EVALUATING STRATEGIES FOR COST REDUCTION IN SCM RELATING TO EXPORTS AND IMPORTS

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ABSTRACT

Many unskilled labour-intensive production tasks began to be offshored by advanced country firms to developing countries, where low-cost but relatively unskilled labour imparted a comparative advantage, essentially in final assembly operations, combined with institutions that could absorb firm-specific technological know-how. This profitable international production fragmentation became feasible with the onset of the information and communications technology (ICT) revolution, which enabled the coordination of spatially dispersed complex tasks at a relatively low cost. The growth of global supply chains has changed the distribution of incomes across countries. Participation in these supply chains, initiated by the successful completion of low value-added manufacturing tasks, contributed to industrialisation and high rates of economic growth in several Asian developing economies. The process of catch-up with developed economies is likely to get stronger as many of these countries seek to move up the value chain through their exposure to advanced technologies (made available by the offshoring process) and build up human capital. At the same time, the continued exclusion of several developing economies from global supply chains, such as those in Africa, means that the gap among countries in the developing world could widen. The

international fragmentation of production has also affected the distribution of incomes within countries. In advanced economies, the direct, negative effect of production fragmentation on employment and wages for lowand semi- skilled workers is the primary concern. In developing economies, production fragmentation is likely to create jobs for a large pool of unskilled labour. However, because a relatively unskilled activity in a developed economy may be a relatively skilled one in a developingeconomy, offshoring may increase the demand for (and returns on) skilled labour among developing economies. These distribution effects, both across and within countries, are likely to affect trade policy, and consequently, the evolution of supply chains.

Changes in the structure of 20th century international industrial organisation that have incited research interest among economists have also driven a significant body of work in the business literature. Indeed, many of the factors driving the changing industrial structureare derived from business. Examples include the innovation and implementation of assembly lines, scientific management, modularisation, lean manufacturing, and just- intime production. While the economics literature has produced terminology such as "task trade", "vertical specialisation", and "production sharing", the business literature tends to emphasise "supply chains". This is in conjunction with terms from political economists and development theorists that include "value chains", "global commodity chains", and "global production networks". Of these, the supply chain provides the most relevant perspective for the business practitioner. Networks of firms are viewed from a focal firm perspective, and the supply chain ontology adopts various dimensions to orient a firm withits network surroundings (for example, direct-extended-ultimate supply chains, horizontal tiers or degrees of separation, and vertical structures within each tier). Further functionalising the supply chain concept is the field of supply chain management (SCM). Born from multidisciplinary roots that include logistics, marketing, management, and sociology, SCM has developed into a distinct field of study over the past fifty years. SCM theory has only recently reached a state of maturation where it produces operationalisableconcepts and tools, but progress is being made in advancing both the overarching field of SCM and the specific issues that fall under the SCM umbrella. This chapter will review theoverarching field, while Part II and its chapters will address the specific issues.

The shuffle of jobs offshore (or back onshore) has caught the attention and concerns of policy makers. The structural shifts in industrial structures are creating new winners and losers. Unskilled labour-intensive parts

of the manufacturing production process have been increasingly offshored by advanced country firms to relatively unskilled labour abundant developing economies. This "offshoring" phenomenon is expected to reduce jobs for low-and semi-skilled workers in advanced economies while increasing them in developing economies. At the same time, resulting productivity increases in advanced economies can raise the demand for native workers – at least in complementary tasks. The empirical literature suggests that fears of job-losses due to offshoring in advanced economies are often exaggerated – restricted largely to the short-run. Policy makers can address these concerns through strengthening social safety nets in the short run and instituting skills- upgrading programmes to create a more flexible labour force in the long run. Greater challenges lie ahead for these policy makers, with an increasing number of services jobs being offshored from developed to developing economies. Even in developing economies, services offshoring can worsen inequality by raising skill premiums, thereby making investment in education equally crucial there. Looking ahead, given increasing wages in certain developing economies, increasing transport costs, new technologies and concerns about separating R&D from manufacturing activities, there is a possibility of a large number of manufacturing and services tasks returning to advanced economies.

INTRODUCTION

In supply chain management cost reduction is one of the most cited objectives (Seuring, 2002) and for more than half of the top executives, cost reduction is a primary strategic goal for supply chain management (Anderson & Dekker, 2009a). Improving supply chain performance also became one of the critical issues to gain competitive advantage (CAI, Liu, Xiao, & Liu, 2009). Most related researches have focused on either strategic cost management in the supply chain or performance management in the supply chain.

According to Anderson and Dekker (2009a), strategic cost management concerns the alignment of a firm's resources and associated cost structure with the long-term strategy and short-term tactics. For cost management in the supply chain it is important that organizations understand their interfirm costs. This demands trust and collaboration between supply chain parties (Cokins, 2001). When studying strategic cost

management in the supply chain, focus is on interactions across boundaries because this can deliver competitive advantages. This competitive advantage can reflect itself in lower costs, but also in higher productivity, quality, innovation and customer responsiveness.

Supply chain management (SCM) is perhaps the premier operations management strategy for companies seeking to establish and maintain competitive advantage in today's global marketplace. SCM is important because businesses have come to recognize that their capacity to continuously reinvent competitive advantage depends as much on their ability to

look outward to their channel partners as it does leveraging their internal capabilities. Channel partners assist companies to generate the innovative ideas and resources necessary to assemble the right blend of competencies that will resonate with their own organizations and the wants and needs of their marketplaces.

Supply Chain Management includes, planning, design, control and implementation of all business processes related to procurement, manufacturing, distribution and sales order fulfilment functions of a business. Thus Supply Chain Management includes managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer.

"Supply chain management is the integration of businesses from end user through original suppliers that provides products, services, and information that add value for customers."

This dissertation will focus on the intersection between supply chain management and strategic cost management, namely strategic cost management in the supply chain. Several methods and concepts can be adopted to analyses and control all costs within the supply chain. It is important to be aware that costs are not only initiated by flows of goods and information, but also by relationships within the supply chain (Seuring, 2002).

This will also study performance management in the supply chain. Performance management is important to reach goals efficiently and effectively, but prior research on this topic is rather limited in comparison to research on cost management in the supply chain.

NEED FOR THE STUDY

Cost reduction strategies in supply chain management focus on finding the most efficient and affordable ways to procure and store products, transport them from point A to point B, and ensure customer satisfaction. However, reducing supply chain management costs involves more than just selecting the cheapest materials and carriers. Every aspect of the order fulfillment process costs money and could benefit from cost reduction strategies.

1. Identify Costly Workflow Inefficiencies

To uncover hidden expenses in supply chain management, stop thinking solely about transport costs. Instead, Logistics Bureau recommends following the entire order fulfill- ment workflow from start to finish. Efficiency is the goal so that more orders can be accurately processed and shipped each day. Look out for bottlenecks in the workflow or instances where employees must manually complete a task that could be automated in- stead.

