

# TRENDS IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT: A FOCUS ON RISK

**David B. Grant \***

Hull University Business School, Hull, United Kingdom

## ABSTRACT

*The logistics and supply chain management domain faces a number of ongoing trends and resultant issues including costs, the globalisation of supply and markets, time compression, product complexity and shrinking product life cycles, quality of performance and service, a shortage of logistics and supply chain management talent, their impact on the natural environment, and risk and disruption and supply chain security. This paper discusses and synthesises these important trends and focuses on risk as an issue that, besides costs, underlies and/or affects almost every other trend. These trends are also related to the context of Thailand and Asia due to their importance in the run-up to the Asian Economic Community (AEC) 2015. Some suggestions are provided for risk mitigation strategies that will address the other trends.*

**Keywords:** Logistics, supply chain management, trends, risk

## บทคัดย่อ

แวดวงการจัดการโลจิสติกส์และโซ่อุปทานต้องเผชิญกับกระแสและประเด็นต่างๆ ที่ส่งผลให้เกิดการเปลี่ยนแปลงอย่างต่อเนื่อง อาทิเช่น ต้นทุน โลกาภิวัตน์ของอุปทานและตลาด การบีบเวลาให้สั้นลง ความซับซ้อนของสินค้า และวงจรชีวิตของสินค้าที่สั้นลง คุณภาพของผลงานและบริการ การขาดแคลนผู้มีความสามารถทางด้านการจัดการโลจิสติกส์และโซ่อุปทาน งานวิจัยนี้ถกประเด็นและสังเคราะห์กระแสที่สำคัญเหล่านี้ และจะมุ่งไปที่ประเด็นเรื่องความเสี่ยง ซึ่งส่งผลกระทบต่อกระแสหลักอื่นๆ นอกเหนือจากเรื่องของต้นทุน กระแสต่างๆ เหล่านี้ยังมีความเกี่ยวข้องกับประเทศไทยและเอเชีย สืบเนื่องมาจากการเข้าร่วมประชาคมเศรษฐกิจอาเซียนในปี ค.ศ. 2015 งานวิจัยนี้ยังให้ข้อเสนอแนะ เพื่อเป็นกลยุทธ์ในการลดความเสี่ยงซึ่งเป็นประเด็นที่อยู่ในกระแสเช่นกัน

## INTRODUCTION

Logistics and supply chain management (SCM) permeate almost all aspects of our daily lives and without them we would not have many of the goods, products and services that we take for granted in our normal existence. Logistics activities also have a major economic impact on countries and their societies and hence the cost of logistics and SCM are important criteria for both firms and governments.

---

\*Dr. Grant is Professor of Logistics, Director of the Logistics Institute, and Associate Dean (Business Engagement), at the University of Hull in England. Email: d.grant@hull.ac.uk

Logistics costs accounted for 8.2% of gross domestic product (GDP) in the United States in 2013, or about \$1.39 trillion (Wilson, 2014). In Europe, they accounted for 7.2% of GDP across the EU 27 countries or about €850 billion in 2008 (A.T. Kearney and the European Logistics Association, 2009). Asian logistics costs, excluding China, Japan and India, accounted for about 17% of GDP (Wilson, 2014), while in Thailand they represented a little over 15% or US \$55.4 million of GDP in 2010 (Pajitrapapon, 2013). Thus, costs may be considered a hygiene factor as a trend and ongoing issue that underlies management thought and decision-making.

At the turn of the Millennium fifteen years ago, around a dozen articles were published in academic and practitioner journals looking at trends and future prospects for logistics and SCM. Together with previous work from the 1990s on future logistics requirements and issues, there were about 25 total pieces on the subject. An examination of the trends and issues discussed in these articles by Grant (2003), excluding costs as a given, is shown in Table 1 together with a simple frequency count of appearance in the various articles. Grant only found three topics that exceeded a frequency count of ten: Information Technology including Virtual Logistics or E-Commerce (15 articles) Integrated Supply Chains and SCM (13) and Customer Service (12).

