

Management Development and the Supply Chain Manager of the Future

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With the growing acceptance of logistics and supply chain management as critical business concerns, there is an emerging realisation that more investment is needed to develop appropriate managerial skills and competencies. This paper explores the challenges for management development that arise as organisations seek to bridge the gap between current capabilities and those required for future success. The results of an exploratory research programme are summarised and, drawing on these findings, a tentative skills profile for the logistics and supply chain manager of the future is advanced.

A key feature of the current business environment is the idea that supply chains compete, not companies (Christopher, 1992). Managing supply chains effectively is a complex and challenging task, as a result of the continuing trends of expanding product variety, short product life cycles, increased outsourcing, globalization of businesses, and continuous advances in information technology (Lee, 2002). In recent years supply chain management (SCM) has grown in acceptance: ‘... the area that was once considered to be only of minor concern to managers is now at the forefront of business planning. The discipline that had a difficult time getting the attention of senior managers in firms now has representatives in the top echelons of most organisations’ (Lancioni, 2000). In this milieu, logistics managers and supply chain managers play a pivotal role in ensuring continued firm competitiveness and success. This paper is concerned with both logistics managers and supply chain managers. Definitional, and practical, differences exist between logistics and supply chain management, and while the terms are often used interchangeably, they are distinct (Cooper et.al, 1997). Logistics can be defined as the planning and management of physical and information flows through an organisation, whereas supply chain management extends this concept into the wider network of the organisations suppliers and customers. As such, supply chain managers not only need to be equipped with the skills and knowledge to manage logistics but also they must be relationship managers.

Whilst recognising that logistics and supply chain management can be, and often are, managed separately we argue that at this early stage in the acceptance and implementation of these ideas the reality is that they tend to be managed conjointly. For this reason we will use the label ‘supply chain manager’ as a generic descriptor.

THE CURRENT CHARACTERISTICS AND ROLE OF SUPPLY CHAIN MANAGERS

Currently supply chain managers are a quite varied group and to an extent reflect the disparate origins of the subject in terms of their functional background - they often come into a logistics / supply chain role from other areas such as transportation, procurement, IT, finance, etc. Indeed it is only in recent years, with the advent of focused undergraduate courses in logistics and SCM, that people are coming into the logistics / SCM function directly from University. The annual survey of logistics managers and directors in the US carried out by the Supply Chain Management Research Group at the Ohio State University (LaLonde and Ginter, 2004) gives an insight into the characteristics of the typical supply chain manager; respondents to their 2004 survey were: 93.5% male, 6.5% female; median age for logistics directors was 43 and for managers was 39; of the survey respondents 89% had a baccalaureate degree, 63% had a masters degree and 18% had professional qualifications (for example APICS); for the respondents who were logistics managers average time worked in logistics was 18.5 years, time with current firm 4.2 years and time in current position 3.7 years. Similar profiles were obtained in a survey of Australian logistics managers by Sohal and D'Netto (2004): 62.5% of their survey respondents were aged between 35 and 49, 76% had a higher degree or diploma, and 63% had worked in the logistics function for over 10 years. While these data are not necessarily typical of supply chain managers everywhere, they are nonetheless indicative of general perceptions of the sector which are that females are under-represented, people work within the function for many years, and rotate jobs relatively frequently.

In recent years, there has been a growing awareness of the critical role played by people, knowledge and talent in the context of supply chain success. In a panel discussion with seven of the leading thinkers in the field of supply chain management, the issue of management talent came to the fore: 'despite years of process breakthroughs and elegant technology solutions, an agile, adaptive supply chain remains an elusive goal. Maybe it's the people who are getting in the way supply chains, it seems are really about talent, not technology, especially as the marketplace grows ever more complex' (Kirby, 2003). Similarly, van Hoek et al (2002) describe managers in the supply chain as 'the critical dimension'. On an anecdotal level, we recently heard a bank manager point out in a presentation to managers from various medium-sized logistics companies that in his view three factors were of utmost importance for the success of these companies: management, management and management ! Quinn (2004) suggests that to achieve any measure of supply chain success, three critical elements (people, process and technology) need to be kept in balance. He adds that there is no single answer as to which of these three is the most important to supply chain success, although he does add that 'you can't do *anything* without the right people'. Research by Langabeer and Seifert (2003) has pointed to the critical role played by supply chain managers in ensuring the success of intercompany mergers; they show that a correlation exists between merger success and how well integrated the supply chains are, and this in turn is dependent upon the role played by supply chain managers.