Begin by analyzing how transactions are processed. Which payment processing platform (PayPal, Stripe, Venmo, etc.) do you use to collect money from customers? Shop around to make sure you're satisfied with the transaction fees or subscription fees associated with this service. You could be losing money before it even has a chance to enter your busi- ness's bank account. Give each technological asset the same level of scrutiny. Is there a more efficient way to assign order fulfillment duties or to update the status of an order? Does order fulfillment get put on hold when a new delivery arrives at the warehouse? Ask your employees to point out the inefficiencies they've noticed, and consider hiring a consultant to take an impartial view of your operations as well.

2. Diversify Your Carriers or Modes

Finding a reliable and affordable carrier isn't a one-time scenario. You could be missing out on competitively priced options if you're not constantly building relationships with carriers and getting quotes for different services. Failing to diversify your carrier rela- tionships also puts your company at high risk of being stuck in a lurch if your sole carrier

suddenly goes out of business. You'll definitely lose money if you cannot keep your cus- tomers happy by delivering their products, so poor carrier diversity puts you in a lose- lose position.

Instead, give yourself more control over the supply chain by always having more than one carrier as an option. In addition, Freight Quote recommends intermodal or multi- modal transport to reduce fuel costs. You may sacrifice a day or two in shipping times but end up reducing overall freight costs by placing the shipment on a train for the inter- state or cross-country part of the journey, and then transferring it to a truck for regional or local transport. In some areas of the country, water transport represents another viable option.

3. Pay for the Right Transport Service

Are you paying an arm and a leg for overnight transport? Have you really thought about why you've chosen this transport service? Yes, customers want fast delivery, and Amazon Prime's free same-day delivery option has put some pressure on businesses to transport products even faster than usual to stay competitive. However, the majority of your cus- tomers understand that you don't have the same resources and extensive locations as an industry giant like Amazon.

In most cases, they'll cut you some slack for offering two- or even three-day shipping instead of overnight delivery. Consider your product and your customer when deciding whether the shipping delay will have a significant impact on customer satisfaction. You can always pass the cost of faster shipping on to the consumer if you'd like to still provide this option.

In addition to paying for the right shipping speed, make sure you also know the difference between FTL (full truckload) and LTL (less than truckload). According to Logistics Plus, the best one to choose depends on what you're shipping and how fast you expect it to be delivered. Very large, heavy deliveries or those that need to arrive quickly should be shipped FTL. Small deliveries whose delivery timelines can withstand a few pit-stops

(since other company's deliveries will be combined with yours) can be shipped LTL at a reduced cost compared to FTL.

4. Forecast Demand with Sales Planning

Sales forecasting allows you to plan ahead to ensure you don't experience a product short-age. You'll lose out on customers who don't want to wait for an out-of-stock product and purchase from a competitor instead. However, forecasting also prevents you from wast- ing money creating or purchasing too much of a product. After all, what's the point of being overstocked when demand for the product is virtually zero?

When done well, forecasting represents one of the best supply chain improvement strat- egies: Don't procure and ship what you cannot sell. However, it's easier said than done, because there's no way to completely predict the future. Factors like previous sales trends, upcoming marketing efforts and new competitors all influence demand. An experienced sales forecaster might require a decent salary, but they could pay for themselves and still save your company money if they do their job well.

5. Reduce Product Packaging

Product packaging does serve an important purpose: it protects the product in transit and provides an eye-catching surface to help sell the product by listing features and specifi- cations. However, packaging also affects how many products can fit inside a box. Only so many boxes can fit in a freight container, especially if you're opting for FTL transport. For an excellent example of frivolous product packaging, think back to how PC games were often sold in the '90s and early 2000s. Large cardboard boxes featured exciting images of game play, but inside was just a thin CD. Companies that sold their PC games in CD cases or DVD boxes dramatically increased the number of games that would fit in a single box, thus reducing the amount of time it took to load and unload trucks at the warehouse and reducing the number of trucks needed in the first place.

Reducing product packaging also saves money on the packaging materials and printing costs. It's a win-win and one of the best cost reduction methods in supply chain manage- ment. Find the best way to ship your products without damaging them, since you'll lose money for every product that does not arrive at its destination intact.

Effective Cost Optimization in Supply Chain

One crucial factor connects each supply chain cost reduction strategy: data. Before you can make a plan to save money, you must establish a starting baseline. According to West Monroe, you'll need to perform a cost-to-serve analysis that looks at costs related to your business's overhead, customer service, planning and, of course, logistics and many other factors. Only then can you effectively track the success of your efforts.

In addition to meticulously tracking current expenses, you should also track data pointsrelated to incoming deliveries, outgoing shipments, and sales. Look for trends over time.For example, is there a certain time of year when sales increase dramatically? Do ware-house deliveries tend to get delayed during particular months or in inclement weather? You'll need to know this information for forecasting purposes and to help you identifyinefficient procedures. In addition, don't hesitate to include personnel from every department in your planning process. The best people to point out inefficient practices on thewarehouse floor are those who encounter those inefficiencies every day.

RESEARCH METHODOLOGY

Secondary research involves the summary, collation and/or synthesis of existing research. Secondary research is contrasted with primary research in that primary research involves the generation of data, whereas secondary research uses primary research sources as a source of data for analysis.

Secondary research or desk research is a research method that involves using already existing data. Existing data is summarized and collated to increase the overall effectiveness

of research.

Secondary research includes research material published in research reports and similar documents. These documents can be made available by public libraries, websites, data obtained from already filled in surveys etc. Some government and non-government agencies also store data, that can be used for research purposes and can be retrieved from them. Secondary research is much more cost-effective than primary research, as it makes use of already existing data, unlike primary research where data is collected first hand by organizations or businesses or they can employ a third party to collect data on their behalf.

As already highlighted, secondary research involves data assimilation from different sources, that is, using available research materials instead of creating a new pool of data using primary research methods. Common secondary research methods include data collection through the internet, libraries, archives, schools and organizational reports.

- Online Data

Online data is data that is gathered via the internet. In recent times, this method has become popular because the internet provides a large pool of both free and paid research resources that can be easily accessed with the click of a button.

While this method simplifies the data gathering process, the researcher must take care to depend solely on authentic sites when collecting information. In some way, the internet is a virtual aggregation for all other sources of secondary research data.

- Data from Government and Non-government Archives

You can also gather useful research materials from government and non-government

archives and these archives usually contain verifiable information that provides useful insights on varying research contexts. In many cases, you would need to pay a sum to gain access to these data. The challenge, however, is that such data is not always readily available due to a number of factors. For instance, some of these materials are described as classified information as such, it would be difficult for researchers to have access to them.

- Data from Libraries

Research materials can also be accessed through public and private libraries. Think of a library as an information storehouse that contains an aggregation of important information that can serve as valid data in different research contexts. Typically, researchers donate several copies of dissertations to public and private libraries; especially in cases of academic research. Also, business directories, newsletters, annual reports and other similar documents that can serve as research data, are gathered and stored in libraries, in both soft and hard copies.