**Table 1: Topics and frequency count of logistics and SCM trends (from Grant, 2003)**

Topic in Alphabetical Order	Number of Articles
Customer Service	12
Forecasting including Collaborative Planning, Forecasting and Replenishment (CPFR) and Efficient Consumer Response (ECR)	6
Globalisation or International or Pan-European Logistics	6
Green or Reverse Logistics	3
Human Resources including Training and Education	3
Information Technology including Virtual Logistics or E-Commerce	15
Integrated Supply Chains and SCM	13
Interfunctional or Interdisciplinary Integration	3
Logistics Operational Activities including Warehousing, Inventory, and Transportation	5
Supply Chain Partnerships or Relationships	5
Logistics Theory Building	4
Third-Party Logistics (3PL) and Outsourcing	5
Value Addition including Economic Value Added (EVA)	5

In the mid 2000s A.T. Kearney and the European Logistics Association (2009) also provided a set of trends affecting manufacturing and logistics, which included most found by Grant but which also added some such as product complexity and time compression. Handfield et al.

(2013) brought that study up to date and noted that risk and disruption and a shortage of talent were becoming more important. Finally, Banomyong (2010) discussed trends in Asia and introduced supply chain security as one part of risk.

This paper discusses and synthesises the important trends and issues found in these four studies concerning the logistics and SCM domain, and focuses on risk as an issue that, besides costs, underlies and/or affects almost every other trend. These trends are also related to the context of Thailand and Asia due to their importance in the run-up to Asian Economic Community (AEC) 2015. Some suggestions are provided for risk mitigation strategies that will address the other trends.

The trends are listed at the end of this introduction and the remainder of the paper is structured as follows. The next section discusses each trend, followed by concepts of risk as they impact each trend, and finally concluding remarks round off the paper. The list of trends is as follows:

- Globalisation of supply and markets
- Time compression, product complexity and shrinking product life cycles
- Quality of performance and service
- Shortage of logistics and SCM talent
- Impact on the natural environment
- Risk and disruption and supply chain security

## **DISCUSSION OF TRENDS**

### **Globalisation of supply and markets**

Globalisation is a major trend affecting not only the world economy but logistics and SCM as well. Factors such as the advent of container shipping and computing power, the removal of tariff barriers, and the move to outsourcing manufacturing and services to other countries have all contributed to an increase in global trade since the end of World War II. Merchandise exports grew by a factor of 3,300% since that time and global container trade has increased on average 5% per year over the last twenty years and at its peak in the mid-2000s comprised 350 million twenty-foot equivalent (TEU) containers per year (Grant, 2012). Container shipments declined during the recession in 2008 and 2009 however the market has recovered and in 2010 was 200 million TEU.

Global trade flows are also important in terms of shipping and port capacities. The Maersk Group developed a forecast of container traffic by 2015 (Kolding, 2008). In the major global trade corridors there are 42 million TEU movements forecast between Asia and Europe, 31 million TUE between Asia and North America, and 45 million TEU intra-Asia, which likely reflects trade between Asian countries related to sub-contracting manufacturing and providing logistics services such as consolidation for other marketplaces. These forecasts suggest there might be bottlenecks emerging in port capacity to handle increased container traffic. While the Maersk Group has led the shipping sector in building large vessels that can carry up to 18,000 TEU, such large ships may not be able to go through the Panama or Suez Canals and thus take

longer to reach destinations. Further, many ports around the world do not have berths or handling equipment sufficient to service such ships.

Handfield et al. (2013) argued that logistics performance measured by delivery reliability has deteriorated due to increasing customer requirements, greater volatility, and problems with infrastructure. Over two-thirds of respondents to their survey noted that their firm's logistics capability is negatively influenced by poor transportation infrastructure, which may be a problem in emerging countries. One way of determining the logistics capability of any country is the World Bank's Logistics Performance Index (LPI), which is a weighted average of individual country scores on six key dimensions: the efficiency of clearance processes, quality of trade and transport related infrastructure, the ease of arranging competitively priced shipments, the competence and quality of logistics services, the ability to track and trace consignments and the timeliness of shipments in reaching destination within a scheduled or expected delivery time (Arvis et al., 2014). The maximum score is 5.0, and the country at the top of the 2014 Index is Germany with a score of 4.12. Thailand was ranked 35<sup>th</sup> with a score of 3.43 and its performance for the last seven years is shown in Table 2.