SKILLS AND COMPETENCY REQUIREMENTS FOR SUPPLY CHAIN MANAGERS

Murphy and Poist (1991, 1994) suggested that the senior-level logistics manager needs to be proficient in three skills categories namely: business skills, logistics skills and management skills. In their survey of executive search firms, logistics practitioners and logistics educators, management skills emerged as the most important of the three categories, followed by logistics skills and then business skills. Gammelgaard and Larson (2001) posited a three-

factor model of SCM skill areas for executive development and other programmes aimed at logistics managers: interpersonal/managerial basic skills, quantitative/technological skills, and SCM core skills. They also stressed the importance of good communications skills for today's logisticians, both upward and downwards communication within the organisation, as well as being able to communicate across functions and organisations so as to coordinate SCM. The consensus view across studies of supply chain managers would appear to be that respondents regard themselves as 'managers first and logisticians second' with requisite skills and competencies sets that comprise both general management skills and competencies and specific logistics / supply chain skills and competencies (see, for example, Mangan *et al*, 2001).

Supply chain management implies a 'horizontal' organisational orientation rather than a 'vertical' one. Traditional businesses are organised on functional lines with strong hierarchical underpinnings. The managers who work in those types of business have typically been trained and/or gained experience in very specific areas such as marketing, production management, accountancy, etc. They will move upwards through the hierarchy as they demonstrate increasing capability in that narrow functional area.

The performance measurement systems that are frequently used in these organisations mirror the vertical structure, i.e. they monitor progress towards the achievement of functional goals.

By contrast, in the 'horizontal' organisation, managers work across functions often as part of teams where different functional skills are brought together with a common process focus. Because business processes are the means by which customer value is created in any business, there is a strong logic in arguing that process management rather than functional management should be the basis for organisational design.

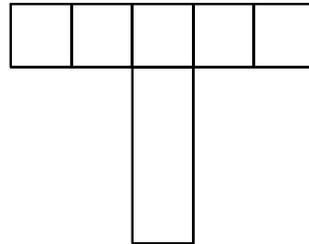
To enable 'horizontal' or process-focused management to become a reality, clearly requires appropriate skill sets amongst managers. The implication is that the management development process must focus on a holistic view of the way in which customer value is created and delivered. This in turn suggests the need to develop an awareness of how the interface in a supply chain needs to be managed and how actions taken in one area might affect the performance of the whole. Thus, the need for a greater level of 'cross-training' across functional boundaries to ensure that the whole becomes more than the sum of its parts.

The implication of this re-orientation is that the supply chain manager of the future will require a 'T-shaped' skills profile (see Figure 1).

Figure 1 – Skills Profile

Effective process management requires significant cross-functional skills.

Creating the 'T-shaped' skills profile:-



Managers have in-depth expertise in one discipline combined with enough breadth to see the connections with others

The idea is that as well as bringing specific logistics management skills to the job (the vertical bar) supply chain managers need to have a wide understanding of related areas such as for example business process engineering, asset management and activity based costing (the horizontal bar).

Recently Christopher (2004) identified seven major business transformations which will have significant implications for supply chain management skills profiles. In his presentation (Table 1), Christopher mapped each of these seven business transformations against both their direct impact on the supply chain and the skills which would as a result be required.

