Where next for Supply Chain Management?

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Supply Chain Management: 
Perspectives, Issues and Cases

McGraw-Hill
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Supply chain management (SCM) has been so successful that it is largely taken for granted. Its success has been built on improving three key flows – of product, of money and of information – and on one core principle – core competence. What next for SCM? This article outlines the vulnerabilities that are embedded in modern supply chains and the unintended consequences of outsourcing activities that are not core competences. These consequences are global and have the potential to undermine past achievements. Finally, broad suggestions are made as to how these issues can be addressed and the areas on which supply chain management needs to focus over the next 20 years.

1 Introduction

After decades of success, it is tempting to conclude that Supply Chain Management (SCM) can now be taken for granted. The evidence for success is ubiquitous and unremarked.

Supermarket shelves brim with a vast array of products and produce, sourced from countries around the world and available every day as a matter of course. Consumer electronics and other manufactured goods are available from stock or to order with short lead times; there is a proliferation of versions, models, colours and other variations available creating a bewildering choice; larger items like cars can be ordered with customised features on a six to eight week lead time; product cycles have got shorter; and, of course, we can pay for all these goods in a number of flexible ways, regardless of the location from which we are purchasing.
The problems of the flow of physical product seem largely solved; financial flows have become globalised and almost entirely fluid; information flows have dramatically improved as IT infrastructure has advanced. It appears that the supply chain problems of the late 20\textsuperscript{th} century are almost entirely solved. So, what next for SCM?

If today’s problems come from yesterday’s solutions (Senge, 1990), the seeds of the next set of problems have already been sown. The vulnerability of physical and financial supply chains has recently been brutally exposed. The financial crash of 2008 was a temporary failure of the global financial supply chain resulting in disruption to payments, trade credit, insurance and refusal to accept some financial instruments. Extensive floods in Thailand in 2011 severely disrupted manufacturing output of a single item (hard disk drives).

This resulted in a global shortage, increased prices and constraints on product availability across the computer sector. Honda’s plant in Thailand only resumed production in March 2012 – almost six months after the floods.

The earthquake, tsunami and nuclear accident in Japan in 2011 caused massive devastation and loss of life. Supply chains were disrupted due to destruction of manufacturing resources, of transport links and due to restrictions on the movement of goods and personnel. The paucity of the depth of knowledge of supply networks was also highlighted with small fourth and fifth tier suppliers causing unexpected problems in several industries e.g. automotive and pharmaceuticals.

The automobile industry was badly affected with some factories not able to return to normal production for months. The information supply chain is also vulnerable as the continuous stream of hacking events and the collapse of Sony’s Playstation network have demonstrated. Even the US Government Accountability Office recognises the vulnerabilities in the IT supply chain stating “…the global IT supply chain introduces a myriad of security vulnerabilities to federal information systems that, if exploited, could introduce threats to the confidentiality, integrity, and availability of federal information systems” (GAO, 2012: p.9). The success of SCM in integrating the physical, financial and information flows has increased efficiency and effectiveness, but has also increased vulnerability.

2 The Consequences of Outsourcing

Supply chain success has been achieved by relentless incremental improvement. But one fundamental idea, the focus on core competencies, originally coined in a 1990 article (Prahalad & Hamel, 1990), has resulted in far-reaching changes. As organisations have defined and re-defined their core competencies, they have gradually outsourced an ever larger proportion of their activities.

The value of new outsourcing contracts signed in 2011 exceeded $100 billion. In turn, outsource suppliers have re-defined their core competencies and have also outsourced. The organisational and human consequences are significant and will present serious challenges to SCM over the next decades.

These consequences include:
2.1 Vertical disintegration.

Ford’s River Rouge plant was the ultimate in vertical integration in the 1920’s and 30’s. In contrast, outsourcing has created *vertical disintegration* leading to a patchwork of organisations attempting to deliver a seamless, efficient and cost-effective service to the end-customer. While Ford owned almost all the resources within the entire chain, modern supply chains are composed of extensive supply networks that frequently span the globe.

As there are more organisations involved in each supply network, there are also more boundaries and “handshakes” between organisations. While integrated computer networks enable these networks, there are different human systems involved and much greater complexity in organisational boundaries. The supply networks themselves have also become more complex with multiple interactions between network companies in the same and/or different tiers.