**Table 2: Logistics Performance Index Results for Thailand (from Arvis et al., 2014)**

Year	LPI Rank	LPI Score	Customs	Infrastructure	International shipments	Logistics competence	Tracking and tracing	Timeliness
2014	35	3.43	3.21	3.40	3.30	3.29	3.45	3.96
2012	38	3.18	2.96	3.08	3.21	2.98	3.18	3.63
2010	35	3.29	3.02	3.16	3.27	3.16	3.41	3.73
2007	31	3.31	3.03	3.16	3.24	3.31	3.25	3.91

Thailand's relatively stagnant performance in the LPI, which only has a few measures related to imports and exports, has led Thailand's Ministry of Industry, Bureau of Logistics to establish a 'Thailand LPI' focusing on nine logistics measures across three dimensions of costs, time, and reliability as shown in Table 3 (Chaisurayakarn et al., 2014). These measures were developed from Grant et al. (2006) and Banomyong and Supatn (2011) to support a logistics master plan for the country to reduce its logistics costs percentage compared to GDP by 3% by the end of this decade (Paijitprapapon, 2013).

**Table 3: Thailand's 'Logistics Performance Index' (from Chaisurayakarn et al., 2013)**

Thailand Logistics Performance Index		
Costs	Time	Reliability
Transport costs per sales ratio	Average order cycle time (days)	DIFOT (Delivered In-Full On-Time)
Warehouse costs sales ratio	Average delivery cycle time (days)	Forecast accuracy
Inventory costs per sales ratio	Average inventory days (days)	Return rates

### **Time compression, product complexity and shrinking product life cycles**

The concept of time compression, i.e. reducing the order cycle time (OCT), was first discussed in the late 1990s (Mason-Jones and Towill, 1999), however customer expectations for the delivery of goods have seen OCTs fall from 100 days in the late 1980s to 44 in 2008 on average (A.T. Kearney and the European Logistics Association, 2009). The average sailing time for a container

ship to travel from Asia to Europe is about 28 days, which leaves 16 days to possibly manufacture, package and ship to port products in an agile supply chain where product variability is high (Grant, 2012).

At the same time, many products have become more complex, from the Airbus A380 airplane to the Apple iPhone6. Airbus encountered major delays when first building the A380 in the mid-2000s due to the complex nature of the airplane and its vast number of subassemblies and parts. Airbus developed their Power8 programme to reduce costs, save cash and develop new products faster (BBC, 2014). Its objective with this programme was to increase productivity by 20% and reduce overheads by 30% to deliver cash savings of Euro 5 billion. Some analysts at the time thought that Airbus would have to reconfigure its elongated production line that featured factories in France, Germany, Spain and the United Kingdom (UK).

Apple's main supplier in China, Foxconn, had to bring in more factory workers to make the iPhone 6 and iPhone 6 Plus at its plant in August and September 2014 before these products were delivered to market. However, the complexities of manufacturing both phones led to the plant running 100 production lines 24 hours a day to keep up with demand (CNET, 2014). Foxconn is the only supplier manufacturing the 5.5-inch iPhone 6 Plus and is responsible for most of the 4.7-inch iPhone 6 units. Such time compression led to flaws in production output where the percentage of successful iPhone 6 Plus units assembled was only around 50-60% and meant Foxconn had to throw out units that didn't meet quality standards. The smaller iPhone 6 enjoyed a more successful average production rate greater than 85%. Finally, supplies for the iPhone Plus 6 were also limited due to the shortage of 5.5-inch displays from suppliers.

The rush to compress time and design and build the iPhone 6 also led to issues once the product was in the market (Kelion, 2014). Consumers complained that the new phones were prone to bending and Apple had to perform structural and torsion tests to alleviate concerns. Also, Apple had to provide an iOS 8 operating system update after iPhone 6 users complained this new system made their phones unable to make or receive calls. The following publicity from users posting photos of bent iPhones on the Internet was that Apple's share price dropped by 5-10% for almost a month.

However, now that these two products are in the market their product life cycles may be very short. Apple introduced its iPhone 5S model in September 2012 but only three months after retailers were offering discounts on it (Matarese, 2012). Normally, Apple products have to be on the shelves six months or more before Apple allows retailer to discount. However, Best Buy started offering a US \$50 discount during the 2012 Christmas period, less than four months after it went on sale. Matarese cited two reasons for this practice: the iPhone 5 was not selling as well as Apple expected and an upgraded iPhone 5S may have already been in the works with longer battery life and Near Field Communication (NFC) technology which was standard on some Android phones at the time.

