment Candidate			H Supported?
H1a	CIOs and CIO stakeholders external to a CIOs organisation agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours in low digital maturity scenarios	C1	CIO->ScLDM->TOB	External Stakeholders	LDM	CHG	CHG	N/A (REL)			Partially Supported
		C2	CIO->ScLDM->CHB								
		C3	CIO->ScLDM->RELB								
		C4	CIO->ScLDM->EOB								
		C5	nCIOExt->ScLDM->TOB								
		C6	nCIOExt->ScLDM->CHB								
		C7	nCIOExt->ScLDM->RELB								
		C8	nCIOExt->ScLDM->EOB								
H1b	CIOs and CIO stakeholders external to a CIOs organisation agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours in high digital maturity scenarios	C9	CIO->ScHDM->TOB		HDM	REL	REL	REL			Supported
		C10	CIO->ScHDM->CHB								
		C11	CIO->ScHDM->RELB								
		C12	CIO->ScHDM->EOB								
		C13	nCIOExt->ScHDM->TOB								
		C14	nCIOExt->ScHDM->CHB								
		C15	nCIOExt->ScHDM->RELB								
		C16	nCIOExt->ScHDM->EOB								
						Subordinate	Peer	Boss	Internal Customer		H Supported?
H1c	CIOs and CIO stakeholders Internal to a CIOs organisation agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours in low digital maturity scenarios	C17	CIO->ScLDM->TOB	Internal Stakeholders	LDM	CHG (REL)	CHG	CHG	CHG		Partially Supported
		C18	CIO->ScLDM->CHB								
		C19	CIO->ScLDM->RELB								
		C20	CIO->ScLDM->EOB								
		C21	nCIOInt->ScLDM->TOB								
		C22	nCIOInt->ScLDM->CHB								
		C23	nCIOInt->ScLDM->RELB								
		C24	nCIOInt->ScHDM->EOB								
H1d	CIOs and CIO stakeholders internal to a CIOs organisation agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours in high digital maturity scenarios	C25	CIO->ScHDM->TOB		HDM	REL (CHG)	REL (CHG)	REL	N/A		Partially Supported
		C26	CIO->ScHDM->CHB								
		C27	CIO->ScHDM->RELB								
		C28	CIO->ScHDM->EOB								
		C29	nCIOInt->ScHDM->TOB								
		C30	nCIOInt->ScHDM->CHB								
		C31	nCIOInt->ScHDM->RELB								
		C32	nCIOInt->ScHDM->EOB								

C.5.2 H2 - Agreement on CIO Behaviours & Personal Attributes – Experience

H2	CIOs and nCIO agree on the relative importance of the CIO personal attributes that enable CIOs to enact the most effective behaviours in digitally maturing scenarios					Key: CIO Pref (nCIO Pref)				1:1 Agree	Partial Agree	Disagree
						Results						
#	Hypotheses	C#	Construct	Then	Env't	1-2 YRS	2-3 YRS	3-5 YRS	5+ YRS			H Supported?
H2a	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their tenure in low digital maturity scenarios	C33	CIO->ScLDM->TOB->CIOTenure	Tenure	LDM	CHG	REL (CHG)	CHG	CHG			Partially Supported
		C34	CIO->ScLDM->CHB->CIOTenure									
		C35	CIO->ScLDM->RELB->CIOTenure									
		C36	CIO->ScLDM->EOB->CIOTenure									
		C37	nCIOALL->ScLDM->TOB->CIOTenure									
		C38	nCIOALL->ScLDM->CHB->CIOTenure									
		C39	nCIOALL->ScLDM->RELB->CIOTenure									
		C40	nCIOALL->ScLDM->EOB->CIOTenure									
H2b	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their tenure in high digital maturity scenarios	C41	CIO->ScHDM->TOB->CIOTenure		HDM	REL	REL	REL	REL + CHG			Supported
		C42	CIO->ScHDM->CHB->CIOTenure									
		C43	CIO->ScHDM->RELB->CIOTenure									
		C44	CIO->ScHDM->EOB->CIOTenure									
		C45	nCIOALL->ScHDM->TOB->CIOTenure									
		C46	nCIOALL->ScHDM->CHB->CIOTenure									
		C47	nCIOALL->ScHDM->RELB->CIOTenure									
		C48	nCIOALL->ScHDM->EOB->CIOTenure									
				Digital Experience		1-3 YRS	4-6 YRS	7-10 YRS	10 + YRS			H Supported?
H2c	H1.h: CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their level of digital technology experience in low digital maturity scenarios	C49	CIO->ScLDM->TOB->CIODigExp		LDM	CHG	CHG	REL + CHG	REL + CHG			Supported
		C50	CIO->ScLDM->CHB->CIODigExp									
		C51	CIO->ScLDM->RELB->CIODigExp									
		C52	CIO->ScLDM->EOB->CIODigExp									
		C53	nCIOALL->ScLDM->TOB->CIODigExp									
		C54	nCIOALL->ScLDM->CHB->CIODigExp									
		C55	nCIOALL->ScLDM->RELB->CIODigExp									
		C56	nCIOALL->ScLDM->EOB->CIODigExp									
H2d	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their level of digital technology experience in high digital maturity scenario	C57	CIO->ScHDM->TOB->CIODigExp		HDM	REL	REL	REL (CHG)	REL			Partially Supported
		C58	CIO->ScHDM->CHB->CIODigExp									
		C59	CIO->ScHDM->RELB->CIODigExp									
		C60	CIO->ScHDM->EOB->CIODigExp									
		C61	nCIOALL->ScHDM->TOB->CIODigExp									
		C62	nCIOALL->ScHDM->CHB->CIODigExp									
		C63	nCIOALL->ScHDM->RELB->CIODigExp									
		C64	nCIOALL->ScHDM->EOB->CIODigExp									
				Sector Experience		Low Transaction	High Transaction	Public				H Supported?
H2e	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their industry sector experience in low digital maturity scenarios	C65	CIO->ScLDM->TOB->CIOSctExp		LDM	CHG (REL)	CHG	REL +EM (REL + CHG)				Partially Supported
		C66	CIO->ScLDM->CHB->CIOSctExp									
		C67	CIO->ScLDM->RELB->CIOSctExp									
		C68	CIO->ScLDM->EOB->CIOSctExp									
		C69	nCIOALL->ScLDM->TOB->CIOSctExp									
		C70	nCIOALL->ScLDM->CHB->CIOSctExp									
		C71	nCIOALL->ScLDM->RELB->CIOSctExp									
		C72	nCIOALL->ScLDM->EOB->CIOSctExp									
H2f	C IOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their industry sector experience in high digital maturity scenarios	C73	CIO->ScHDM->TOB->CIOSctExp		HDM	REL	REL	REL				Supported
		C74	CIO->ScHDM->CHB->CIOSctExp									
		C75	CIO->ScHDM->RELB->CIOSctExp									
		C76	CIO->ScHDM->EOB->CIOSctExp									
		C77	nCIOALL->ScHDM->TOB->CIOSctExp									
		C78	nCIOALL->ScHDM->CHB->CIOSctExp									
		C79	nCIOALL->ScHDM->RELB->CIOSctExp									
		C80	nCIOALL->ScHDM->EOB->CIOSctExp									