- Data from Institutions of Learning

Educational facilities like schools, faculties, and colleges are also a great source of secondary data; especially in academic research. This is because a lot of research is carried out in educational institutions more than in other sectors.

It is relatively easier to obtain research data from educational institutions because these institutions are committed to solving problems and expanding the body of knowledge. You can easily request research materials from educational facilities for the purpose of a literature review. Secondary research methods can also be categorized into qualitative and quantitative data collection methods.
Quantitative data gathering methods include online questionnaires and surveys, reports

about trends plus statistics about different areas of a business or industry. Qualitative research methods include relying on previous interviews and data gathered through focus groups which helps an organization to understand the needs of its customers and plan to fulfill these needs. It also helps businesses to measure the level of employee satisfaction with organizational policies.

Advantages of Secondary Research

1. Easily Accessible With secondary research, data can easily be accessed in no time; espe- cially with the use of the internet. Apart from the internet, there are different data sources available in secondary research like public libraries and archives which are relatively easyto access too.

2. Secondary research is cost-effective and it is not time-consuming. The researcher can cut down on costs because he or she is not directly involved in the data collection process which is also time-consuming.

3. Secondary research helps researchers to identify knowledge gaps which can serve as the basis of further systematic investigation.

4.   It is useful for mapping out the scope of research thereby setting the stage for field inves-tigations. When carrying out secondary research, the researchers may find that the exact information they were looking for is already available, thus eliminating the need and ex- pense incurred in carrying out primary research in these areas.

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Secondary Research Methods with Examples

Secondary research is cost effective and that's one of the reasons that make it a popular choice among a lot of businesses and organizations. Not every organization is able to pay huge sum of money to conduct research and gather data. So, rightly secondary research is also termed as "desk research", as data can be retrieved from sitting behind a desk.

Following are popularly used secondary research methods and examples:

1. **Data available on the internet:** One of the most popular ways of collecting secondary data is using the internet. Data is readily available on the internet and can be downloaded at the click of a button.

   This data is practically free of cost or one may have to pay a negligible amount to download the already existing data. Websites have a lot of information that businesses or organizations can use to suit their research needs. However, organizations need to consider only authentic and trusted website to collect information.

2. **Government and nongovernment agencies**: Data for secondary research can also be col-lected from some government and non-government agencies. For example, US Govern- ment Printing Office, US Census Bureau, and Small Business Development Centers have valuable and relevant data that businesses or organizations can use. There is a certain cost applicable to download or use data available with these agencies. Data obtained from these agencies are authentic and trustworthy.

3. **Public libraries:** Public libraries are another good source to search for data for this re- search. Public libraries have copies of important research that were conducted earlier. They are a storehouse of important information and documents from which information can be extracted. The services provided in these public libraries vary from one library to another. More often, libraries have a huge collection of government publications with market sta- tistics, large collection of business directories and newsletters.

4. **Educational Institutions:** Importance of collecting data from educational institutions for secondary research is often overlooked. However, more research is conducted in colleges and universities than any other business sector. The data that is collected by universities is

mainly for primary research. However, businesses or organizations can approach educa-tional institutions and request for data from them.

5.   **Commercial information sources:** Local newspapers, journals, magazines, radio and TV stations are a great source to obtain data for secondary research. These commercial infor- mation sources have first-hand information on economic developments, political agenda, market research, demographic segmentation and similar subjects. Businesses or organiza- tions can request to obtain data that is most relevant to their study.

METHODOLOGY

The present study is both descriptive and exploratory in nature. The methodology used in the paper in order to collect the information is basically secondary in nature. The infor- mation are being collected from the various sources like records, articles, research jour- nals and databases. Information has also been collected from the different trustworthy websites in order to make the study more updated and accurate. Primary data is being avoided in the paper because the study is related to the internal management of the organ-ization and thereby primary data collection becomes a very complicated, time consuming and expensive process due to geographical constraints.

SUPPLY CHAINS AND SUPPLY CHAIN MANAGEMENT

Supply Chain Management (SCM) has received a considerable amount of interest both from researchers and in the industry. The SCM concept came up just before the 1960s according to Huan et al. (2004). The study of SCM increased in the 1980s and had a dramatic increase in the 1990s (cf. Huan et al. (2004)).

There are many definitions of SCM in the literature. The definitions focus on different things. There is cost focus, customer service and inventory cost focus and the flow focus. Shapiro (2001) writes that the traditional objective of SCM is to minimize the total SupplyChain Cost to meet fixed and given demand. This total cost may include the following: Raw material and other acquisition costs.

- Inbound transportation cost
- Facility investment costs
- Direct and indirect manufacturing cost.
- Direct and indirect distribution cost
- Inventory holding cost
- Interfaculty transportation cost
- Outbound transportation cost

Supply Chain Management is described by Ellram (1990) as the integration of control and planning of materials and product flow from supplier to customer. Simchi-Levy (2000) defines Supply Chain Management as " a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements."

The objective of Supply Chain Management (SCM) is to improve operations management across functional boundaries in the supply chain. Cambra and Polo (2008) mean that SCM is one of the key activities that present the success of a company. There are different types of supply chains that have other focuses and fit better with certain product characteristics and customer requirements.

A **LEAN SUPPLY CHAIN** uses continuous improvement efforts to eliminate waste and non-value adding steps. It focuses on achieving internal manufacturing efficiencies and the reduction of setup and lead times in order to attain cost reduction, profitability an internal flexibility. The focus is on incrementally improving existing products and maximizing performance while minimizing the costs of these products.

An **AGILE SUPPLY CHAIN** wants to respond to fast changing markets in a dynamic and growth-oriented way. By interacting with customers and markets, agile supply chains try to understand customer requirements in order to deliver customized products (mass customization). This kind of supply chains want to obtain new competencies, develop new product lines and target new markets. Deploying new technologies, methods, tools, techniques and information systems are very important in this context.

HYBRID SUPPLY CHAIN want to achieve a certain degree of customization by postponing the product differentiation until final assembly or by adding components that are innovative. Lean as well as agile supply chain techniques are adopted to produce components with differing characteristics. The agile part of the supply chain is used to understand and satisfy customer requirements.

Supply chains are very dynamic and there is a constant flow of products, information and funds forwards and backwards. The satisfaction of customer needs is the primary purpose of any supply chain in order to generate profits. Due to intense and global competition, the introduction of products with shorter life cycles and higher customer expectations, supply

chain management became more and more important.

Simchi-Levi et al (2003) have defined supply chain management as follows: "Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations and at the right time, in order to minimize system wide costs while satisfying service level requirements. Effective supply chain management means thus that supply chain assets, product, information and fund flows are managed in such a way that the total supply chain surplus (customer value minus supply chain cost) is maximized.

Organizations that want to minimize costs and maximize performance in the supply chain through strategic cost and performance management in the supply chain must view themselves as a link in a value chain of business processes that create customer value and where competitors are defined as other supply chains that deliver value for the same customers. Each partner in the chain has interest in a high productivity level and effective performance of all the partners by working together collaboratively. To perform as one value chain, they will leverage information across the chain.