Hence, the requirement to make more complex products faster to ensure their product life cycles are as long as possible can lead to quality, delivery and post-purchase issues for firms and customers. Firms have outsourced much of their manufacturing to developing countries such as Thailand and thus the situation that Foxconn endured in China can be replicated anywhere.

Lastly, there is an interesting issue from a social and consumption perspective. Many UK mobile phone operators give iPhone 6 and 6 Plus units away, or charge a nominal upfront fee, provided a consumer signs up to a long-term contract, e.g. at least two years. This practice appears incongruous as technically complex products then seem to have little value in the eyes of the customer, i.e. they treat them like a commodity.

### **Quality of performance and service**

Despite making more products faster and speeding-up their movement through the supply chain, A.T. Kearney and the European Logistics Association (2009) noted that over a ten year period from 1993-2003 in Europe, the percentage of incomplete deliveries fell from 11.0% to 6.2%, damaged deliveries fell from 5.0% to 2.2% and late deliveries fell from 12.0% to 7.1%. Thus, despite compressing time and possibly affecting product quality, logistics performance actually improved.

However, Handfield et al. (2013), while noting that indicators for most industrial sectors remained as they were in 2008, found performance deteriorating in the electronics sector as delivery time and delivery flexibility, both in days, increased from 5 and 1 in 2008 to 8.5 and 3 in 2012 respectively. A similar deterioration was found in the chemicals and plastics sector where delivery time and flexibility increased from 5 and 1 day to 7.5 and 2 days from 2008 to 2012.

While these limited samples are statistically insufficient to suggest a trend, a question to consider for future research is whether performance has ‘bottomed-out’ or is asymptotic whereby more significant gains cannot be achieved, i.e. perhaps such indicators are at optimal levels. Further, if this is indeed the case what role do manufacturers in developing countries such as Thailand play in inhibiting better logistics performance in customer countries? While both logistics costs as a percentage of GDP and the World Bank LPI are not absolute or thoroughly robust measures, they are nevertheless representative of comparative advantage between countries, i.e. those countries with a lower percentage of logistics costs to GDP and ranked higher in the LPI have a comparative advantage to other countries that do not fare as well. However, is their better performance constrained by poorer performing countries in global production and consumption markets?

### **Shortage of logistics and SCM talent**

There is a shortage of suitable talent in the logistics and SCM sector around the world. The UK Commission for Employment and Skills noted that some 1.6 million people are employed in over 193,000 firms in logistics and SCM roles (UKCES, 2011). However, UKCES argued that the UK sector will need an additional 844,000 workers by 2017 including 170,000 managers, 132,000 customer services personnel, and 107,000 transport and warehouse operatives. These needs are due to the fact that around 44% of employees in the sector are over 45 years of age and that only 9% are under 25. Further, around 76% of employees are male.

Handfield et al. (2013) also found that their survey respondents believed there will be critical human resource shortages for the European sector in the areas of skilled labour, supply chain planners, entry-level logistics managers, truck drivers and warehouse staff. However, why aren't people attracted to this profession?

One issue relates to the understanding of this profession by both government and the public. The UK Freight Transport Association surveyed its members (FTA/pwc, 2011) and found that 51% of them believe government had no or little understanding of the role of logistics and SCM in the UK economy. Moreover, 83% responded the same for the public. If members of the UK government don't appreciate that the sector represents £75 billion of GDP or if members of the public, including students, desire to be financial 'masters of the universe' in the City of London or marketing and advertising 'creatives' instead of supply chain managers, then the sector must address its image problem directly.

Subsequent to that work, Manners-Bell (2012) and his firm Transport Intelligence undertook a global survey for the World Economic Forum in 2011 and found that 64% of firms said they had difficulty recruiting good employees, characterised by issues related to both supply and demand. For example, many logistics companies responded it was difficult to find good quality candidates with the right skills. This is a supply issue related to the state of education, over which the sector has little control. Conversely, it is within the sector's control to address reasons why many good candidates fail to be attracted to the sector. For example, the survey identified pay levels and a low industry profile in schools and colleges, as well as a poor industry image.