C.5.3 H2 - Agreement on CIO Behaviours & Personal Attributes – Power

H2	CIOs and nCIO agree on the relative importance of the CIO personal attributes that enable CIOs to enact the most effective behaviours in digitally maturing scenarios					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Th	Er	Results					
				Reporting Level		Sub-TMT	TMT				H Supported?
H2g	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their reporting level in low digital maturity scenarios	C81	CIO->ScLDM->TOB->CIORepLvl		LDM	REL (CHG)	CHG				Partially Supported
		C82	CIO->ScLDM->CHB->CIORepLvl								
		C83	CIO->ScLDM->RELB->CIORepLvl								
		C84	CIO->ScLDM->EOB->CIORepLvl								
		C85	nCIOALL->ScLDM->TOB->CIORepLvl								
		C86	nCIOALL->ScLDM->CHB->CIORepLvl								
		C87	nCIOALL->ScLDM->RELB->CIORepLvl								
		C88	nCIOALL->ScLDM->EOB->CIORepLvl								
H2h	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their reporting level in high digital maturity scenarios	C89	CIO->ScHDM->TOB->CIORepLvl		HDM	REL	REL				Supported
		C90	CIO->ScHDM->CHB->CIORepLvl								
		C91	CIO->ScHDM->RELB->CIORepLvl								
		C92	CIO->ScHDM->EOB->CIORepLvl								
		C93	nCIOALL->ScHDM->TOB->CIORepLvl								
		C94	nCIOALL->ScHDM->CHB->CIORepLvl								
		C95	nCIOALL->ScHDM->RELB->CIORepLvl								
		C96	nCIOALL->ScHDM->EOB->CIORepLvl								
				Budget Size		<£10m	>£10m <£100m	>£100m <£499m	£500m+		H Supported?
H2i	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and the size of their annual budget in low digital maturity scenarios	C97	CIO->ScLDM->TOB->CIOAnnBudg		LDM	CHG (REL + EM)	CHG + REL	REL (CHG)	CHG		Partially Supported
		C98	CIO->ScLDM->CHB->CIOAnnBudg								
		C99	CIO->ScLDM->RELB->CIOAnnBudg								
		C100	CIO->ScLDM->EOB->CIOAnnBudg								
		C101	nCIOALL->ScLDM->TOB->CIOAnnBudg								
		C102	nCIOALL->ScLDM->CHB->CIOAnnBudg								
		C103	nCIOALL->ScLDM->RELB->CIOAnnBudg								
		C104	nCIOALL->ScLDM->EOB->CIOAnnBudg								
H2j	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and the size of their annual budget in high digital maturity scenarios	C105	CIO->ScHDM->TOB->CIOAnnBudg		HDM	CHG + REL	CHG + REL	REL	REL		Supported
		C106	CIO->ScHDM->CHB->CIOAnnBudg								
		C107	CIO->ScHDM->RELB->CIOAnnBudg								
		C108	CIO->ScHDM->EOB->CIOAnnBudg								
		C109	nCIOALL->ScHDM->TOB->CIOAnnBudg								
		C110	nCIOALL->ScHDM->CHB->CIOAnnBudg								
		C111	nCIOALL->ScHDM->RELB->CIOAnnBudg								
		C112	nCIOALL->ScHDM->EOB->CIOAnnBudg								

C.5.4 H2 - Agreement on CIO Behaviours & Personal Attributes – Education

H2	CIOs and nCIO agree on the relative importance of the CIO personal attributes that enable CIOs to enact the most effective behaviours in digitally maturing scenarios					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Th	Er	Results					
						Under Graduate	Graduate	Post Graduate			H Supported?
H2k	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their academic major in low digital maturity scenarios	C113	CIO->ScLDM->TOB->CIOAcaMjr	Academic Level	LDM	REL	CHG (REL)	CHG			Partially Supported
		C114	CIO->ScLDM->CHB->CIOAcaMjr								
		C115	CIO->ScLDM->RELB->CIOAcaMjr								
		C116	CIO->ScLDM->EOB->CIOAcaMjr								
		C117	nCIOALL->ScLDM->TOB->CIOAcaMjr								
		C118	nCIOALL->ScLDM->CHB->CIOAcaMjr								
		C119	nCIOALL->ScLDM->RELB->CIOAcaMjr								
		C120	nCIOALL->ScLDM->EOB->CIOAcaMjr								
H2l	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their academic major in high digital maturity scenarios	C121	CIO->ScHDM->TOB->CIOAcaMjr		HDM	REL (REL + EM)	REL	REL			Partially Supported
		C122	CIO->ScHDM->CHB->CIOAcaMjr								
		C123	CIO->ScHDM->RELB->CIOAcaMjr								
		C124	CIO->ScHDM->EOB->CIOAcaMjr								
		C125	nCIOALL->ScHDM->TOB->CIOAcaMjr								
		C126	nCIOALL->ScHDM->CHB->CIOAcaMjr								
		C127	nCIOALL->ScHDM->RELB->CIOAcaMjr								
		C128	nCIOALL->ScHDM->EOB->CIOAcaMjr								
						Technology	Business	Business & Technology			H Supported?
H2m	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their academic major in low digital maturity scenarios	C129	CIO->ScLDM->TOB->CIOAcaMjr	Academic Major	LDM	CHG + REL	CHG	N/A (REL)			Partially Supported
		C130	CIO->ScLDM->CHB->CIOAcaMjr								
		C131	CIO->ScLDM->RELB->CIOAcaMjr								
		C132	CIO->ScLDM->EOB->CIOAcaMjr								
		C133	nCIOALL->ScLDM->TOB->CIOAcaMjr								
		C134	nCIOALL->ScLDM->CHB->CIOAcaMjr								
		C135	nCIOALL->ScLDM->RELB->CIOAcaMjr								
		C136	nCIOALL->ScLDM->EOB->CIOAcaMjr								
H2n	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their academic major in high digital maturity scenarios	C137	CIO->ScHDM->TOB->CIOAcaMjr		HDM	REL + CHG	REL + CHG	N/A (REL)			Partially Supported
		C138	CIO->ScHDM->CHB->CIOAcaMjr								
		C139	CIO->ScHDM->RELB->CIOAcaMjr								
		C140	CIO->ScHDM->EOB->CIOAcaMjr								
		C141	nCIOALL->ScHDM->TOB->CIOAcaMjr								
		C142	nCIOALL->ScHDM->CHB->CIOAcaMjr								
		C143	nCIOALL->ScHDM->RELB->CIOAcaMjr								
		C144	nCIOALL->ScHDM->EOB->CIOAcaMjr								
						IT Sys, InfraSte, IT Managt	Project Management	Business Management			H Supported?
H2o	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their professional certifications in low digital maturity scenarios	C145	CIO->ScLDM->TOB->CIOPrfQua	Professional Qualifications	LDM	CHG + REL	CHG + REL	REL (NTT)			Partially Supported
		C146	CIO->ScLDM->CHB->CIOPrfQua								
		C147	CIO->ScLDM->RELB->CIOPrfQua								
		C148	CIO->ScLDM->EOB->CIOPrfQua								
		C149	nCIOALL->ScLDM->TOB->CIOPrfQua								
		C150	nCIOALL->ScLDM->CHB->CIOPrfQua								
		C151	nCIOALL->ScLDM->RELB->CIOPrfQua								
		C152	nCIOALL->ScLDM->EOB->CIOPrfQua								
H2p	CIOs and CIO stakeholders agree on the relative importance of a CIOs most effective task, change, relationship, and externally orientated behaviours and their professional certifications in high digital maturity scenarios	C153	CIO->ScHDM->TOB->CIOPrfQua		HDM	CHG + REL	CHG + REL	CHG + REL			Supported
		C154	CIO->ScHDM->CHB->CIOPrfQua								
		C155	CIO->ScHDM->RELB->CIOPrfQua								
		C156	CIO->ScHDM->EOB->CIOPrfQua								
		C157	nCIOALL->ScHDM->TOB->CIOPrfQua								
		C158	nCIOALL->ScHDM->CHB->CIOPrfQua								
		C159	nCIOALL->ScHDM->RELB->CIOPrfQua								
		C160	nCIOALL->ScHDM->EOB->CIOPrfQua								