According to Seuring (2009), supply chain management can be split up into two dimensions, the relationship dimension and the product dimension.

Conceptual cost models, which will be described later in this dissertation, can be adopted in all four quadrants. However, most researches have focused on one dimension (Schulze, Seuring, &Ewering, 2011). The product-relationship- matrix approach is briefly summarized because it gives some valuable insights into the adoption of cost models for designing the supply chain and improving efficiency.

"**I.** Strategic configuration of product and network" concerns deciding which products and services will be offered and which suppliers a company will work together with.

In "**II.** Product design in the supply chain", a company uses the knowledge and capabilities of its suppliers to develop the product.

"**III**. Formation of the production network" deals with the allocation of production

processes to the supply chain partners and determines the associated decoupling points. At last, "**IV.** Process optimization in the supply chain" aims at continually increasingefficiency.

In short**, I.** and **III**. Focus on supply chain design, while II. And IV. Target increasing efficiency. The dimensions can be seen as sequential steps, but it is important to notice thatan iterative process is present.
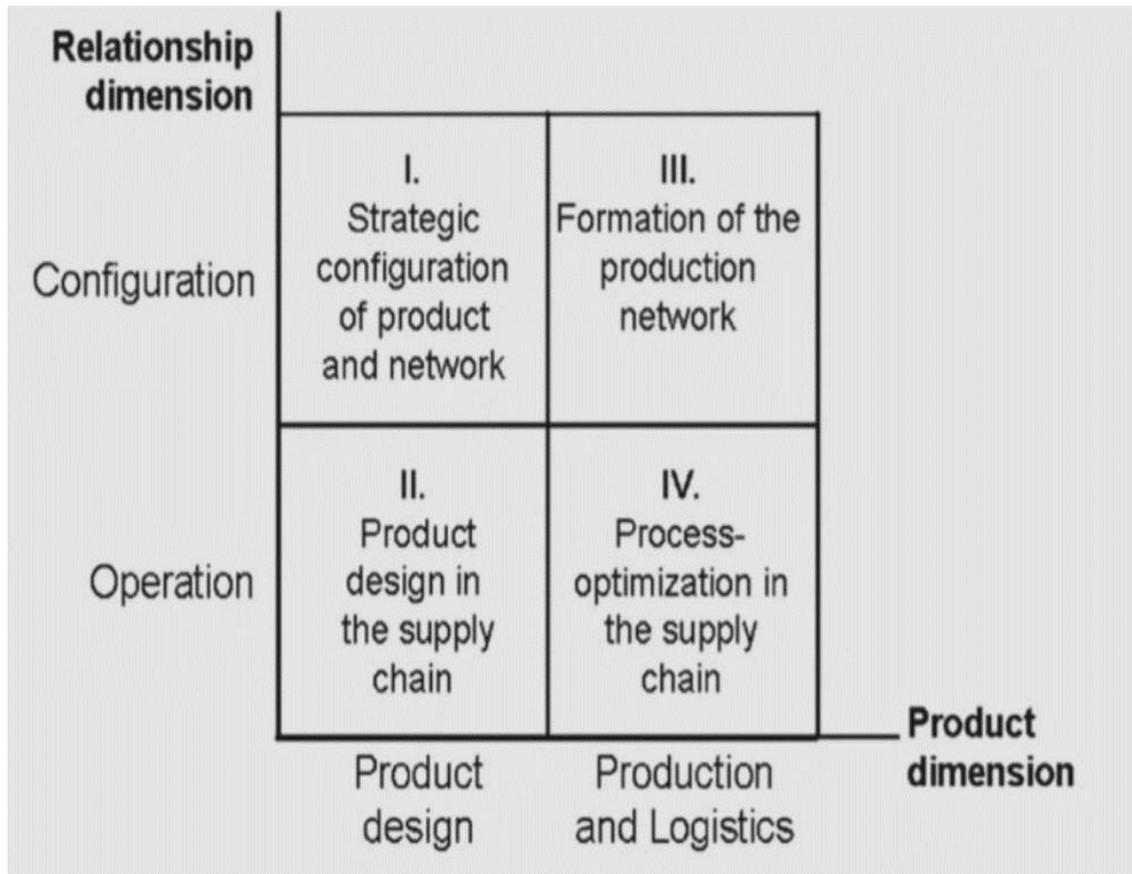

FIGURE SHOWS THE PRODUCT-RELATIONSHIP MATRIX (SEURING, 2009)

COST REDUCTION STRATEGIES IN SUPPLY CHAINMANAGEMENT

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Finding a reliable and affordable carrier isn't a one-time scenario. You could be missing out on competitively priced options if you're not constantly building relationships with carriers and getting quotes for different services. Failing to diversify your carrier relationships also puts your company at high risk of being stuck in a lurch if your sole carrier suddenly goes out of business. You'll definitely lose money if you cannot keep your

customers happy by delivering their products, so poor carrier diversity puts you in a lose- lose position.

Instead, give yourself more control over the supply chain by always having more than one carrier as an option. In addition, Freight Quote recommends intermodal or multimodal transport to reduce fuel costs. You may sacrifice a day or two in shipping times but end up reducing overall freight costs by placing the shipment on a train for the interstate or cross-country part of the journey, and then transferring it to a truck for regional or local transport. In some areas of the country, water transport represents another viable option.

3. Pay for the Right Transport Service

Are you paying an arm and a leg for overnight transport? Have you really thought about why you've chosen this transport service? Yes, customers want fast delivery, and Amazon Prime's free same-day delivery option has put some pressure on businesses to transport products even faster than usual to stay competitive. However, the majority of your customers understand that you don't have the same resources and extensive locations as an industry giant like Amazon.

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In addition to paying for the right shipping speed, make sure you also know the difference between FTL (full truckload) and LTL (less than truckload). According to Logistics Plus, the best one to choose depends on what you're shipping and how fast you expect it to be delivered. Very large, heavy deliveries or those that need to arrive quickly should be

shipped FTL. Small deliveries whose delivery timelines can withstand a few pit-stops (since other company's deliveries will be combined with yours) can be shipped LTL at a reduced cost compared to FTL.

4. Forecast Demand with Sales Planning

Sales forecasting allows you to plan ahead to ensure you don't experience a product shortage. You'll lose out on customers who don't want to wait for an out-of-stock product and purchase from a competitor instead. However, forecasting also prevents you from wasting money creating or purchasing too much of a product. After all, what's the point ofbeing overstocked when demand for the product is virtually zero?

When done well, forecasting represents one of the best supply chain improvement strategies: Don't procure and ship what you cannot sell. However, it's easier said than done, because there's no way to completely predict the future. Factors like previous sales trends, upcoming marketing efforts and new competitors all influence demand. An experienced sales forecaster might require a decent salary, but they could pay for themselves and still save your company money if they do their job well.