Solutions to this issue, which should apply to all countries including Thailand, include educating government, schools, teachers and society in general about the importance of logistics and SCM to the economy, and society, including logistics and SCM on school syllabi in areas such as geography and business studies, and being honest and making the sector more attractive to young people in terms of training, work patterns, and remuneration.

### **Impact on the natural environment**

Environmental issues have been an area of growing concern and attention for firms on a global scale and also affect logistics and SCM activities. Transportation, production, storage and the disposal of hazardous materials are frequently regulated and controlled (Grant et al., 2013). Abukhader and Jönson (2004) posed two interesting questions regarding logistics and SCM and the natural environment:

1. What is the impact of logistics on the environment?
2. What is the impact of the environment on logistics?

The impact of logistics on the environment is an easy question to understand but the second question is a bit more difficult to conceptualize. However, cotton does not grow naturally in many countries in extreme northern or southern latitudes due to a lack of hot weather and consistent sunshine. Thus, some form of logistics activity such as transportation and/or warehousing will be required to bring cotton to these markets for consumers desiring cotton clothing or other cotton goods. However, the main logistical or supply chain issue here is whether the cotton should be in the form of raw materials or finished goods. The answer to that issue will depend on the particular logistical system or supply chain design (Grant et al., 2013).

Issues concerning the natural environment are considered under the wider term of sustainability, which Brundtland (1987) defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is linked

to corporate social responsibility (CSR) as a socially responsible firm should ensure its impact on the natural environment is minimised. But, CSR goes beyond the natural environment to include aspects of fair trade, good employment practices, and appropriate relationships with customers, suppliers and other stakeholders. This wider linkage with sustainability is manifested in John Elkington's (1994) 'triple bottom line' or TBL concept encompassing profits, the planet and people. The TBL suggests that firms should focus on maximizing shareholder wealth or economic value they create while ensuring they also add environmental and social value to achieve long-term natural environment security and proper working and living standards for all human beings.

Brundtland (1987) defined five key areas related to sustainability: species and ecosystems, energy, industry, food, and population and urban growth. These areas plus the area of fresh water form a holistic view of sustainability that all countries and firms, including logistics firms, need to be aware of. On a more practical level, those natural environment issues most affecting firms include reverse logistics, emissions assessment and the 'greening' of supply chains (Abukhader and Jönson, 2004).

Reverse logistics is not a new concept as the stages of return, recovery and recycling of products has been practiced for decades. However, it is growing in importance for logistics and SCM and work by Rogers and Tibben-Lembke (1998) provided a renewed impetus. The amount of materials that can be handled at each stage and the processes in doing so are difficult, e.g. there is uncertainty in reverse product collection, quality or condition, quantity and timing, and consumer behaviour, however addressing these difficulties can provide a competitive advantage for firms and brand credibility and quality for consumers.

In an Asian context Fujifilm initiated a voluntary take-back program for its QuickSnap one-use cameras and began recycling the cameras by utilizing a highly developed and original recycling programme they called an 'inverse manufacturing system' where an almost 100 per cent recycling rate is achieved, even with components such as packaging for the product. Fujifilm thus established one of the first, fully-integrated closed-loop or reverse logistics systems for fast-moving consumer goods (FMCG) products (Grant and Banomyong, 2010).

Transportation and storage activities are both users of energy, for example fuel and electricity, and both produce carbon dioxide (CO<sub>2</sub>) emissions as a result of using this energy. The World Economic Forum (2009) estimates that logistics activity account for 2,800 mega-tonnes of CO<sub>2</sub> emissions annually or about 6% of the total 50,000 mega-tonnes produced by human activity. On the energy input side, vehicle engines are becoming more efficient in terms of fuel use and emissions and there are ongoing efforts to consider alternative fuels such as biodiesel or bioethanol, hydrogen, natural gas or liquid petroleum gas, and electricity. The World Business Council for Sustainable Development (2007) notes that buildings, which include storage facilities, account for 40 percent of world-wide energy use. Initiatives to increase the efficiency of building in using energy and reducing emissions have been developed by the Leadership in Energy and Environmental Design certification program (LEED) in the US and the Building Research Establishment Environmental Assessment Method (BREEAM) in the UK.