C.5.5 H3 – Agreement CIO Behaviours & Skills – TOB & RELOB

H3	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of the most effective CIO skills					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
						Results					
#	Hypotheses	C#	Construct	Theme	Env't	Clarifying	Ops Planning	Solving Probs	Strategic Planning	Monitoring	H Supported?
H3a	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and task orientated skills in low digital maturity scenarios	C161	CIO->ScLDM->TOB->CIOTOSkls	Task Orientated Skills	LDM	REL	CHG	CHG	CHG	N/A	Supported
		C162	CIO->ScLDM->CHB->CIOTOSkls								
		C163	CIO->ScLDM->RELB->CIOTOSkls								
		C164	CIO->ScLDM->EOB->CIOTOSkls								
		C165	nCIOALL->ScLDM->TOB->CIOTOSkls								
		C166	nCIOALL->ScLDM->CHB->CIOTOSkls								
		C167	nCIOALL->ScLDM->RELB->CIOTOSkls								
		C168	nCIOALL->ScLDM->EOB->CIOTOSkls								
H3b	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and task orientated skills in high digital maturity scenarios	C169	CIO->ScHDM->TOB->CIOTOSkls		HDM	REL	CHG (REL)	REL	REL	N/A	Partially Supported
		C170	CIO->ScHDM->CHB->CIOTOSkls								
		C171	CIO->ScHDM->RELB->CIOTOSkls								
		C172	CIO->ScHDM->EOB->CIOTOSkls								
		C173	nCIOALL->ScHDM->TOB->CIOTOSkls								
		C174	nCIOALL->ScHDM->CHB->CIOTOSkls								
		C175	nCIOALL->ScHDM->RELB->CIOTOSkls								
		C176	nCIOALL->ScHDM->EOB->CIOTOSkls								
						Developing	Empowering	Exchanging	Recognizing	Supporting	H Supported?
H3c	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and relationship orientated skills in low digital maturity scenarios	C177	CIO->ScLDM->TOB->CIORelSkls	Relationship Orientated Skills	LDM	CHG	CHG	REL + CHG	REL + EM (REL + CHG)	CHG (N/A)	Partially Supported
		C178	CIO->ScLDM->CHB->CIORelSkls								
		C179	CIO->ScLDM->RELB->CIORelSkls								
		C180	CIO->ScLDM->EOB->CIORelSkls								
		C181	nCIOALL->ScLDM->TOB->CIORelSkls								
		C182	nCIOALL->ScLDM->CHB->CIORelSkls								
		C183	nCIOALL->ScLDM->RELB->CIORelSkls								
		C184	nCIOALL->ScLDM->EOB->CIORelSkls								
H3d	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and relationship orientated skills in high digital maturity scenarios	C185	CIO->ScHDM->TOB->CIORelSkls		HDM	REL	REL	REL + CHG	REL + CHG (REL)	REL	Partially Supported
		C186	CIO->ScHDM->CHB->CIORelSkls								
		C187	CIO->ScHDM->RELB->CIORelSkls								
		C188	CIO->ScHDM->EOB->CIORelSkls								
		C189	nCIOALL->ScHDM->TOB->CIORelSkls								
		C190	nCIOALL->ScHDM->CHB->CIORelSkls								
		C191	nCIOALL->ScHDM->RELB->CIORelSkls								
		C192	nCIOALL->ScHDM->EOB->CIORelSkls								

C.5.6 H3 – Agreement CIO Behaviours & Skills – CHGOB & EMOB

H3	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of the most effective CIO skills					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
						Results					
#	Hypotheses	C#	Construct	Th	En	Advocating	As Change Agent	Encouraging Innovation	Envisioning Change	Facilitating Learning	H Supported?
H3e	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and change orientated skills in low digital maturity scenarios	C193	CIO->ScLDM->TOB->CIOChalSkls	Change Orientated Skills	LDM	CHG (REL)	CHG	REL + CHG	REL + CHG (CHG)	REL (CHG)	Partially Supported
		C194	CIO->ScLDM->CHB->CIOChalSkls								
		C195	CIO->ScLDM->RELB->CIOChalSkls								
		C196	CIO->ScLDM->EOB->CIOChalSkls								
		C197	nCIOALL->ScLDM->TOB->CIOChalSkls								
		C198	nCIOALL->ScLDM->CHB->CIOChalSkls								
		C199	nCIOALL->ScLDM->RELB->CIOChalSkls								
		C200	nCIOALL->ScLDM->EOB->CIOChalSkls								
H3f	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and change orientated skills in high digital maturity scenarios	C201	CIO->ScHDM->TOB->CIOChalSkls		HDM	REL + CHG	CHG	REL (REL & CHG)	REL	CHG (REL)	Partially Supported
		C202	CIO->ScHDM->CHB->CIOChalSkls								
		C203	CIO->ScHDM->RELB->CIOChalSkls								
		C204	CIO->ScHDM->EOB->CIOChalSkls								
		C205	nCIOALL->ScHDM->TOB->CIOChalSkls								
		C206	nCIOALL->ScHDM->CHB->CIOChalSkls								
		C207	nCIOALL->ScHDM->RELB->CIOChalSkls								
		C208	nCIOALL->ScHDM->EOB->CIOChalSkls								
						3rd Party Collab	Customer Collab	External Monitoring	Networking	Representing	H Supported?
H3g	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and external monitoring orientated skills in low digital maturity scenarios	C209	CIO->ScLDM->TOB->CIOExMonSkls	External Monitoring Orientated Skills	LDM	N/A (CHG)	REL + CHG	REL (CHG + EM)	CHG (REL)	CHG (REL)	Unsupported
		C210	CIO->ScLDM->CHB->CIOExMonSkls								
		C211	CIO->ScLDM->RELB->CIOExMonSkls								
		C212	CIO->ScLDM->EOB->CIOExMonSkls								
		C213	nCIOALL->ScLDM->TOB->CIOExMonSkls								
		C214	nCIOALL->ScLDM->CHB->CIOExMonSkls								
		C215	nCIOALL->ScLDM->RELB->CIOExMonSkls								
		C216	nCIOALL->ScLDM->EOB->CIOExMonSkls								
H3h	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and external monitoring orientated skills in high digital maturity scenarios	C217	CIO->ScHDM->TOB->CIOExMonSkls		HDM	REL + CHG	REL	REL	REL	REL	Supported
		C218	CIO->ScHDM->CHB->CIOExMonSkls								
		C219	CIO->ScHDM->RELB->CIOExMonSkls								
		C220	CIO->ScHDM->EOB->CIOExMonSkls								
		C221	nCIOALL->ScHDM->TOB->CIOExMonSkls								
		C222	nCIOALL->ScHDM->CHB->CIOExMonSkls								
		C223	nCIOALL->ScHDM->RELB->CIOExMonSkls								
		C224	nCIOALL->ScHDM->EOB->CIOExMonSkls								