5. Reduce Product Packaging

Product packaging does serve an important purpose: it protects the product in transit and provides an eye-catching surface to help sell the product by listing features and specifications. However, packaging also affects how many products can fit inside a box. Only so many boxes can fit in a freight container, especially if you're opting for FTL transport.

For an excellent example of frivolous product packaging, think back to how PC games were often sold in the '90s and early 2000s. Large cardboard boxes featured exciting images

of game play, but inside was just a thin CD. Companies that sold their PC games in CD cases or DVD boxes dramatically increased the number of games that would fit in a singlebox, thus reducing the amount of time it took to load and unload trucks at the warehouse and reducing the number of trucks needed in the first place. Reducing product packaging also saves money on the packaging materials and printing costs. It's a win-win and one of the best cost reduction methods in supply chain management. Find the best way to ship your products without damaging them, since you'll lose money for every product that doesnot arrive at its destination intact.

Effective Cost Optimization in Supply Chain

One crucial factor connects each supply chain cost reduction strategy: data. Before you can make a plan to save money, you must establish a starting baseline. According to West Monroe, you'll need to perform a cost-to-serve analysis that looks at costs related to your business's overhead, customer service, planning and, of course, logistics and many other factors. Only then can you effectively track the success of your efforts.

In addition to meticulously tracking current expenses, you should also track data points related to incoming deliveries, outgoing shipments, and sales.

Look for trends over time.

For example, is there a certain time of year when sales increase dramatically? Do warehouse deliveries tend to get delayed during particular months or in inclement weather?

You'll need to know this information for forecasting purposes and to help you identify inefficient procedures. In addition, don't hesitate to include personnel from every department in your planning process. The best people to point out inefficient practices on the warehouse floor are those who encounter those inefficiencies every day.

Shipping Cost Analysis

In addition to increasing your sales, controlling business expenses is a key step to maximizing profits. If you haven't analyzed your shipping costs, it might be a good idea to evaluate not only your expense for delivering product but the benefits, as well. The lowest shipping cost might not be the main determinant in choosing shipping methods, and the cheapest option might cost you more in the long run.

Shipping Needs

Any shipping cost analysis you do will include your need for shipping. In addition to getting your product from here to there, you must consider speed of delivery, damage, tracking ability and ease of return. These affect not only your bottom line but your customer service, as well.

Hard Cost

The first way to analyze your shipping costs is to determine the bottom-line cost to ship products. If you receive competitive bids or price services such as FedEx, UPS, DHL and the Postal Service, one criteria you will use to compare them is the dollar cost to ship from point A to point B. In addition to the transportation cost, include insurance, pick-up, preparation, over-sized package fees and any other add-on costs. If you use your own delivery trucks, calculate driver, router and loader pay and benefits, truck payments, maintenance, gas, tires and insurance.

Benefits

In addition to getting your products physically delivered, you must consider your other shipping needs to calculate your overall shipping costs. For example, the cheapest option might also be the slowest. This might not be a problem if you can make your product early

and still get it delivered on time. If late deliveries reduce your sales or jeopardize your relationships with vendors and customers, the low-price, slow-delivery option might end up costing you more than you save over the long term if you lose sales.

If you ship expensive products, you might not be able to afford any being damaged during delivery. Subtract the cost of your potential average damage during delivery from the cost savings of using a less-reliable but cheaper delivery service to determine if it's worth using the cheapest service. You might save more money using a cheap service than you lose on damaged items.

Service

Different shippers offer different levels of customer service. Some give you real-time tracking, while others only give you estimated times of arrival. Some shippers can contact their drivers 24/7 if there's a question about your delivery, while others must wait until drivers call in. Some will load and unload your packages, while others require you and your vendor to do that.

Consider the total services shippers offer to determine if you'll have additional costs or increase your exposure to potential delays. If your delivery service requires you to take your product to their center, factor in your time, staff and mileage expenses to their cost.

Cash Flow

If quicker delivery results in quicker sales and quicker vendor payments, factor that into your shipping cost analysis. Work with your accountant to determine how soon you'll get cash in using each delivery option. Determine if your money will arrive early enough that you can reduce enough interest payments on credit cards or other debt to make a more expensive shipper worthwhile. Getting cash in quicker might also help you order more materials to make more product sooner and increase sales.

PERFORMANCE MANAGEMENT IN THE SUPPLY CHAIN

Performance management relates to application of processes, methods, metrics, and technologies in order to create a consistent relationship between supply chain strategy, planning, implementation, and controlling. The goal of supply chain performance management is business process optimization through monitoring and analysis of key performance indicators.

By measuring and monitoring metrics against predefined goals companies can provide added value to large volumes of data generated over time.

Performance management in supply chain is so important by engaging in supply chain performance management, a firm can significantly reduce lead times (delays) and cut operating costs while getting goods to the consumer as quickly as possible to increase revenue. In order for a business to function correctly, every part of the business must communicate effectively.

Performance management can improve supply chain management by the following ways:

1. By Optimizing Company and also by checking the quantity of the company-
2. By Improving Distribution Network.
3. By Embracing Technology. ...
4. By Building Healthy Supplier Relationships. ...
5. By Reviewing Procedures Regularly. ...
6. By Establishing Green Initiative measures.

Supply chain management is an important part for every organization as it improves the effectiveness, efficiency, management of resources, etc. it also establish god and prominent relations with the stake holders like suppliers, customers, etc.

Two concepts are meaningful for the development of performance measurement systems. The first one is the balanced scorecard approach that provides an equilibrium in multiple ways (short term – long term; internal focus – external focus; learning and growth – internal processes – customers – financials; organization levels; stakeholder perspectives). The SCOR (supply chain operations reference) model delivers a standardized manner to look at the supply chain in a balanced way at multiple levels (plan, source, make, deliver and return). It provides a consistent scorecard framework, it is process oriented and it enables the use of benchmarks.

Performance measurement must be aligned with the supply chain strategy, balanced, systemic, take dynamics into account, be hierarchical and dependent, take human and organizational aspects into account and there must be a fit present among the parameters.

This framework solves some of the before stated problems, such as long feedback loops and unidentified relationships between KPIs, but it does have its own limitations. It is important to mention that the results of the analysis must be treated as supportive information for making decisions, decision makers eventually select a pattern of critical KPIs that are aligned with their supply chain strategy.

Performance management and measures are not only applied to evaluate the current situation, to discover opportunities, to set goals, to make decisions etc. They can also be adopted for the selection of suppliers and the evaluation of (relationships between) supplychain parties.

Mahama stated that the use of performance measures is directly related to better supplier performance (Anderson & Dekker, 2009b). Performance measures are important because they clearly communicate expectations and realizations. They are also employed to assesshow well collaboration is executed, whether the current supply base will be able to meet current and future needs and they make suppliers aware of inconsistencies between current and expected performance. Supplier performance can be improved using the performance

measures for benchmarking and yardstick competition. Comparable financial and non- financial information of suppliers with similar characteristics is then used to help firms identify shortcomings and to give them the opportunity to learn

It is also relevant for a firm to assess whether the current supply chain configuration and relationships are sustainable. They can, for instance, incorporate data on the health of suppliers, this means that not only transactions with the own firm are taken into account. For a supply chain to be sustainable, it is important that each party in the supply chain contributes value in proportion to its costs, that all parties receive a fair value for their contribution and that no changes in the value propositions or relationship designs could deliver a greater net value. Measurement systems have to be adapted to those criteria.