The 'greening' of logistics and supply chain activities means ensuring these activities are environmentally friendly and not wasteful, and particularly focus on reducing carbon emissions across the entire supply chain. The World Economic Forum (2009) argued that a collaborative responsibility for 'greening' the supply chain resides with three groups: logistics and transport service providers, shippers and buyers as recipients of such services, and both government and non-government policy makers.

There are several recurring themes regarding sustainable logistics and SCM that stem from the above and which tie-in to current trends. Firstly, firms need to recognise that sustainability needs to form part of their logistics and supply chain strategies and for the right reasons. Secondly, internal operations including transportation, warehousing and production need to be conducted as efficiently as possible. Thirdly, relationships with upstream suppliers and downstream customers need to embrace sustainability. And finally, what goes downstream in the supply chain must also come back upstream; hence reverse logistics is important (Grant et al., 2013).

From a Thai perspective there are two key national initiatives regarding sustainability: the Greater Mekong Subregion (GMS) Economic Cooperation and Climate Change Programme and Thailand's own environmental policy (Chairsurayakarn et al., 2014). The two main areas of focus for the GMS Programme are strengthening climate change adaptation capacity by enhancing the awareness of climate change impacts, strengthening government capacity in vulnerability assessment, building capacity in reducing emissions from deforestation and forest degradation (REDD) in GMS countries; and climate change mitigation by reducing CO<sub>2</sub> emissions from land use changes and in sectors such as energy and transport.

Thailand has established the Thailand Climate Change Master Plan (2011-2050) through the Office of National Resources and Environmental Policy and Planning (ONEP), Thai Ministry of National Resources and Environment. This plan covers externalities from CO<sub>2</sub> emissions and the use of national resources in many sectors such as energy or power generation, industry, agriculture and transport. To achieve this plan the ONEP has built-in two important mechanisms: setting up carbon trading through using an economic externalities concept to determine a quota of CO<sub>2</sub> emissions; and using several assessment tools such as strategic environmental assessment (SEA), environmental impact assessment (EIA), health impact assessment (HIA), and social impact assessment (SIA).

### **Risk and disruption and supply chain security**

Risk can be defined as the probability that a particular adverse event occurs during a stated period of time, or results from a particular challenge (Adams, 1995). The notion of an adverse event connotes a detrimental consequence and thus as a probability in a statistical theory sense, risk thus obeys all formal laws of combining probabilities and can be calculated. Outsourcing, globalisation, improved infrastructure and information technology, cheap labour and raw material have extended supply chains to longer and complex networks (Manuj and Mentzer, 2008). This has consequently increased supply chain vulnerability, fragility and frequent operational disruptions. Additionally, factors such as shorter product life cycles, reduced suppliers, buffers and inventories, increased demand for on time deliveries, change in consumer tastes and preferences, technology shifts or supplier priorities.

A heightened interest in supply chain risk management (SCRM) is attributed to the recent increase in high profile man-made and natural incidents such as terrorist attacks, wars, earthquakes and the recent economic crisis. However, it is difficult to predict risks or assign probabilities due to the changing profile of risky events. Recent examples in 2013-14 include the Bangladeshi factory collapse, issues for Malaysian Airlines, and the European horse meat scandal (Rafi-Ul-Shan et al., 2014).

The aim of SCRM is to avoid delays, reduce costs, improve customer service, avoid major disasters and operational disruptions, increase the chances of quick recovery and enhance resilience (Pujawan and Geraldin, 2009). Usual risk management approaches largely depend upon the nature of market, industry, organizational structure and attitude, strategy, culture, leadership and geographic area in which a firm is operating (Harland et al., 2003). Therefore, SCRM should also take these factors into consideration.

One useful model for considering risk was proposed by Peck (2005). Her model comprises four 'levels in a landscape' that require different considerations of risk at each level. These levels, from micro- to macro- focus, are:

1. A firm's value stream, products and processes that can be evaluated through operations management and business process engineering;
2. A firm's assets and infrastructure dependencies including logistics, information technology, and human resources;
3. A firm's organisational relationship and inter-organisational networks determined by business strategy, production networks, and/or strategic purchasing; and
4. A firm's wider environment, e.g. the natural and social environment, which can be tracked using environmental scanning.