C.5.7 H4 – Agreement on CIO Behaviours & Knowledge – Stakeholder Satisfaction & Aspiration

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
						Results					
#	Hypotheses	C#	Construct	Theme	Env't	3rd Party Dissatisfaction	Business Leader Dissatisfaction	Business Manager Dissatisfaction	Customer Dissatisfaction		Hypoth Supported?
H4a	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Satisfaction in low digital maturity scenarios	C225	CIO->ScLDM->TOB->CIOKwStkSat	Stakeholder Satisfaction	LDM	N/A	CHG	CHG +REL	CHG		Supported
		C226	CIO->ScLDM->CHB->CIOKwStkSat								
		C227	CIO->ScLDM->RELB->CIOKwStkSat								
		C228	CIO->ScLDM->EOB->CIOKwStkSat								
		C229	nCIOALL->ScLDM->TOB->CIOKwStkSat								
		C230	nCIOALL->ScLDM->CHB->CIOKwStkSat								
		C231	nCIOALL->ScLDM->RELB->CIOKwStkSat								
		C232	nCIOALL->ScLDM->EOB->CIOKwStkSat								
H4b	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Satisfaction in high digital maturity scenarios	C233	CIO->ScHDM->TOB->CIOKwStkSat		HDM	N/A (CHG)	REL	CHG +REL	REL		Partially Supported
		C234	CIO->ScHDM->CHB->CIOKwStkSat								
		C235	CIO->ScHDM->RELB->CIOKwStkSat								
		C236	CIO->ScHDM->EOB->CIOKwStkSat								
		C237	nCIOALL->ScHDM->TOB->CIOKwStkSat								
		C238	nCIOALL->ScHDM->CHB->CIOKwStkSat								
		C239	nCIOALL->ScHDM->RELB->CIOKwStkSat								
		C240	nCIOALL->ScHDM->EOB->CIOKwStkSat								
				Stakeholder Aspiration		Business Leader Aspiration	Business Manager Aspiration	Customer Aspiration	IT Manager Aspiration		
H4c	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Aspirations in low digital maturity scenarios	C241	CIO->ScLDM->TOB->CIOKwStkAsp		LDM	CHG	CHG (REL)	CHG +REL	N/A (CHG)		Partially Supported
		C242	CIO->ScLDM->CHB->CIOKwStkAsp								
		C243	CIO->ScLDM->RELB->CIOKwStkAsp								
		C244	CIO->ScLDM->EOB->CIOKwStkAsp								
		C245	nCIOALL->ScLDM->TOB->CIOKwStkAsp								
		C246	nCIOALL->ScLDM->CHB->CIOKwStkAsp								
		C247	nCIOALL->ScLDM->RELB->CIOKwStkAsp								
		C248	nCIOALL->ScLDM->EOB->CIOKwStkAsp								
H4d	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Aspirations in high digital maturity scenarios	C249	CIO->ScHDM->TOB->CIOKwStkAsp		HDM	REL	CHG +REL	REL	CHG		Supported
		C250	CIO->ScHDM->CHB->CIOKwStkAsp								
		C251	CIO->ScHDM->RELB->CIOKwStkAsp								
		C252	CIO->ScHDM->EOB->CIOKwStkAsp								
		C253	nCIOALL->ScHDM->TOB->CIOKwStkAsp								
		C254	nCIOALL->ScHDM->CHB->CIOKwStkAsp								
		C255	nCIOALL->ScHDM->RELB->CIOKwStkAsp								
		C256	nCIOALL->ScHDM->EOB->CIOKwStkAsp								

C.5.8 H4 – Agreement on CIO Behaviours & Knowledge – Stakeholder IT Skills & Knowledge

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Th	Er	Results					Hypoth
						IT	Incumbent 3rd Party	Business Operators/ Managers	Business Leaders	Customers	
H4e	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder IT Skills in low digital maturity scenarios	C256	CIO->ScLDM->TOB->CIOKwStklTSk	Stakeholder IT Skills	LDM	CHG +REL	REL (CHG)	CHG (CHG + REL)	CHG (CHG + REL)	CHG +REL	Partially Supported
		C257	CIO->ScLDM->CHB->CIOKwStklTSk								
		C258	CIO->ScLDM->RELB->CIOKwStklTSk								
		C259	CIO->ScLDM->EOB->CIOKwStklTSk								
		C260	nCIOALL->ScLDM->TOB->CIOKwStklTSk								
		C261	nCIOALL->ScLDM->CHB->CIOKwStklTSk								
		C262	nCIOALL->ScLDM->RELB->CIOKwStklTSk								
		C263	nCIOALL->ScLDM->EOB->CIOKwStklTSk								
H4f	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder IT Skills in high digital maturity scenarios	C264	CIO->ScHDM->TOB->CIOKwStklTSk		HDM	CHG +REL	REL	CHG +REL	REL + CGN	REL + NTT (REL +CHG)	Partially Supported
		C265	CIO->ScHDM->CHB->CIOKwStklTSk								
		C266	CIO->ScHDM->RELB->CIOKwStklTSk								
		C267	CIO->ScHDM->EOB->CIOKwStklTSk								
		C268	nCIOALL->ScHDM->TOB->CIOKwStklTSk								
		C269	nCIOALL->ScHDM->CHB->CIOKwStklTSk								
		C270	nCIOALL->ScHDM->RELB->CIOKwStklTSk								
		C271	nCIOALL->ScHDM->EOB->CIOKwStklTSk								
						IT	Incumbent 3rd Party	Business Operators/ Managers	Business Leaders	Customers	
H4g	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder IT Knowledge in low digital maturity scenarios	C272	CIO->ScLDM->TOB->CIOKwStklTKn	Stakeholder IT Knowledge	LDM	CHG +REL	REL (CHG)	CHG +REL	CHG +REL	CHG +REL	Partially Supported
		C273	CIO->ScLDM->CHB->CIOKwStklTKn								
		C274	CIO->ScLDM->RELB->CIOKwStklTKn								
		C275	CIO->ScLDM->EOB->CIOKwStklTKn								
		C276	nCIOALL->ScLDM->TOB->CIOKwStklTKn								
		C277	nCIOALL->ScLDM->CHB->CIOKwStklTKn								
		C278	nCIOALL->ScLDM->RELB->CIOKwStklTKn								
		C279	nCIOALL->ScLDM->EOB->CIOKwStklTKn								
H4h	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder IT Knowledge in high digital maturity scenarios	C280	CIO->ScHDM->TOB->CIOKwStklTKn		HDM	CHG +REL	CHG +REL	REL + CHG	REL + CHG	REL + NTT (REL + CHG + EM)	Partially Supported
		C281	CIO->ScHDM->CHB->CIOKwStklTKn								
		C282	CIO->ScHDM->RELB->CIOKwStklTKn								
		C283	CIO->ScHDM->EOB->CIOKwStklTKn								
		C284	nCIOALL->ScHDM->TOB->CIOKwStklTKn								
		C285	nCIOALL->ScHDM->CHB->CIOKwStklTKn								
		C286	nCIOALL->ScHDM->RELB->CIOKwStklTKn								
		C287	nCIOALL->ScHDM->EOB->CIOKwStklTKn								