	Business Transformation:	Leading to:	Skills required:
1.	From supplier-centric to customer-centric	The design of customer-driven supply chains	Market understanding; customer insight
2.	From push to pull	Higher levels of agility and flexibility	Management of complexity and change
3.	From inventory to information	Capturing and sharing information on real demand	Information systems and information technology expertise
4.	From transactions to relationships	Focus on service and responsiveness as the basis for customer retention	Ability to define, measure and manage service requirements by market segment
5.	From 'trucks and sheds' to end-to end pipeline management	A wider definition of supply chain cost	Understanding of the 'cost-to-serve' and time-based performance indicators
6.	From functions to processes	The creation of cross functional teams focussed on value creation	Specific functional excellence with cross-functional understanding. Team working capabilities
7.	From stand alone	More collaborative	Relationship management and

	competition to network rivalry	working with supply chain partners	win-win orientation
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Table 1 The key business transformations and the implications for management skills (Christopher, 2004)

Christopher's framework again comprises both management skills and competencies and logistics / supply chain management skills and competencies. These skills requirements for future supply chain managers are wide and varied (perhaps more so than might be the case with other categories of managers), with an emphasis in particular on what could be described as interpersonal and communications skills.

DEVELOPING THE SUPPLY CHAIN MANAGER OF THE FUTURE

Given the emerging profile of the various roles, skills and competencies of supply chain managers, the question arises as to how best can these managers be developed? Bowersox *et al* (2000) identified a requisite shift from training to knowledge-based learning as one of the ten mega-trends that will revolutionize supply chain logistics. The concept of the learning organisation, popularised by Senge (1990) and Pedlar *et al* (1991), is now well established. Bessant *et al* (2003) take the concept a stage further and consider learning across entire supply chains - given that organisations can and do learn, they suggest that further benefits can accrue from learning among the wider entity of the supply chain. Ellinger *et al* (2002) summarise that the overall premise of the learning organisation concept is that the firm can improve performance by developing the learning skills and harnessing the knowledge of its employees. Regrettably, however, their research in the US suggests that logistics organisations may not be the best examples of learning organisations and stand accused of having placed far less of an emphasis on the growth and development of personnel than on operational efficiency and improving customer relations. This point is echoed by Easterby-Smith (1997) who noted that within the production management discipline the dominant ontology is around the link between learning and organisational productivity / efficiency.

In terms of provision, many countries now provide a range of development activities for supply chain managers. Many of these activities take place around the professional bodies, examples of which include the Council of Supply Chain Management Professionals (www.cscmp.org) and the Chartered Institute of Logistics and Transport in the UK (www.ciltuk.org.uk). In addition, the tertiary education sector provides a range of courses and qualifications, ranging from vocational qualifications and executive education programmes to undergraduate and postgraduate degree level qualifications. A more recent development has been the emergence of publicly funded, regional centres of excellence for the development of skills levels and management capabilities in logistics and SCM. This dovetails with the increased recognition being given by many public policy makers to management capability and management development generally. Three examples of such developments are: The Logistics Institute–Asia Pacific (TLI-AP), a joint venture between the Singapore government, the National University of Singapore and Georgia Institute of Technology in the US (Box 1); the MIT - Zaragoza International Logistics Programme in Spain (Box 2); and the recently established University Of Hull Logistics Institute (Box 3).

Box 1

The Logistics Institute–Asia Pacific (TLI-AP) (www.tliap.nus.edu.sg)

TLI-AP has as its mission to be the premier institute in Asia Pacific nurturing logistics excellence in research and education. Located at the National University of Singapore, the institute is modelled after The Logistics Institute (TLI) at Georgia Institute of Technology in the US. TLI has four major programmes:

- A comprehensive global logistics and supply chain research programme
- A dual masters degree programme in logistics and SCM
- A logistics executive education programme
- Industry outreach programmes: Leaders in Logistics, Market Research Centre, Centre of Competence (COC) in Optimisation.