Complexity, defined as the number of suppliers, their level of interaction and the degree of differentiation between them (Choi, Krause, 2006), has been demonstrated as contributing to higher transaction costs and lower responsiveness which both impact negatively on SC effectiveness. Vertical disintegration leads to higher transaction costs (external transactions being more expensive than internal ones), hopefully offset by lower product/service costs as the suppliers are performing what they are most competent to do, and presumably can do it more cheaply.

2.2 Changing global workforce.

There have been dramatic changes in the location of the global supply chain workforce. The search for lower costs has always included off-shoring – Ireland was particularly successful in this regard, attracting a large number of US multi-nationals. The incorporation of China into global trading systems provided a once-off injection of workers into the global workforce that suppressed cost inflation in manufacturing for over 20 years.

This effect is nearly over and will not be repeated. Labour costs are rising sharply in China (double digit annual increases are firmly established) and there is no other large pool of available labour to take its place. In addition, many millions of people in the developing world now aspire to a middle class lifestyle with consumption levels that are equivalent to the developed world. Demand for commodities and energy seems certain to increase even further.

The conclusion must be that there will be significant upward pressure on global costs. Global supply chains built on low-cost inputs from China and the Far East are facing significant challenges.

2.3 Outsourcing exacerbates concentration.

In an era of vertical integration, each organisation built up and maintained productive resources and expertise that had wide implications for competitive advantage.
Not only was capacity available to produce, but also to experiment, to learn, to contribute to new product design, to product prototyping and manufacturability. The logic of outsourcing is to replace an activity carried out within the organisation with one that is provided by an external company for whom this is a core competence. As a result, the supplier company should be able to carry out the task more efficiently, at higher quality and at lower cost.

On the one hand, the focal organisation obtains a cost advantage (along with other possible benefits). On the other, it can progressively lose key areas of knowledge and become increasingly dependent on its outsource partners.

As the outsourcing markets have developed, the companies with the best performance naturally get more and more of the business available and become larger. There is an inherent tendency for particularly successful outsource providers to dominate their market sector, as in any other market. Success, profitability, scale, continuous investment and excellent customer service lead to more success and ultimately to oligopolistic (or monopolistic) market structures.

As a result, we see outsourcing companies becoming global behemoths dominating their industry sector as the brand holders (and IP holders) reduce their activities and their expertise while increasing dependence on their outsourced supply chain. Some have become Original Design Manufacturers (ODM) who not only produce but also design (thereby creating their own intellectual property). There is a corresponding concentration of knowledge and expertise on which customers rely.

For example, Foxconn is estimated to be responsible for 40% of consumer electronics assembly worldwide. The automobile industry is serviced by maybe 80,000 parts suppliers and a cohort of about 25 global tier 1 suppliers who design and supply functional sub-assemblies across the whole industry e.g. Bosch, Dana, Delphi. Without the design and innovation capabilities of these suppliers, modern automobile production would be virtually impossible. Many supply chains rely on the three global parcel delivery companies – DHL, UPS and FedEx.

### 2.4 Dual labour markets.

The structure of the labour market has changed in many countries due to outsourcing and off-shoring. “Good” manufacturing jobs, both operational and service, were common in vertically integrated firms and offered the terms and conditions associated with high quality employment – permanent position, pension, health benefits, etc.

Many of these jobs were in manufacturing companies and their associated support services. Employment in US manufacturing declined by 40% between 1980 and 2010. Similar declines were reported in many other countries. The remaining workforce is increasingly temporary or part time with inferior terms and conditions.

These jobs are much less secure and their pay scales are anchored or referenced to the minimum wage. Real wages have stagnated in US and much of the developed world while corporate profit as a percentage of GDP is at record highs (Source: BES). The earnings pyramid has got much steeper, but those at the bottom (which includes many operational SC workers) have seen their position become more precarious, less
well rewarded and with fewer prospects. A two tier labour market is a feature of many developed economies – one tier has permanent employment with good terms and conditions; the second tier is made up of short term and temporary jobs with lower wages and conditions.

Even Germany, which has retained more of its traditional industrial base than most countries, has seen a large increase in low-wage jobs. Twenty three percent of the German workforce earn less than €9.15 per hour and nearly one million full time workers earn less than €1000 per month (Kalina, Weinkopf, 2012). Outsourcing has contributed significantly to this structure.