C.5.9 H4 – Agreement on CIO Behaviours & Knowledge – Stakeholder Agreement & Strategic Planning

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Th	Er	Results					Hypoth
						IT	Incumbent 3rd Party	Business Operators/ Managers	Business Leaders	Customers	
H4i	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Agreements in low digital maturity scenarios	C288	CIO->ScLDM->TOB->CIOKwStkAgrs	Stakeholder Agreements	LDM	CHG +REL	CHG + REL (REL)	REL + CHG	CHG +REL	EM (CHG)	Partially Supported
		C289	CIO->ScLDM->CHB->CIOKwStkAgrs								
		C290	CIO->ScLDM->RELB->CIOKwStkAgrs								
		C291	CIO->ScLDM->EOB->CIOKwStkAgrs								
		C292	nCIOALL->ScLDM->TOB->CIOKwStkAgrs								
		C293	nCIOALL->ScLDM->CHB->CIOKwStkAgrs								
		C294	nCIOALL->ScLDM->RELB->CIOKwStkAgrs								
		C295	nCIOALL->ScLDM->EOB->CIOKwStkAgrs								
H4j	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Stakeholder Agreements in high digital maturity scenarios	C296	CIO->ScHDM->TOB->CIOKwStkAgrs		HDM	CHG + REL (REL)	REL + CHG	CHG (CHG + EM)	REL + CHG	REL + CHG	Partially Supported
		C297	CIO->ScHDM->CHB->CIOKwStkAgrs								
		C298	CIO->ScHDM->RELB->CIOKwStkAgrs								
		C299	CIO->ScHDM->EOB->CIOKwStkAgrs								
		C300	nCIOALL->ScHDM->TOB->CIOKwStkAgrs								
		C301	nCIOALL->ScHDM->CHB->CIOKwStkAgrs								
		C302	nCIOALL->ScHDM->RELB->CIOKwStkAgrs								
		C303	nCIOALL->ScHDM->EOB->CIOKwStkAgrs								
						Alignment: Business Strategy & IT Plans	Alignment: Business Strategy & IT Strategy	Information Systems Strategy	Digital Business Strategy	Digital Customer Strategy	
H4k	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Strategic Planning in low digital maturity scenarios	C304	CIO->ScLDM->TOB->CIOKwStrPln	Strategic Planning	LDM	CHG +REL	REL + CHG	CHG (REL)	REL + CHG (REL)	CHG	Partially Supported
		C305	CIO->ScLDM->CHB->CIOKwStrPln								
		C306	CIO->ScLDM->RELB->CIOKwStrPln								
		C307	CIO->ScLDM->EOB->CIOKwStrPln								
		C308	nCIOALL->ScLDM->TOB->CIOKwStrPln								
		C309	nCIOALL->ScLDM->CHB->CIOKwStrPln								
		C310	nCIOALL->ScLDM->RELB->CIOKwStrPln								
		C311	nCIOALL->ScLDM->EOB->CIOKwStrPln								
H4l	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Strategic Planning in high digital maturity scenarios	C312	CIO->ScHDM->TOB->CIOKwStrPln		HDM	REL + CHG	REL + CHG	N/A (EM)	REL + CHG	REL (REL + CHG + EM)	Partially Supported
		C313	CIO->ScHDM->CHB->CIOKwStrPln								
		C314	CIO->ScHDM->RELB->CIOKwStrPln								
		C315	CIO->ScHDM->EOB->CIOKwStrPln								
		C316	nCIOALL->ScHDM->TOB->CIOKwStrPln								
		C317	nCIOALL->ScHDM->CHB->CIOKwStrPln								
		C318	nCIOALL->ScHDM->RELB->CIOKwStrPln								
		C319	nCIOALL->ScHDM->EOB->CIOKwStrPln								

C.5.10 H4 – Agreement on CIO Behaviours & Knowledge – Organizational Requirements & Expectations