Box 2

**The MIT - Zaragoza International Logistics Programme in Spain
(web.mit.edu/zlc)**

The MIT-Zaragoza International Logistics Programme is a research and education partnership between MIT, the University of Zaragoza, industry, and the government of Aragón in Spain. The programme combines resources from the MIT Center for Transportation and Logistics and the Zaragoza Logistics Center (ZLC), a research institute associated with the University of Zaragoza. ZLC is based in PLAZA, reportedly the largest logistics park in Europe, which is currently being built in Zaragoza, and which offers faculty and students direct access to a concentration of logistics activity and state-of-the-art technology

Box 3

**The Logistics Institute at the University of Hull
(www.hull.ac.uk/hubs/logistics)**

Funded from a mix of European Union, UK Government and University funds, a Logistics Institute is currently being established at the University of Hull which is located in the Humber region on the east coast of England. This region comprises the largest ports conurbation in the UK and is an important node for trade with Northern Europe, especially given the increasing congestion in the southern part of the UK. Set to employ over 30 full-time staff, plus additional part-time staff and contract consultants, the institute will provide a range of degree programmes, short courses and consultancy services. It will also have a resource centre and technology demonstration area to help practitioners stay abreast of the latest developments in logistics.

There is little data available with regard to the types, quantities and effectiveness of training and development undertaken by logistics and supply chain managers. Mangan *et al* (2001) showed that the most common types of training received by their sample of logistics managers were (in decreasing order of frequency): formal college, in-house training, seminar / workshop, 'on the job', and in-house training with an external trainer. In terms of skills and competencies, Gammelgaard and Larson (2001) note that skills are general tools and rules taught in most logistics classes, whereas to reach competence level in the logistics discipline they suggest that practitioners acquire context-dependent knowledge through organisational

experience, thus highlighting the importance of relevant on-the-job experience. A criticism of much logistics and SCM education is that there is often too much emphasis on the technical aspects of the role, to the detriment of the other elements (see, for example, van Hoek et al, 2002).

A variety of teaching modes are generally employed in logistics / SCM education and development. These modes include those generally employed elsewhere such as lectures and guest presentations. Given the nature of the subject, site visits to logistics facilities such as warehouses etc. are common and generally found to be very beneficial by participants. Frequent use is also made of computer based training, group exercises and simulations. One of the most popular such simulations used in logistics and SCM is the 'Beer Game' which is used to introduce students to the challenges of managing supply chains (Sparling, 2003). The game was originally developed at MIT and is based on the systems dynamics work of Forrester (1958) at that university in the 1950s. Many variants of this game are now in use.

As regards degree programmes in SCM, Handfield (2004) noted that providers need to ensure the provision of fully integrated SCM programmes that take account of the integration-oriented skills required of successful graduates. With regard to university provision of SCM education, there is some evidence of differences in the pedagogical perspective of individual universities. This is perhaps understandable when considered in light of the evolution of logistics and SCM, with different universities perhaps reflecting the varying origins of the subject. At MIT in the US, for example, a university renowned for its emphasis on science, engineering and technology, the focus is very much on 'engineering the supply chain' (Caplice et al, 2004) with an emphasis on teaching both analytical skills and management skills. At Erasmus University in the Netherlands, in contrast, the focus in logistics / SCM teaching is very much on economics and econometric skills. Other examples include Cranfield University in the UK which has developed the marketing aspects of logistics and SCM and more recently has pioneered the agile supply chain concept, while Cardiff University in the UK has pioneered the concept of lean logistics, particularly as a result of its work in the automobile sector.

In a survey of senior logistics managers' views on developing valuable logistics managers (i.e. their subordinates), Myers *et al* (2004) showed that neither job experience nor education level were found to be directly related to employee performance, but that various job skills (such as decision-making and problem-solving skills) appear to be good predictors of employee performance. They caution however not to discount education and experience as these may represent minimum or threshold level requirements in order to function as logistics managers. Myers *et al* (2004) conclude that while in the past most education in the US emphasised book knowledge, a re-evaluation is needed to determine the appropriate blend of soft and hard skills.