ENABLER OF COST AND PERFORMANCE MANAGEMENT INITIATIVES IN THE SUPPLY CHAIN MANAGEMENT

Enablers of Supply Chain Management

Researchers have identified six primary customer for the enablers of alignment. The enablers included organizational structure, internal relational behaviour, customer relational behaviour, top management support, information sharing and business performance measurement system. The model literature review includes the relationship between shareholder alignment, customer alignment and the enablers of the supply chain alignment. The enablers are urged to positively influence shareholder and customeralignment.

Organisational Structure

Organizational structure refers to a systematic approach that highlights how certain activities are directed so as to achieve the organizational objectives. The rules, roles and responsibilities are examples of these activities. Organizational structure involves the formalization, centralization, and the hierarchy of an

organization.

Internal Rational Behaviour

It can be considered as sit approaches in which activities are conducted to enable the process of developing a cross-functional relationship: Cross –functional teams, mutual understanding within the organizations, joint problem- solving strategies and effective planning characterize the internal relational behaviour. These features plays an important role in improving the cost effectiveness of the business and also inkling the needs of the customers. A business can improve customer delivery performance by aligning its internal rational behaviour and ensuring that supplies cooperate with the internal function of the organization.

Customer Relational Behaviour

In an organization, customer interaction is paramount in encouraging the process of developing and maintaining customer relationships. Customer interaction create shareholder alignment by enhancing revenue growth. Additionally, customer interaction create customer alignment by encouraging customer loyalty. Interacting with customers help the business broaden its market share, facilitate cost sharing and ensure that the business understands the effective planning and problem solving techniques. As skip worth pointed out goal sharing, cost sharing, profit sharing, point solving and delivery performance improvement are the main characteristics of customer interactions.

Top Management Support

The support and commitment of Top Management is important in supply chain management. Managerial commitment is very essential to supply chain management. This is because it helps the business achieve collaboration breakthrough and customer responsiveness. Sand berg and abranemisson found out that the role of the top management in supply chain management is reached at by introducing six distinctive standards "the supply chain thinker the relationship management, the controller, the frame setter, the process designer and the organizer of the future". Organization understand that top management support is important in providing a crucial channel between shareholder and employees.

Information Sharing

Information sharing is important in supply chain management since it enables the exchange of information thus assist activities relating to business and supply chain strategies. Skip worth argues that information sharing significantly influence the shareholder and customer alignment.

Increased organizational collectively characterizes contemporary organizations. Increased connectivity enables the business to reduce their production cost and increase customer service. All this is made possible by the fact that advanced technologies have it possible for organizations to share more information and plan production and inventory effectively.

Business Performance Measurement System

In business, Performance Management System refers to a system in which business performance is measured: thus influence the staff to achieve improvements. Employees have been known to work in accordance with the incentives provided by the company. Therefore, the performance management system remain essential in providing the right incentives to influence staff behaviour. Performance Management System need to be properly aligned with the objective of the shareholders. Proper alignment implies that performance management system acts as catalyst for change. A performance management system present employees with an opportunity to contribute to the objectives of the shareholders. Performance management system comprises of processes of a retrospective analysis. This type of analysis helps in determining whether a proper process was adhered to or whether the desired outcomes are achieved in supply chain management. Organizations have the responsibility of investing in a performance management system that are designed, developed and implemented with respect to the organizational policies and procedures.

To Evaluate Cost Savings in a Supply Chain: Two Examplesfrom Ericsson in the Telecom Industry

An accurate cost analysis is necessary to evaluate changes in a supply chain; this article shows how a rather simple framework can be used when evaluating changes in a supply chain. The framework is built on a Supply Chain Cost (SCC) model and customer servicemeasurements, delivery precision and leadtime. Both suggested changes in a supply chainand already executed changes can be evaluated by the framework. Two different examplesfrom the company Ericsson are presented to illustrate the framework, which is a 5 step analysis model. The existing, or pre-existing, supply chain is analysed, described and defined. The SCC and performance measures are measured and/or estimated. Improvements are designed and defined. The same measures as before are measured again.The measures from before and after the change of the supply chain are evaluated to decideif the changes are improvements or not. Cutting costs in one area of the supply chain can be a mistake if not the total supply chain is considered and the total SCC. Considering boththe SCC part and customer service measures present a wider understanding of the change.It is shown that SCC can be used as a tool to identify cost savings and evaluate if a changeproject will, or has, resulted in the cost savings the project aims for. Rough standard costsmeasures should be avoided instead actual costs should be used as much as possible. The used framework hopefully stimulate to similar analyses in other companies with other supply chains.

There is high pressure on companies to increase profit and at the same time the customers are demanding lower prices; therefore the companies have to cut cost in all areas. According to Tummala et al. (2006) making changes to the supply chain helps to lower cost and enables a company to more easily compete based on the price. Kumar and Chang

(2007) highlight that cutting cost in a company increase net income. The performance of a supply chain decides the company's success according to Lahti et al. (2009). Shahabuddin(2011) found in his study that companies that adopted supply chain processes were more profitable that those that did not. Evaluating changes in a supply chain can be difficult. Have the changes in the supply chain led to the reduced costs and improved customer service as it intended to do? To be able to answer this question you need some approach to evaluate the result from cost and customer service aspects. New (1996) claimed that is difficult to quantify the expected economic consequences of improved Supply Chain Management (SCM). This paper is concerned with Supply Chain Cost (SCC) and how this measure with its components can be used to identify and evaluate improvements of the supply chain. The paper describes two studies performed at Ericsson AB during 2011. The aim with the presented studies is to show that a framework built on SCC measurement combined with customer service measures can be used to evaluate changes that have been done but also changes that are planned to be executed.

SUPPLY CHAIN MANAGEMENT AND SUPPLY CHAIN COST

Supply Chain Management (SCM) has received a considerable amount of interest both from researchers and in the industry. The SCM concept came up just before the 1960s according to Huan et al. (2004). The study of SCM increased in the 1980s and had a dramatic increase in the 1990s (cf. Huan et al. (2004)). More and more companies have to focus on their supply chain in order to be successful in their business. Already in 1997 top managers had recognized the importance of having effective Supply chains to create competitive advantage according to Higginson and Alam (1997) and Cooper et al. (1997). Supply chain management is one of the key activities that give the success of a company, Cambra and Polo (2008). Spens and Wisner (2009) state that SCM is still viewed as very worthwhile. There are many definitions of SCM in the literature. The definitions focus on different things. There is cost focus, customer service and inventory cost focus and the flow focus. Shapiro (2001) writes that the traditional objective of SCM is to minimize the total Supply Chain Cost to meet fixed and given demand.