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Theri	Env'	Results					Hypoth Supported?
				Organizational Requirements		Inhouse IT Managers	Business Leaders & Managers	Customers	Regulatory Authorities		
H4m	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Organizational Requirments in low digital maturity scenarios	C320	CIO->ScLDM->TOB->CIOKwOrgReqs		LDM	N/A (CHG)	REL + CHG	REL + CHG	N/A (CHG + REL)		Partially Supported
		C321	CIO->ScLDM->CHB->CIOKwOrgReqs								
		C322	CIO->ScLDM->RELB->CIOKwOrgReqs								
		C323	CIO->ScLDM->EOB->CIOKwOrgReqs								
		C324	nCIOALL->ScLDM->TOB->CIOKwOrgReqs								
		C325	nCIOALL->ScLDM->CHB->CIOKwOrgReqs								
		C326	nCIOALL->ScLDM->RELB->CIOKwOrgReqs								
		C327	nCIOALL->ScLDM->EOB->CIOKwOrgReqs								
H4n	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Organizational Requirments in high digital maturity scenarios	C328	CIO->ScHDM->TOB->CIOKwOrgReqs		HDM	CHG (N/A)	REL + CHG	REL + CHG	REL (CHG + REL)		Partially Supported
		C329	CIO->ScHDM->CHB->CIOKwOrgReqs								
		C330	CIO->ScHDM->RELB->CIOKwOrgReqs								
		C331	CIO->ScHDM->EOB->CIOKwOrgReqs								
		C332	nCIOALL->ScHDM->TOB->CIOKwOrgReqs								
		C333	nCIOALL->ScHDM->CHB->CIOKwOrgReqs								
		C334	nCIOALL->ScHDM->RELB->CIOKwOrgReqs								
		C335	nCIOALL->ScHDM->EOB->CIOKwOrgReqs								
				Organizational Expectations		3rd Party IT	Inhouse IT Managers	Business Leaders & Managers	Customers	External Auditors	
H4o	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Organizational Expectations in low digital maturity scenarios	C336	CIO->ScLDM->TOB->CIOKwOrgExpec		LDM	N/A (CHG)	CHG	CHG + REL	REL + CHG	N/A (REL + CHG)	Partially Supported
		C337	CIO->ScLDM->CHB->CIOKwOrgExpec								
		C338	CIO->ScLDM->RELB->CIOKwOrgExpec								
		C339	CIO->ScLDM->EOB->CIOKwOrgExpec								
		C340	nCIOALL->ScLDM->TOB->CIOKwOrgExpec								
		C341	nCIOALL->ScLDM->CHB->CIOKwOrgExpec								
		C342	nCIOALL->ScLDM->RELB->CIOKwOrgExpec								
		C343	nCIOALL->ScLDM->EOB->CIOKwOrgExpec								
H4p	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Organizational Expectations in high digital maturity scenarios	C344	CIO->ScHDM->TOB->CIOKwOrgExpec		HDM	REL (CHG)	REL + CHG	REL	REL + CHG	REL	Partially Supported
		C345	CIO->ScHDM->CHB->CIOKwOrgExpec								
		C346	CIO->ScHDM->RELB->CIOKwOrgExpec								
		C347	CIO->ScHDM->EOB->CIOKwOrgExpec								
		C348	nCIOALL->ScHDM->TOB->CIOKwOrgExpec								
		C349	nCIOALL->ScHDM->CHB->CIOKwOrgExpec								
		C350	nCIOALL->ScHDM->RELB->CIOKwOrgExpec								
		C351	nCIOALL->ScHDM->EOB->CIOKwOrgExpec								

C.5.11 H4 - Agreement on CIO Behaviours & Knowledge – Business Products and Services & Data Value

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Ther	Env'	Results					Hypoth Supported?
				Business Products & Services		Relevant to Business Strategy	Relevance to Customers	Relevance of Market Alternates	Competitor Capabilities	Supply Chain Risks	
H4q	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Business Products and Services in low digital maturity scenarios	C351	CIO->ScLDM->TOB->CIOKwBusPrdSer		LDM	CHG + REL	REL + CHG	REL + CHG	REL + CHG	CHG	Supported
		C352	CIO->ScLDM->CHB->CIOKwBusPrdSer								
		C353	CIO->ScLDM->RELB->CIOKwBusPrdSer								
		C354	CIO->ScLDM->EOB->CIOKwBusPrdSer								
		C355	nCIOALL->ScLDM->TOB->CIOKwBusPrdSer								
		C356	nCIOALL->ScLDM->CHB->CIOKwBusPrdSer								
		C357	nCIOALL->ScLDM->RELB->CIOKwBusPrdSer								
		C358	nCIOALL->ScLDM->EOB->CIOKwBusPrdSer								
H4r	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Business Products and Services in high digital maturity scenarios	C359	CIO->ScHDM->TOB->CIOKwBusPrdSer		HDM	REL + CHG	REL + CHG	REL + CHG	REL + EM	REL + CHG	Supported
		C360	CIO->ScHDM->CHB->CIOKwBusPrdSer								
		C361	CIO->ScHDM->RELB->CIOKwBusPrdSer								
		C362	CIO->ScHDM->EOB->CIOKwBusPrdSer								
		C363	nCIOALL->ScHDM->TOB->CIOKwBusPrdSer								
		C364	nCIOALL->ScHDM->CHB->CIOKwBusPrdSer								
		C365	nCIOALL->ScHDM->RELB->CIOKwBusPrdSer								
		C366	nCIOALL->ScHDM->EOB->CIOKwBusPrdSer								
				Creating Value from Data		improving quality of current business data	…and creating, storing and providing controlled access to quality data created by the business	…and creating, storing and providing controlled access to quality data created by 3rd parties	…and automatically generating and disseminating real-time insights about business performance	…and automatically generating and disseminating real-time insights about external trends	
H4s	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Creating Value from Data in low digital maturity scenarios	C367	CIO->ScLDM->TOB->CIOKwValfDta		LDM	REL + CHG	CHG + REL	N/A (REL + CHG)	CHG + REL	REL (CHG)	Partially Supported
		C368	CIO->ScLDM->CHB->CIOKwValfDta								
		C369	CIO->ScLDM->RELB->CIOKwValfDta								
		C370	CIO->ScLDM->EOB->CIOKwValfDta								
		C371	nCIOALL->ScLDM->TOB->CIOKwValfDta								
		C372	nCIOALL->ScLDM->CHB->CIOKwValfDta								
		C373	nCIOALL->ScLDM->RELB->CIOKwValfDta								
		C374	nCIOALL->ScLDM->EOB->CIOKwValfDta								
H4t	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Creating Value from Data in high digital maturity scenarios	C375	CIO->ScHDM->TOB->CIOKwValfDta		HDM	REL + CHG + NTT (REL + CHG + EM)	REL + CHG	REL + CHG	REL + CHG	REL + CHG	Partially Supported
		C376	CIO->ScHDM->CHB->CIOKwValfDta								
		C377	CIO->ScHDM->RELB->CIOKwValfDta								
		C378	CIO->ScHDM->EOB->CIOKwValfDta								
		C379	nCIOALL->ScHDM->TOB->CIOKwValfDta								
		C380	nCIOALL->ScHDM->CHB->CIOKwValfDta								
		C381	nCIOALL->ScHDM->RELB->CIOKwValfDta								
		C382	nCIOALL->ScHDM->EOB->CIOKwValfDta								

C.5.12 H4 - Agreement on CIO Behaviours & Knowledge – IT Operations & IT Products and Applications