2.5 Organisation of work.

The organisation of jobs has changed as a result of outsourcing. Jobs in manufacturing operations have always been organised in order to achieve efficiency, quality and cost advantage. The most efficient form of repetitive production was (and still is) the production line.

However, operational efficiency is difficult to reconcile with good employee relations. As labour costs rose and as employees demanded better conditions, organisations in developed countries replaced expensive labour with relatively cheaper capital investment, where possible. As manufacturing has moved offshore to countries where labour is cheaper, traditional operational organisation has been applied in those operations.

While this is to be expected in production and physical supply chain jobs, Taylorism in the extreme is also being applied to back office and customer service roles e.g. call centres. Previous attempts to rigorously apply Taylor’s methods resulted in alienation, demotivation, low productivity, industrial unrest, etc. It hardly seems likely that workers in Asia will feel much different about being organised, controlled and treated as part of a production process.

A series of suicides among workers in Foxconn along with increasing industrial unrest in other firms in China are a case in point. The average “lifespan” of an employee in a many call centres in Ireland and the UK is less than 12 months. Individual discretion and control has also been reduced in many supply chain and support roles within outsourced organisations, at the same time as wages have been reduced and benefits cut.

2.6 More external links.

Relationships and linkages have been externalised. In a vertically integrated firm, relationships, linkages, communication flows and problem solving resources are all available within the organisation. Difficulties with all of these are well documented, but mechanisms are also available to manage them.

The hierarchical system of roles and the embedded bureaucracy of administration are frequently a source of frustration, but they also enable organisations to systematically communicate and to solve problems. As outsourcing has grown, more and more
relations and linkages are with people who work for other organisations and whose interests may well be different.

A problem for the buying organisation may not be perceived in the same light in the outsource supplier; priorities are different; as are business pressures. An “implanted” employee may work alongside colleagues in the customer’s operation, eating in the same canteen, taking the same holidays, experiencing the same work pressures and successes, but is employed by a different organisation with different terms and conditions.

In the normal course of everyday work, all are colleagues working to the same objectives. In the event of a disagreement between the two organisations, the “implant” will be subject to a totally different organisational process. Inter-organisational disagreement (or dispute) is likely to lead to difficulties between workers and to supply chain disruption.

2.7 Employee identification and motivation are altered.

Effective supply chain delivery relies on seamless co-ordination from raw material through to end customer. Within an integrated supply chain organisation it is possible to imagine a single set of objectives, a coherent corporate culture and a company-wide focus on the customer. Employees would be more likely to have a coherent focus and identification with the company, its products and end customers. In a disintegrated supply chain there are many customers, all of them external.

Each organisation has its own objectives, methods, structures, style and culture. Employees are rewarded and motivated differently and must conform to the expectations of their employer. For low-quality jobs, motivation will be primarily instrumental with the focus on simply earning a living.

There is little incentive for employees to engage in the hard emotional work that is associated with good customer service. Employees are more likely to identify with their employer than with their customers.

2.8 Incentives are misaligned.

Very few supply chains have end-to-end visibility or metrics. Each organisation in a disintegrated supply chain must strive for optimal results on costs, efficiency, inventory, etc. Each organisation must make a financial surplus if it is survive and has a very strong incentive to seek a local optimum that may not be optimal for the entire supply chain.

Channel masters can and do dominate supply chains to capture a larger proportion of the surplus and push sub-optimal conditions onto other organisations in the network. While the consumer may be the ultimate customer, proximate issues dominate at each level. Local efficiencies, costs, profits and relations are more important to most organisations than the overall supply chain outcome.

Apple made a net profit $13 billion in one quarter despite having outsourced the majority of its physical supply chain. As the dominant firm, Apple captured a 28% net
profit margin (Q3 2011) from the value add activities of the entire supply network – other network members must make do with far less (Foxconn had a net margin of only 3.5% in Q4 2011).

2.9 Complicated relationships.

Supply chain relationship management has become more complicated. Running a large organisation is intricate and fraught with challenges. However, it does have one key advantage in the single structure of governance, management and control. Managing a disintegrated supply chain involves multiple boundaries, multiple stakeholders and a wide diversity of interests and objectives.