RESEARCH METHODOLOGY

There were three constituencies of interest in the context of the current research programme which aimed to investigate the knowledge areas, skills and competencies required by supply chain managers and the preferred approaches for the development of these managers. The three constituencies were:

- Providers: academics and management developers engaged in the development of supply chain managers;
- Users: students (in the case of graduate programmes) and participants (in the case of executive programmes) who partake in such development;

- Buyers: corporates who pay for such development.

Given the nature of the subject matter, it was deemed essential as far as was practicable to ascertain views from actors in each of these three constituencies. A triangulated research approach (Easterby-Smith *et al*, 1991 and Hussey and Hussey, 1997) was employed. Interviews were conducted with three leading academics and management developers from the US, the UK and the Netherlands. Ten further responses were elicited via a survey of other (carefully selected) academics and management developers from Europe and Asia. A survey was conducted of recent graduates from the #1 ranked masters degree programme in logistics / SCM in the US and a total of 26 usable responses were received. The views of participants on executive education programmes were obtained both via a focus group (10 participants) and a survey (23 usable responses) of executives working for both multinational and indigenous firms in Ireland and who are either currently engaged in, or have recently completed, a management development programme for logistics / supply chain managers. Finally, the 'buyers' constituency was represented via interviews with executives responsible for management development in the logistics / supply chain area at one of the world's leading pharmaceutical companies (Glaxosmithkline). Discussions were also held with a number of other multinational companies, however for a variety of reasons it was not possible to elicit from these companies valid data for this research effort.

RESULTS & DISCUSSION

Table 2 outlines some of the key themes which emerged from the interviews with providers, while Tables 3 and 4 illustrate some inter-group comparisons. In addition, Box 4 discusses the issues which arise in the context of the case study company (Glaxosmithkline).

Theme	Specific Issues
Specific logistics competencies are required for emerging markets.	As countries such as India and China develop, one of the key challenges will be how to 'manage' logistics <u>within</u> these large countries. Similarly, supply chain managers from these countries will focus on different areas (such as trade regulations and international transport) to their counterparts from developed countries.
Courses need to be more practical.	Often there can be an overemphasis on academic content to the detriment of practical content. In addition, other areas need to be added to syllabi such as, for example, leadership.
Multimodal nature of logistics and SCM needs to be highlighted more.	Growing international trade combined with environmental and other issues impacting particular transport modes is leading to the growing use of multimodal transport with which supply chain managers will need to be familiar.
Need to differentiate between different learners.	Learning needs of those new to the function versus those with experience within the function will differ. Similarly learning capabilities of supply chain managers range from those with too narrow a perspective to those with an ability to both reflect and think strategically.
Focus on processes and flows.	Avoid encouraging a mentality that focuses only on specific sectors or functions ('silos').
In-class exercises.	In-class exercises which can last up to half a day can be especially useful particularly if they are properly sequenced and structured into a course.
Best practice exists within certain companies.	Limited, but highly insightful, examples of best practice logistics and supply chain management development exist within particular companies.

Table 2 Key themes from the interviews with providers

Box 4

Logistics / Supply Chain Management Development at Glaxosmithkline

Glaxosmithkline (GSK) is one of the world's leading pharmaceutical companies with an estimated 7% of the world's pharmaceutical market. With over 100,000 employees worldwide, the company had sales of \$35.2 billion and profit before tax of \$11 billion in 2003. Of the company's 100,000 employees, over 40,000 are in sales and marketing (the largest sales force in the industry), while around 35,000 work in manufacturing (across 85 sites in 37 countries).