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Ther	Env'	Results					Hypoth Supported?
				IT Operations (BAU)		IT Performance Management	...and IT Change Management	...and IT Operational Design	...and IT Resources Planning	...and IT Operations Strategy	
H4u	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Operations (BAU) in low digital maturity scenarios	C383	CIO->ScLDM->TOB->CIOKwITOps		LDM	REL + CHG	CHG	CHG + REL	REL + CHG (REL)	REL + CHG	Partially Supported
		C384	CIO->ScLDM->CHB->CIOKwITOps								
		C385	CIO->ScLDM->RELB->CIOKwITOps								
		C386	CIO->ScLDM->EOB->CIOKwITOps								
		C387	nCIOALL->ScLDM->TOB->CIOKwITOps								
		C388	nCIOALL->ScLDM->CHB->CIOKwITOps								
		C389	nCIOALL->ScLDM->RELB->CIOKwITOps								
		C390	nCIOALL->ScLDM->EOB->CIOKwITOps								
H4v	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Operations (BAU) in high digital maturity scenarios	C391	CIO->ScHDM->TOB->CIOKwITOps		HDM	CHG + REL + EM)	REL + CHG	REL + CHG	REL + CHG + EM (REL)	REL + CHG	Partially Supported
		C392	CIO->ScHDM->CHB->CIOKwITOps								
		C393	CIO->ScHDM->RELB->CIOKwITOps								
		C394	CIO->ScHDM->EOB->CIOKwITOps								
		C395	nCIOALL->ScHDM->TOB->CIOKwITOps								
		C396	nCIOALL->ScHDM->CHB->CIOKwITOps								
		C397	nCIOALL->ScHDM->RELB->CIOKwITOps								
		C398	nCIOALL->ScHDM->EOB->CIOKwITOps								
				IT Products & Applications		Products & Applications provided by IT	...and those provided by (incumbent) 3rd Party Providers	...and those used by the Business	...and those used by Business Customers	…and those used by the Business' Competitors	
H4w	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Products and Applications in low digital maturity scenarios	C399	CIO->ScLDM->TOB->CIOKwITPrdApps		LDM	REL + CHG	REL + CHG	CHG + REL	CHG + REL	N/A (CHG)	Partially Supported
		C400	CIO->ScLDM->CHB->CIOKwITPrdApps								
		C401	CIO->ScLDM->RELB->CIOKwITPrdApps								
		C402	CIO->ScLDM->EOB->CIOKwITPrdApps								
		C403	nCIOALL->ScLDM->TOB->CIOKwITPrdApps								
		C404	nCIOALL->ScLDM->CHB->CIOKwITPrdApps								
		C405	nCIOALL->ScLDM->RELB->CIOKwITPrdApps								
		C406	nCIOALL->ScLDM->EOB->CIOKwITPrdApps								
H4x	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Products and Applications in high digital maturity scenarios	C407	CIO->ScHDM->TOB->CIOKwITPrdApps		HDM	REL (CHG + REL)	REL + CHG (REL + CHG +EM)	REL + CHG	REL + CHG + EM	REL (REL + CHG)	Partially Supported
		C408	CIO->ScHDM->CHB->CIOKwITPrdApps								
		C409	CIO->ScHDM->RELB->CIOKwITPrdApps								
		C410	CIO->ScHDM->EOB->CIOKwITPrdApps								
		C411	nCIOALL->ScHDM->TOB->CIOKwITPrdApps								
		C412	nCIOALL->ScHDM->CHB->CIOKwITPrdApps								
		C413	nCIOALL->ScHDM->RELB->CIOKwITPrdApps								
		C414	nCIOALL->ScHDM->EOB->CIOKwITPrdApps								

C.5.13 H4 - Agreement on CIO Behaviours & Knowledge – IT Services & Technology Architectures

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Ther	Env'	Results					Hypoth Supported?
H4y	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Services in low digital maturity scenarios			IT Services		IT Services provided by IT	...and IT Services provided by (incumbent) 3rd Party Providers	...and IT Services used by the Business	...and IT Services used by Business' Customers	...and IT Services used by Business' Competitors	
		C415	CIO->ScLDM->TOB->CIOKwITSrvs		LDM	CHG + REL (CHG + NTT)	REL + CHG (CHG + REL)	CHG + REL	REL + CHG	N/A (CHG)	Partially Supported
		C416	CIO->ScLDM->CHB->CIOKwITSrvs								
		C417	CIO->ScLDM->RELB->CIOKwITSrvs								
		C418	CIO->ScLDM->EOB->CIOKwITSrvs								
		C419	nCIOALL->ScLDM->TOB->CIOKwITSrvs								
		C420	nCIOALL->ScLDM->CHB->CIOKwITSrvs								
		C421	nCIOALL->ScLDM->RELB->CIOKwITSrvs								
		C422	nCIOALL->ScLDM->EOB->CIOKwITSrvs								
H4z	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of IT Services in high digital maturity scenarios	C423	CIO->ScHDM->TOB->CIOKwITSrvs		HDM	REL + CHG (REL + EM)	REL + CHG	REL + CHG	REL + CHG	REL (REL + CHG)	Partially Supported
		C424	CIO->ScHDM->CHB->CIOKwITSrvs								
		C425	CIO->ScHDM->RELB->CIOKwITSrvs								
		C426	CIO->ScHDM->EOB->CIOKwITSrvs								
		C427	nCIOALL->ScHDM->TOB->CIOKwITSrvs								
		C428	nCIOALL->ScHDM->CHB->CIOKwITSrvs								
		C429	nCIOALL->ScHDM->RELB->CIOKwITSrvs								
		C430	nCIOALL->ScHDM->EOB->CIOKwITSrvs								
H4aa	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Technical Architectures in low digital maturity scenarios			Technology Architectures		IT Infrastructures provided by IT	...and IT Infrastructures provided by (incumbent) 3rd Party Providers	...and IT Infrastructures used by the Business	...and IT Infrastructures used by Business' Customers	...and IT Infrastructures used by Business' Competitors	
		C431	CIO->ScLDM->TOB->CIOKwTechArch		LDM	CHG (CHG + REL)	REL + CHG	CHG + REL	CHG (CHG + REL)	N/A (CHG + REL)	Partially Supported
		C432	CIO->ScLDM->CHB->CIOKwTechArch								
		C433	CIO->ScLDM->RELB->CIOKwTechArch								
		C434	CIO->ScLDM->EOB->CIOKwTechArch								
		C435	nCIOALL->ScLDM->TOB->CIOKwTechArch								
		C436	nCIOALL->ScLDM->CHB->CIOKwTechArch								
		C437	nCIOALL->ScLDM->RELB->CIOKwTechArch								
		C438	nCIOALL->ScLDM->EOB->CIOKwTechArch								
H4ab	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Technical Architectures in high digital maturity scenarios	C439	CIO->ScHDM->TOB->CIOKwTechArch		HDM	REL + CHG	REL + CHG	REL + CHG	REL + CHG	REL (REL + CHG)	Partially Supported
		C440	CIO->ScHDM->CHB->CIOKwTechArch								
		C441	CIO->ScHDM->RELB->CIOKwTechArch								
		C442	CIO->ScHDM->EOB->CIOKwTechArch								
		C443	nCIOALL->ScHDM->TOB->CIOKwTechArch								
		C444	nCIOALL->ScHDM->CHB->CIOKwTechArch								
		C445	nCIOALL->ScHDM->RELB->CIOKwTechArch								
		C446	nCIOALL->ScHDM->EOB->CIOKwTechArch								