Managing a single level of suppliers (as in traditional purchasing operations) is relatively easy. Managing multiple levels of supply relationships, each of whom could represent a critical element of supply, is much more difficult. Coupled with a lack of visibility of multiple tiers, it is almost impossible. The creation of lean, agile, global supply networks has been revolutionary, but has in turn created a myriad of complex risks.

2.10 Loss of visibility and control.

To keep control of the ever larger proportion of costs that are represented by the supply network and to reduce the complexity of relationships, supplier tiering has become commonplace (the term originated in the automobile industry). First tier suppliers are used to manage parts of the supply network, frequently assuming total control for some element of the product or service.

This simplifies the relationships for the buying company who deal almost exclusively with a small set of first tier suppliers, but also represents a loss of control and of visibility. Integrated data networks have enabled this handover as well as permitting further off-shoring in pursuit of ever lower costs. But tiering involves passing a large element of control of the supply network to an external agent.

This, too, has its risk and challenges, not least of which is lack of visibility. Despite huge improvements in integration, few supply chains have comprehensive visibility beyond the first tier.

The concept of core competence and the process of aligning organisations so that they concentrate on what they are really good at has been transformational. The benefits have been enormous in terms of cost, speed, efficiency, innovation and customer service. The consequences have also been enormous and the supply chain management activity over the coming years and decades will have to grapple with and solve them.
3 Supply Chain Management towards 2030

The first focus of supply chain management for the next decades is to maintain the advances already gained, while plugging the weaknesses that have become visible. This will involve reversing some of the extreme positions that have created vulnerability in global supply chains. While it is hard to disagree with the broad thrust of *The New Supply Chain Agenda* (Slone *et al.*, 2010), a complementary set of proposals is presented here.

The first improvement required is in information. Recent disruptions have demonstrated how little we know about the total supply chain. Knowledge is largely restricted to one or two tiers; beyond that, very few organisations have visibility or information. Enhanced information (in both breadth and depth) will involve “mapping” the total supply chain, end-to-end, to determine what activities are being carried out, where, by whom and by what routes goods are being moved. This information can be used to identify concentrations of resources, dependencies within the supply chain, critical nodes or routes, and other vulnerabilities. Corresponding metrics are also required on inventory, lead time, capacity, etc.

This is a gargantuan task that will be enabled by agreed supply chain models for mapping and to align metrics. Some models already exist, e.g. SCOR (Supply Chain Council), but it is unclear if these are suitable for global application. Systems will need to be deployed that can integrate data from multiple tiers of the supply network. It seems unlikely that full-scale ERP will be implemented from end to end; simpler systems may be required in smaller companies. Data sharing protocols and formats would facilitate widespread adoption as http and HTML did for the internet.

The second area for improvement is organisational. Vertical disintegration has created a patchwork of organisations in each supply chain; complicated supply arrangements; complex contractual and legal issues; splintered relationships; increased organisation turnover; and lack of identification with the core product, service and customer. There is a need to revisit outsourcing. The number of organisations in each supply chain has increased with a greater number of boundaries and “handshakes”. Are there too many organisations in the supply chain? How would we know if there were? Outsourcing needs to be evaluated on the bases of total lifecycle cost (similar to that used for capital investment). The total lifecycle cost of an outsource arrangement would include tendering, selection and negotiation, contract and legal costs, setting up the service level agreement, the supplier’s learning curve, relationship management, measurement and disengagement at the end of the contract. If all of these are taken into account, is the total cost less than would be incurred by carrying out this operation internally? There are additional “soft” costs to outsourcing – loss of knowledge and expertise, loss of capability and increased dependence on external agents.