The essence of Peck's model is that risk is present at all levels of a firm's activities and therefore an SCRM strategy needs to encompass all these levels. Thai firms need to be aware of their place in a customer's 'landscape level,' most likely at level 3, so they can respond to increased demands to ensure risk can be mitigated throughout the entire supply chain. The case of Apple discussed above demonstrates the importance of that awareness.

However, endemic in Peck's model are the use of relationship management, cooperation and collaboration between supply chain partners, data exchange, inventory sharing and collaborative inventory planning, information sharing and trust building measures, which enable greater visibility to manage risks and enhance a supply chain's resiliency (Rafi-Ul-Shan et al., 2014).

## **CONCLUSIONS**

The domain of logistics research and SCM face several trends and issues going forward for the rest of this decade and the next. Further, Thailand and other Asian countries need to address some of them in a unified fashion in the run-up to AEC 2015. Globalised markets, operational pressures to produce better and cheaper products at a faster rate without compromising quality and service, a shortage of qualified and interested talent, and external pressures regarding the

natural environment all provide a challenging and risky business environment for firms in developed and developing countries. However, recognition of these trends and issues, and the inherent risk surrounding them, also present an opportunity to manage them and become leaders and indeed long-term survivors.

### **ACKNOWLEDGEMENT**

This paper was developed from a lecture tour by the author in January 2014 to several universities in Thailand, including Assumption University, and other Thai organisations. The author acknowledges and thanks Piyawan Puttibarncharoensri and Brian Lawrence at the *Journal of Supply Chain Management: Research & Practice* for inviting him to submit this paper.

### **REFERENCES**

- Abukhader, S.M. and Jönson, G. (2004) "Logistics and the Environment: Is it an Established Subject?" *International Journal of Logistics: Research and Applications*, 7 (2), 137-149.
- Adams, J. (1995) *Risk*, London: University College London Press.
- Arvis, J.-F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C. and Raj, A. (2014) "Connecting to Compete 2014: Trade Logistics in the Global Economy," *The Logistics Performance Index and its Indicators*, [available at: <http://lpi.worldbank.org/>].
- A.T. Kearney and European Logistics Association (2009) "Supply chain excellence amidst the global economic crisis," *6<sup>th</sup> European A.T. Kearney/ELA Logistics Study 2008/2009*, European Logistics Association: Brussels.
- Banomyong, R. (2010) "Supply Chain Dynamics in Asia," *ADB Working Paper 184*, Tokyo: Asian Development Bank Institute, [available at: <http://www.adbi.org/workingpaper/2010/01/07/3427.supply.chain.dynamics.asia/>].
- Banomyong, R. and Supatn, N. (2011) "Developing a supply chain performance tool for SMEs in Thailand," *Supply Chain Management: An International Journal*, 16 (1), 20-31.
- BBC (2006) *Q&A: A380 delays*, <http://news.bbc.co.uk/1/hi/business/5405524.stm>, 30 October [accessed 27 October 2014].
- Brundtland, G.B. (ed.) (1987) *Our Common Future: World Commission on Environment and Development*, Oxford: Oxford University Press.
- Chaisurayakarn, S., Grant, D.B. and Talas, R. (2014) "Green logistics service quality and LSP performance," *Proceedings of the 6<sup>th</sup> International Conference on Logistics and Transport (ICLT)*, Kuala Lumpur: August, e-proceedings.
- CNET (2014) *iPhone 6 demand challenges Apple supplier Foxconn*, <http://www.cnet.com/uk/news/iphone-6-demand-challenges-apple-supplier-foxconn/>, 17 September [accessed 27 October 2014].
- Elkington, J. (1994) "Towards the sustainable corporation: Win-win-win business strategies for sustainable development," *California Management Review*, 36 (2), 90-100.
- FTA/pwc (2011) *The Logistics Report 2011*, London: Freight Transport Association and pwc.
- Grant, D.B. (2003) *A Study of Customer Service, Customer Satisfaction and Service Quality in the Logistics Function of the UK Food Processing Industry*, Edinburgh: University of Edinburgh PhD Thesis, [available at: <https://www.era.lib.ed.ac.uk/handle/1842/1553>].
- Grant, D.B. (2012) *Logistics Management*, London: Pearson Education.