C.5.14 H4 - Agreement on CIO Behaviours & Knowledge – Project Management

H4	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO knowledge					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Theme	Env't	Results					Hypoth Supported?
						Sponsoring Portfolios of Programmes and Projects	Sponsoring Programmes	Managing IT Projects mostly impacting Customers	Managing IT Projects mostly impacting the Business	Managing IT Projects mostly impacting IT	
H4ac	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Project Management in low digital maturity scenarios	C447	CIO->ScLDM->TOB->CIOKwProgMng	Project Management	LDM	CHG (CHG + REL + EM)	REL (CHG + REL)	REL (CHG + REL +EM)	CHG + REL	REL (N/A)	Partially Supported
		C448	CIO->ScLDM->CHB->CIOKwProgMng								
		C449	CIO->ScLDM->RELB->CIOKwProgMng								
		C450	CIO->ScLDM->EOB->CIOKwProgMng								
		C451	nCIOALL->ScLDM->TOB->CIOKwProgMng								
		C452	nCIOALL->ScLDM->CHB->CIOKwProgMng								
		C453	nCIOALL->ScLDM->RELB->CIOKwProgMng								
		C454	nCIOALL->ScLDM->EOB->CIOKwProgMng								
H4ad	CIOs and nCIOs agree on the relative importance of the most effective CIO task, change, relationship, and externally orientated behaviours and CIO knowledge of Project Management in high digital maturity scenarios	C455	CIO->ScHDM->TOB->CIOKwProgMng		HDM	REL	REL + CHG + NTT (REL)	REL + CHG	REL + CHG	N/A (CHG + EM)	Partially Supported
		C456	CIO->ScHDM->CHB->CIOKwProgMng								
		C457	CIO->ScHDM->RELB->CIOKwProgMng								
		C458	CIO->ScHDM->EOB->CIOKwProgMng								
		C459	nCIOALL->ScHDM->TOB->CIOKwProgMng								
		C460	nCIOALL->ScHDM->CHB->CIOKwProgMng								
		C461	nCIOALL->ScHDM->RELB->CIOKwProgMng								
		C462	nCIOALL->ScHDM->EOB->CIOKwProgMng								

C.5.15 H5 - Agreement on CIO Behaviours & Learning

H5	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO learning preferences					Key: CIO Pref (nCIO Pref)				1:1 Agree	Partial Agree	Disagree
#	Hypotheses	C#	Construct	Theme	Env't	Results						H Supported?
						More effective Data Management	Improving Business Performance	IT Products and Applications	IT Infrastructure and Networks	Customer needs and trends		
H5a	CIOs and nCIOs agree on the relative importance of the subjects CIOs should learn most about in low digital maturity scenarios	C463	CIO->ScLDM->LrnPref->Subject	Lear'g Subjects	LDM	CHG + REL	REL+ CHG	CHG (EM + REL	N/A (REL + CHG)	CHG + REL		Partially Supported
		C464	nCIOALL->ScLDM->LrnPref->Subject									
H5b	CIOs and nCIOs agree on the relative importance of the subjects CIOs should learn most about in high digital maturity scenarios	C465	CIO->ScHDM->LrnPref->Subject		HDM	REL+ CHG	REL (REL + CHG)	CHG (REL)	N/A (EM + REL)	REL + CHG (REL + CHG + EM)		Partially Supported
		C466	nCIOALL->ScHDM->LrnPref->Subject									
H5c	CIOs and nCIOs agree on the relative importance of a CIOs source of learning in low digital maturity scenarios			Learnng Sources		Inhouse IT Managers and Teams	IT Vendors/ 3rd Party IT Provider Specialists	Business Managers and Leaders	Customers	External peer network(s)	Think Tanks	H Supported?
		C467	CIO->ScLDM->LrnPref->Source		LDM	N/A (CHG + EM)	CHG + REL	CHG + REL (CHG + EM + REL)	CHG (CHG + REL)	REL + CHG	N/A (NTT)	Partially Supported
		C468	nCIOALL->ScLDM->LrnPref->Source									
H5d	CIOs and nCIOs agree on the relative importance of a CIOs source of learning in high digital maturity scenarios	C469	CIO->ScHDM->LrnPref->Source		HDM	REL+ CHG	REL+ CHG	REL (REL + CHG)	REL+ CHG	REL+ CHG	REL (N/A)	Partially Supported
		C470	nCIOALL->ScHDM->LrnPref->Source									

C.5.16 H6 – Agreement on CIO Behaviours & Personal Development

H6	For the most effective behaviour in digitally maturing scenarios, CIOs and nCIOs agree on the relative importance of CIO assessment, ambition and motivation					Key: CIO Pref (nCIO Pref)			1:1 Agree	Partial Agree	Disagree
						Results					
#	Hypotheses	C#	Construct	Theme	Env't	Achieving IT Performance Targets	Achieving Business Performance Targets	Delivering tangible benefits	Delivering new capabilities	Fulfilling Strategic Business Objectives	H Supported?
H6a	CIOs and nCIOs agree on the relative importance of CIO performance assessment in low digital maturity scenarios	C471	CIO->ScLDM->CIOPerfAs	Perfmce Ass'nt	LDM	CHG + REL	CHG + REL (REL)	REL + CHG	CHG (CHG + REL)	CHG + REL (CHG + EM)	Partially Supported
		C472	nCIOALL->ScLDM->CIOPerfAs								
H6b	CIOs and nCIOs agree on the relative importance of CIO performance assessment in high digital maturity scenarios	C473	CIO->ScHDM->CIOPerfAs		HDM	CHG (CHG + REL)	REL (CHG + REL)	REL + CHG	REL + CHG	REL + CHG	Partially Supported
		C474	nCIOALL->ScHDM->CIOPerfAs								
H6c	CIOs and nCIOs agree on the relative importance of CIO ambitions in low digital maturity scenarios			CIO Ambition		Stay Abreast of Technology Development	Constructive Feeback	In Work Opportunties	Regularly Changing Employer	Changing Reporting Line	H Supported?
		C475	CIO->ScLDM->CIOAmbit		LDM	CHG + REL	CHG + REL	CHG + REL	REL (CHG + NTT)	REL (CHG)	Partially Supported
		C476	nCIOALL->ScLDM->CIOAmbit								
H6d	CIOs and nCIOs agree on the relative importance of CIO ambitions in high digital maturity scenarios	C477	CIO->ScHDM->CIOAmbit		HDM	REL + CHG	REL + CHG	REL + CHG	REL + CHG (REL)	REL + CHG (REL)	Partially Supported
		C478	nCIOALL->ScHDM->CIOAmbit								
H6e	CIOs and nCIOs agree on the relative importance of CIO motivations in low digital maturity scenarios			CIO Motivation		Achieving Personal Development Goals	Achieving Personal Financial Goals	Recognition from the Top Management Team	Recognition from Customers	Recognition from their (external) Peers	H Supported?
		C479	CIO->ScLDM->CIOMotiv		LDM	CHG	REL + CHG (N/A)	REL + CHG	REL + CHG (CHG)	REL (CHG + REL)	Partially Supported
		C480	nCIOALL->ScLDM->CIOMotiv								
H6f	CIOs and nCIOs agree on the relative importance of CIO motivations in high digital maturity scenarios	C481	CIO->ScHDM->CIOMotiv		HDM	CHG + REL	REL (N/A)	REL + CHG	REL (CHG + REL)	REL (CHG + REL)	Partially Supported
		C482	nCIOALL->ScHDM->CIOMotiv								