The third area that requires our attention is location. The combination of outsourcing and off-shoring was built on the basis of lower labour (and other) costs in other locations, particularly China, the Far East and Eastern Europe. It is commonplace for supply chains to span many countries, regions and trading blocs. On the one hand, supply networks are widely dispersed which should reduce location-based risk. On
the other hand, there has been increased concentration in these global networks as the Thai floods demonstrated. If a major earthquake occurred in Shenzen, the global electronics industry would be crippled. Globalised networks rely on competitive advantage in different locations (usually cost based) with free movement between locations to the point of product/service completion. This model is undermined if low-cost locations cease to be low-cost, if transport costs increase substantially, if transport movement is restricted for any reason, or if there is local or regional disruption. Recent estimates of the cost difference between China and US for manufactured goods are less than 5% and Chinese labour costs are rising steeply. Transport costs are likely to rise in the short to medium term due to the effects of oil prices, of carbon taxes or both. Transport movements are affected by strikes (for example, recent national strikes in Italy, Spain and Greece), by weather and other natural phenomena. Movements can also be affected by trade disputes between countries and/or trading blocs. There is definitely a case to be made for reviewing globalised supply networks with the possibility of increased “in-shoring”. Recent evidence suggests that this is starting to take place in the US.

The last two proposals here echo points made by Slone et al. (2010) but with a slightly different priority. People are the key to supply chain success and are the fourth area that requires our attention. At a strategic level, there is a need for a much larger pool of capable people who can take leadership roles within global supply chains. Finding those people and ensuring they have the education, skills and development opportunities is a real challenge – people of this calibre are always in short supply and this poses a real constraint on supply chain development. Similarly broad skill sets are required at all levels of global supply chains with a particular emphasis on the ability to cope with diversity, competing interests and cultural nuances. A bigger challenge is to ensure that all those who contribute to the total supply chain are sufficiently involved, committed and motivated to deliver on the promises made to customers. Many supply chain tasks are performed by people on or close to the minimum wage, in jobs that are organised on Taylorist lines, and with little knowledge, interest or visibility of the wider supply chain or the end customer. If the consequences of this model of employment are to be avoided, supply chain managers need to become a lot smarter and a lot more proactive at monitoring employment practice across the total supply chain and intervening where such practices threaten overall results. Apple has been forced to publicly intervene recently, not due to threats to supply chain performance, but due to possible damage to the brand image. The company’s recent engagement with the Fair Labour Association and a visit by the CEO to a key supplier shows just how important this has become to Apple. Good supply chain management needs to take a longer-term view of self-interest.

The final area is that of connection. The very nature of supply chain is of activities that are connected and co-ordinated in their efforts to deliver to the end customer. Outsourcing has created vertical disintegration with multiple organisations, multiple boundaries and more complex relations. Collaboration, within and between organisations, must be continuously improved. Misaligned objectives within and between operations, perverse incentives along the supply chain and a residual mistrust of “others” continue to be significant barriers to better co-operation. Many organisations pur-
sue local optima that are sub-optimal for the total supply chain. Listed companies, under pressure from the requirement to report quarterly results, focus excessively on short-term outcomes. Collaboration is not a short-term project, nor is it likely to yield short-term results. Channel masters harvest as much of the value-add from the total supply chain as their market power will allow. And while this may well encourage the rest of their supply network to focus on efficiency and improvement, it can also leave them starved of sufficient margin to invest in design, innovation and capacity.

The enablers for improved connection and collaboration are largely in place - integrated IT networks, widespread adoption of appropriate software, increasing use of shared information and internet based tools. These are necessary conditions but not sufficient to ensure good connection and integration.

The missing element is the willingness of leaders and supply chain professionals to drive integration and collaboration through the supply chain. This is risky. For a small organisation, it could be existential.

Therefore, it is the larger, more dominant, more secure organisations that must take the lead. Otherwise, supply chain management will be just another faddish term that failed to reach its potential.

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Supply Chain Management: Perspectives, Issues and Cases

It is quite complicated to monitor the developments that have been taking place in recent years in management studies and, in particular, in Supply Chain Management (SCM). Based on this premise, the volume contains contributions that highlight some basic issues of the recent international debate on SCM, which has gained the attention of several scholars, for a deeper understanding of its theoretical implications and to improve the methods and scope of empirical research. Accordingly, the book presents a large number of papers relating to SCM, as well as the Logistics and Transport Services industry, written by academics, managers, entrepreneurs, practitioners and other experts.

The volume, therefore, includes papers by Authors with different backgrounds, research and professional expertise. Hence, this reflects both the wide scope and complexity of SCM, and the variety of perspectives from which processes and strategies are analysed and interpreted.

This volume is structured into three sections, which represent three different points of view on issues, constraints and actions, revolving around SCM and Logistics and Transport Services industry.

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