Glaxosmithkline believe that they are at the forefront of logistics and supply chain management education. Two years ago they established an 'Academy of Logistics' which is run from both their UK (Global HQ) and US sites. The focus of the Academy is very much on blended learning and it comprises a raft of online courses on various different aspects of logistics and SCM. These are supplemented by face to face classes, fora with external speakers and live webcasts, best practice alerts and a company focused online simulation. Topics covered are both of a general nature (e.g. key principles of different aspects of SCM) and also specifically business related (e.g. demonstrations of new production protocols, dissemination of company policies and procedures, etc.). The portals and various online components of the Academy are very clearly presented, easily navigated and allow for regular and focused self-assessment by users. Usage of the Academy can be incorporated into participants' personal development plans and there is also an assessment capability which can chart participant progress. Users' managers can also access the system and chart their subordinates' progress.

Going forward, the company sees two key areas for development with regard to the Academy. The first concerns partnering with an expert logistics / supply chain organisation (university / consultancy / other) with a view to advanced studies (e.g. a company focused and blended masters programme in logistics / SCM). The second area concerns knowledge management. What the company would like to achieve is to move beyond mere knowledge sharing (which they regard as a somewhat passive role) to a more proactive role whereby once best practice is identified it is actively placed into the system. Following on from this, usage of, and benefits from, such best practice could be measured.

Barriers and difficulties identified to current usage of the Academy include: timezone differences, internet and intranet access and speed for users, users' ability to block off in-company time to use the system, management support, and issues around responsibility for payment (from central overhead or from users' budgets).

Knowledge areas, competencies and skills

Table 3 compares the key knowledge areas for providers, graduate students and participants. There was a lot of similarity in the areas listed across the three groups, albeit with differences in the individual hierarchies for each group. The key areas were thus, in aggregate, finance, IT, management, and operations / SCM. 'Legal' was also listed by the participants group (instead of finance). Table 4 compares the competencies and skills required for the three

groups. The providers and graduate students had the exact same hierarchy of factors. The participants group had three of the same four factors as the other two groups, but with a different hierarchical ranking. The key competencies and skills were thus, in aggregate, analytical, interpersonal, leadership and change management. 'Project management' was also listed by the participants group (instead of analytical). Other key knowledge areas and competencies / skills which were identified during the course of the research (via the provider interviews, individual survey respondent comments, etc.) included specific competencies for emerging markets, an understanding of multimodal logistics, an understanding of security and international trade rules, and the ability to think in terms of processes and flows.

Providers	Graduate students	Participants
=1. Finance	1. Ops/SCM	1. Ops/SCM
=1. IT	2. IT	2. Management
=1. Management	3. Finance	3. IT
4. Ops/SCM	4. Management	4. Legal

Table 3 Comparison: Key knowledge areas required

Providers	Graduate students	Participants
1. Analytical	1. Analytical	1. Interpersonal
2. Interpersonal	2. Interpersonal	2. Change Management
3. Leadership	3. Leadership	=3. Project Management
4. Change Management	4. Change Management	=3. Leadership

Table 4 Comparison: Competencies and skills required

Table 5 groups the various knowledge areas and competencies / skills which emerged from the research. Overall, the providers and graduate students shared similar views, while some differences existed between these groups and the participants group. Educators and developers should be cognisant of these minor, yet subtle, differences in participants' requirements.

Knowledge areas - General	Finance IT Management / Strategy
- Logistics / SCM specific	Operations / SCM Focus on processes / flows Legal, security and international trade Multimodal logistics Logistics in emerging markets
Competencies / skills	Analytical Interpersonal Leadership Change management Project management

Table 5 Key knowledge areas and competencies / skills required by logistics and supply chain managers

There appears to be broad agreement between the factors listed in table 5 and the literature reviewed, although perhaps the listing in the above table comprises more detail than some of the literature which seemed to aggregate factors into broad categories. The listing of factors in the table would appear to dovetail quite closely with the key business transformations and implications for management skills identified by Christopher (2004) and illustrated in Table 1 - for example, one of the key transformations he lists is that from functions to processes with a resulting requirement for cross-functional understanding. The listing in table 5 would appear to suggest that the supply chain manager's job is indeed complex and multidimensional, requiring both general management and logistics / supply chain specific knowledge, competencies and skills. Christopher (2004) notes that 'there is clearly a need for an acceleration in the rate at which these critical skills can be acquired and new mechanisms must be developed to enable this to happen. For logistics educators there are exciting opportunities for creating more flexible and innovative ways of meeting the growing demand for training and development in logistics and supply chain management'.