- Grant, D.B. and Banomyong, R. (2010) "Design of Closed-Loop Supply Chain and Product Recovery Management for Fast-Moving Consumer Goods: The Case of a Single-Use Camera," *Asia Pacific Journal of Marketing & Logistics*, 22 (2), 233-246.
- Grant, D.B., Lambert, D.M., Stock, J.R. and Ellram, L.M. (2006) *Fundamentals of Logistics Management: European Edition*, Maidenhead UK: McGraw-Hill Education.
- Grant, D.B., Trautrim, A. and Wong, C.Y. (2013) *Sustainable Logistics and Supply Chain Management*, London: Kogan Page.
- Handfield, R., Straube, F., Pfohl, H.-Chr., and Wieland, A. (2013) *Trends and Strategies in Logistics and Supply Chain Management - Embracing Global Logistics Complexity to Drive Market Advantage*, Bremen: BVL International.
- Harland, C., Brenchley, R. and Walker, H. (2003) "Risk in supply networks," *Journal of Purchasing and Supply management*, 9 (2), 51–62.
- Kelion, L. (2014) *Apple says bent iPhones are 'rare'*, <http://www.bbc.co.uk/news/technology-29371113>, 25 September, [accessed 27 October 2014].
- Kolding, E. (2008) "Challenges and Opportunities," *Presentation at the 25<sup>th</sup> German Logistics Congress*, Berlin: October, e-proceedings.
- Manners-Bell, J. (2012) "Where have all the truck drivers gone?" <http://forumblog.org/2012/06/where-have-all-the-truck-drivers-gone/>, 21 June, [accessed 21 June 2012].
- Manuj, I. and Mentzer, J. T. (2008) "Global supply chain risk management strategies," *International Journal of Physical Distribution & Logistics Management*, 38 (3), 192–223.
- Mason-Jones, R. and Towill, D. (1999) "Total cycle time compressions and the agile supply chain," *International Journal of Production Economics*, 62 (1-2), 61-73.
- Matarese, J. (2012) *Apple's iPhone 5 already marked down at best Buy: Here's why*, <http://www.newsnet5.com/money/consumer/dont-waste-your-money/apples-iphone-5-already-marked-down-at-best-buy-heres-why>, 13 December, [accessed 27 October 2014].
- Pajitprapapon, A. (2013) *Thailand's Manufacturing Logistics and Supply Chain Management Development Plan*, [available at [http://www.adbi.org/files/2013.05.10.cpp.sess6.2.pajitprapapon.thailand.manufacturing\\_logistics.pdf](http://www.adbi.org/files/2013.05.10.cpp.sess6.2.pajitprapapon.thailand.manufacturing_logistics.pdf)].
- Peck, H. (2005) "Drivers of supply chain vulnerability: an integrated framework," *International Journal of Physical Distribution & Logistics Management*, 35 (4), 210-232.
- Pujawan, I.N. and Geraldin, L.H. (2009) "House of risk: a model for proactive supply chain risk management," *Business Process Management Journal*, 15 (6), 953–967.
- Rafi-Ul-Shan, P.M., Grant, D.B. and Perry, P. (2014) "Managing sustainability risks in fashion supply chains," *Proceedings of the 19<sup>th</sup> Annual Logistics Research Network (LRN) Conference*, Huddersfield UK: September, e-proceedings.
- Rogers, D.S. and Tibben-Lembke, R.S. (1998) *Going Backwards: Reverse Logistics Trends and Practices*, Reno NV: University of Nevada-Reno.
- UKCES (2011) *Working Futures 2010-2020*, London: UKCES.
- Wilson, R. (2014) *CSCMP's 25<sup>th</sup> Annual State of Logistics Report: Ready for a New Route*, Lombard, IL: Council of Supply Chain Management Professionals.
- World Business Council for Sustainable Development (2007) *Energy Efficiency in Buildings: Business realities and opportunities*, [www.wbcsd.org](http://www.wbcsd.org), [accessed 25 December 2012].
- World Economic Forum (2009) *Supply Chain Decarbonization: The role of logistics and transport in reducing supply chain carbon emissions*, Geneva: World Economic Forum.