This total cost may include the following:

- Raw material and other acquisition costs.

- Inbound transportation cost

- Facility investment costs

- Direct and indirect manufacturing cost.

- Direct and indirect distribution cost

- Inventory holding cost

- Interfacility transportation cost

- Outbound transportation cost

Christopher (1998) defines SCM as the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the Supply chain as a whole. Johnston (1995) defines SCM as the process of strategically managing the movement and storage of materials, parts and finished inventory from suppliers through the firm to customers. Kranz (1996) defines SCM as the effort involved in producing and delivering a final product from a supplier's supplier to the customer's customer. Carter et al. (1995) define SCM as a co-ordinated approach for managing the flow of goods from suppliers to ultimate customers, and that the goal is to meet customer service objectives while minimising inventory and related costs. Simchi-Levy (2000) says that "Supply Chain Management is a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements" Supply Chain Management is described by Ellram (1990) as the integration of control and planning of materials and product flow from supplier to customer. Simchi-Levy (2000) defines Supply Chain Management as " a set of approaches utilized to efficiently integrate suppliers, manufactures, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements." The objective of Supply Chain

Management (SCM) is to improve operations management across functional boundaries in the supply chain. Therefore one purpose of SCM is to reduce the supply chain's total costs and improving the quality and service to its end customers (Berry and Naim, 1996). Cambra and Polo (2008) mean that SCM is one of the key activities that present the success of a company. Also the design and management of its supply chain is an important factor for the success of any company (MacFarland et al., 2008). It is difficult to quantify the expected economic consequences of improved SCM (New, 1996). To claim that a company has become more efficient after an optimisation work that has been performed without being able to evaluate the economic consequences is risky. Therefore it is valuable for a company to have methods for cost evaluations. In order for a company to accomplish cost evaluations the focus shall be on the total supply chain to acquire the total picture. According to Collin et al. (2009) is it important to consider all the existing flows in the supply chain, from the origin to the final customer. Customer satisfaction and service should be the leading goal for supply chain managers and cost reduction is the prime focus (Fawcett et al, 2008). All supply chains of the future will likely focus their efforts on achieving success through process improvement and collaboration on strategic, tactical, and operational levels (Beamon, 1998). The system for performance measurements in a company is an important factor for excellent management of a supply chain. The lack of standardized metrics and inappropriate Enterprise Resource Planning (ERP) functionality could be obstacles for performance measurements integration, (Forslund and Jonsson, 2007). The importance of supply chain performance measurement is increasing at a time when supply chain networks have become more complex (Mondragon and Lalwani, 2011). de Waal and Counet (2009) say when implementing performance measurement systems companies the most severe problems are lack of top management commitment and not having a performance measurement culture. The lack of awareness about performance measurement systems in supply chains are a significant barrier for implementing systems for performance measurements (Charan et al., 2009). Forslund (2010) point out that the future for performance measurement seems bright due to that the ERP systems have developed fast during the years. Supply Chain Cost is defined as all relevant costs in the

supply chain of the company, or organisation, in question. Analysis of SCC can be performed in different ways. Different kind of grouping of cost can be found in the literature. Bowersox and Closs (1996), Chen (1997), Sachan et al. (2005) and Byrne and Heavey (2006) have done similar definitions. These definitions use for example different terms for the same thing like Production cost in the definition of Chen (1997) and Manufacturing cost in the Bowersox and Closs (1996) definition. Chen (1997) says that SCC can be placed in the five categories: Production cost, Transportation cost, Warehousing cost, Inventory carrying cost and internal material handling cost. Many companies limit their definition of cost only to those costs that are contained within the four walls of their business entity (Christopher and Gattorna, (2004). Svensson (2010) questions if companies learn from previous failures, he even wonders whether companies ever learn from previous mistakes. Using SCC to evaluate cost savings and improvements in a supply chain can help companies to learn from previous changes in the supply chain and avoid the same mistakes in future change projects. The main obstacle to supply chain excellence in a company is the behaviour of people according to Halldorsson et al. (2008). The supply chain requires active management to maximize efficiency and effectiveness (Canever et al., 2008; Walters, 2008). Hayashi et al. (2009) have found that the sales function and the production function do not always work together for profit optimization. In most cases, the sales function is responsible for maximizing sales. On the other hand, the production function is responsible for minimizing production cost There is a need to take a supply chain view of costs. For many companies many of their costs lie outside their own legal boundaries. Production and distribution activities that used to be performed in- house are now often out sourced to specialist service providers. Total SCC includes both cost coming from the own company, but also cost for services bought from an external company. Measuring the total SCC presents information that helps the company to evaluate if the design of its supply chain is competitive or if it should be redesign. Accurate SCC provides a company a base for learning about different supply scenarios. Accurate SCC measurements help managers of the supply chain to take correct decisions. Finding all cost parts within SCC can be difficult for some companies and some companies are using

allocations for indirect cost Hatzis et al. (2011) claim that the most significant problems that the companies indicated regarding the costing procedure were the incorrect allocation of indirect costs to the provided services and the problem of the acquisition of right costing information. There is no general definition of SCM and SCC. In general, all definitions claim that SCM is a management philosophy, which has both intercompany and outer company scope. It includes all activities from the raw materials stage through to the end- user with the focus on optimization and efficiency (Tan et al., 2002). A lot of attempts to define logistic costs and SCC exists (Pettersson and Segerstedt, 2013). This paper uses the suggestions and definitions of Pettersson and Segerstedt (2012, 2013). In this definition SCC is divided into 6 main categories: Manufacturing cost, Administration cost, Warehouse cost, Distribution cost, Capital cost and Installation cost. Every category is in its turn subdivided in different cost elements, see Figure 1.
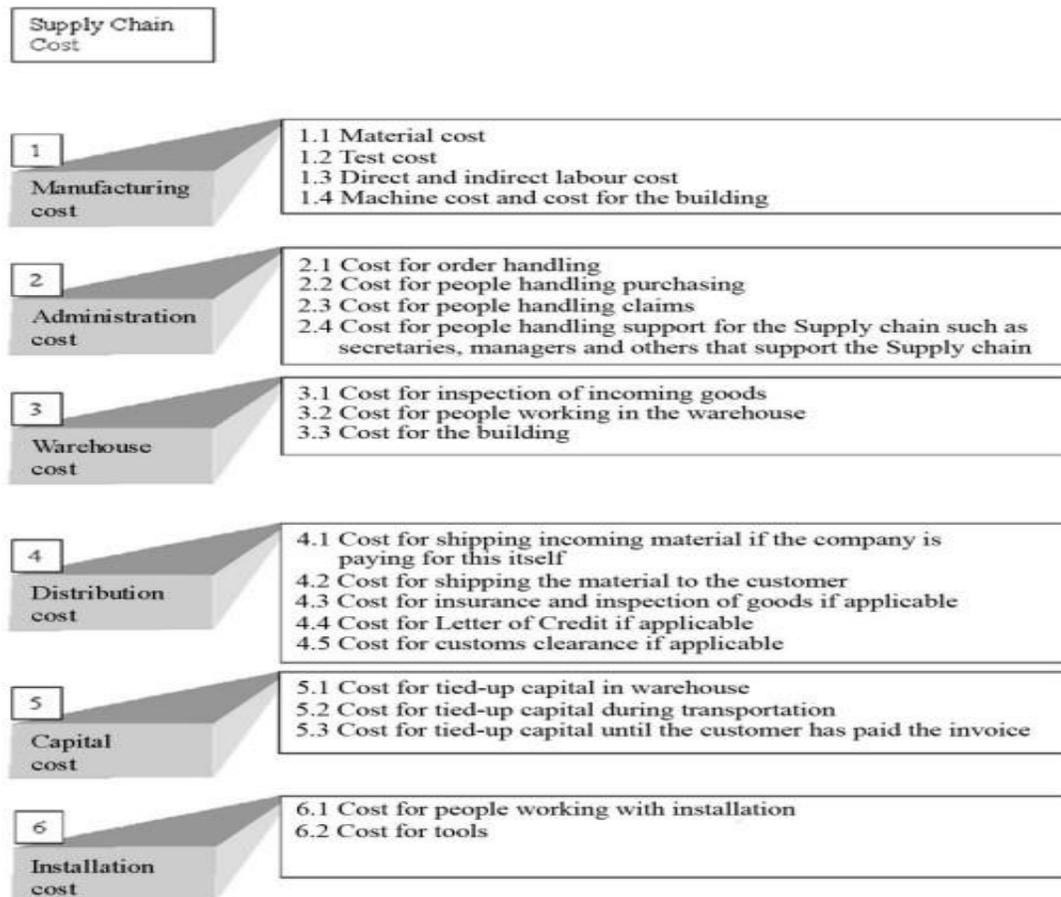
Figure 1. Contents for Supply Chain Cost (source: Pettersson and Segerstedt (2013)