Preferred teaching approaches

Providers	Graduate students
1. Simulations	1. Cases
2. Cases	2. Lectures
3. Group Projects	3. Simulations
4. Lectures	4. Site visits

Table 6 Comparison: Preferred teaching approaches

Table 6 compares the preferred teaching approaches as viewed by providers and graduate students. While similar approaches were listed by both groups (simulations, cases and lectures), the relative hierarchies differed. Furthermore, two other areas were also ranked (one each by each group), namely group projects (by providers) and site visits (by graduate students). Approaches and issues mentioned during other phases of the research (via the provider interviews, individual survey respondent comments, etc.) included the need for courses to be more practical, the use of properly sequenced and structured in-class exercises, and the benefits in terms of skills development for individual learners which can accrue from group projects, student presentations, small student seminars and discussion groups. On this latter point what was perhaps interesting was that no mention was made during the course of this research by any of the respondents of learning from peers (in terms of specific logistics / supply chain knowledge, as opposed to general skills development). The case study of logistics / supply chain management development at Glaxosmithkline also highlighted the efficiencies and benefits for both the organisation and individual learners which are leveraged from their blended learning approach. Again, these various insights concur with what was elaborated in the literature review, and hopefully add further insights.

Optimum approaches for career development

Only the providers' survey comprised questions around optimum approaches for career development. A focused masters degree in logistics / SCM emerged as the favoured approach for developing and advancing a career in logistics / SCM (this could of course be

due to respondent bias in that many of the respondents will likely be directly involved with such degrees). This was closely followed by in-company / tailored executive education programmes in logistics / supply chain management (as distinct from open / public programmes which were ranked fourth). The other issue highlighted with regard to career development during the course of the research is the need for coaching and development for the relatively young and inexperienced managers who comprise a large proportion of the community of supply chain managers in many developing countries.

AREAS FOR FURTHER WORK

In any research exercise there is always insufficient time to investigate the many issues and dimensions one would like to investigate. Furthermore, new issues and other insights do emerge during the course of a research exercise which are worthy of investigation. Areas for further investigation we identified include:

- in-depth case studies on best practice logistics / supply chain management development at particular organisations are likely to be very insightful, certainly given our experience with the large pharmaceutical company we studied.
- Extending the research effort to include perceptions of preferred teaching approaches among participants on executive education programmes.
- Examining the learning styles and abilities of different types of participants on logistics programmes (e.g. those working in the field for a long period, new entrants to the field, those with formal third level qualifications versus those without such qualifications, etc.)
- Continuing on the learning theme, examining the link between individual, organisational and supply chain learning. Issues in this regard were considered in the literature review above and again arose in the context of the discussion on knowledge management with Glaxosmithkline.

It is apparent from our research that the demand for experienced and qualified supply chain managers exceeds the current supply. Whilst there are a growing number of universities and business schools that offer specialist programmes at degree and post-experience level, the take-up of these programmes is very small against the perceived need. A small number of companies, usually large and global, have recognised the need for a more pro-active approach to logistics and supply chain management development through the creation and provision of in-house learning capabilities. The opportunities for partnerships between academic institutions and the corporate sector in developing and delivering knowledge and learning in these areas are also considerable. There can be no doubting that the achievement of supply chain excellence in the marketplace can only be built upon excellence in the skills and competencies of the people who manage those supply chains. For the moment it seems that there is still some way to go.

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