STUDY EXAMPLES FROM ERICSSON AB

Introduction to Ericsson AB

Ericsson is a world-leading provider of telecommunications equipment and related services to mobile and fixed network operators all over the world. The company has customers in more than 175 countries according to Ericsson (2012). More than 40 percentages of the world's mobile traffic passes through Ericsson's networks. The Ericsson organization has four Business Units: Business Unit Networks; Business Unit Global Services; Business

Unit Multimedia; Business Unit CDMA Mobile Systems Research, Regions, and Group are the other parts of the organization. Each Business has a Supply unit. This unit is taking care of all Supply related issues. Each Region also has a supply unit. Ericsson has a wide scope of products: Mobile systems, Wireline systems, Transmission and transport, Service layer and Services 3.2 Study Approach Kähkönen (2011) argues that case studies are suitable research of supply chain management. However, according to e.g. Yin (2003) and Kähkönen (2011) our study may not be classified as a proper case study. It only presents short descriptions of two analyses and evaluations of changes in different supply chains at Ericsson. The analysis and evaluation was performed by a group of people all employed by Ericsson. One of the participants in the group was the main author of this article. Ericsson has many competitors therefore Ericsson is restrictive to make public their successes, and failures, especially when it comes to the design of their supply chains and processes. The design of their supply chains and processes are the core business; it decides profit and/or loss. This restricts the scope of this presentation. However the aim with this article is not to present a close case study, but the main idea with the article is to illustrate a framework or model for evaluating changes in a supply chain. The Supply Chain Cost (SCC) in the two examples is measured according to the model and definition in Pettersson and Segerstedt (2013) and Figure 1. The two scenario analyses are based on a five step approach measuring SCC and customer service measures, delivery precision and lead-time, before and after a performed or planned change. Before means that SCC is measured in the supply chain as it is designed before the change. After means that SCC is measured after the change in the supply chain. The first step in this evaluation model is to define the supply chain that will be studied. Next step is to measure SCC and customer service measures in the defined supply chain. The third step is to define improvements or define changes that have been done. In the fourth step the SCC and customer service measures are measured again and in a fifth step the measurements from step 2 and step 4 are compared and analysed. The definition of the analysed supply chains was performed in a group of colleagues within the supply organisation at Ericsson. Costs elements to the SCC measurements were collected from Ericsson's Enterprise Resource Planning (ERP)

computer system. 3.3 Example 1: Direct deliveries to customers This study is performed on a supply chain Ericsson is in control of and responsible for. Some parts in the supply chain are within Ericsson boundaries and some parts are bought as a service fromcompanies outside Ericsson. The idea with the study is to find improvements that both present better customer service and decreased costs through a substantial change of the distribution link from production to end customers. The evaluation framework with 5 stepspresented in section 2.2 is applied to Example 1 together with service measurements. Both SCC and service measurements are important factors when evaluating the excellence in a supply chain (Pettersson and Segerstedt, 2012). Customer service includes delivery precision and lead-time. Delivery precision is calculated as the number of orders deliveredin time compared to the total number of orders delivered during a month. In time means onconfirmed delivery date, the exact promised day. The lead-time, or delivery time, is the time from receiving customer order until the order is delivered to customers place. The studied supply chain is a chain from customer ordering a product until the product is delivered to the customer. Each involved step in the process creates and adds cost to the total SCC.

Step 1: Analyse, describe and define version one of the supply chain

The first step is to define and analyse the supply chain in this case in control of Ericsson. The first thing that is happening in this supply chain is that customers are sending orders to the local company (LC) in the country where the customer is located. Thereafter is the order sent to an Order desk that takes care of all customer orders. The Order desk sends a purchase order to an external production facility. The produced material is sent to a deliverycentre in another country, marked with ESD/EDC in Figure 2. After that the ordered material is sent to a local warehouse in the country where the customer is situated. The laststep in the supply chain is from the local warehouse to the customer warehouse, marked with Cust. WH, Site in Figure 2.

Figure 2. Example 1: Original flow, supply chain, creating costs

Step 2: Measure SCC and customer service measures for version

one Manufacturing cost is created and added at the External Supplier, marked with External S in Figure 2. Administration cost is added at the LC and the Order desk. Distribution cost is added when transporting material from External Supplier to ESD/EDC, from ESD, EDC to Local warehouse and from Local warehouse to Customer Warehouse. Capital cost is added when the external supplier is paid for their manufacturing work until the customer has paid for the delivered material. Warehouse cost is added for ESD/EDC and Local Warehouse. The Customer warehouse is paid by the customer and therefore not included in Ericsson's SCC. Manufacturing cost and Distribution cost comes from external suppliers in the supply chain. The costs are the amount of money Ericsson pays to the supplier handling the production and to the supplier handling the distribution. The prices are negotiated on annual basis for each product and each distribution route. SCC in the defined Supply chain is measured by the Controller in the supply chain monthly. Here is the measurement presented in distorted "money units" (MU). But the MU shows the correct differentiate between the different costs.

Total SCC measured before changes in the supply chain were initiated:

SCC	(MU)
Manufacturing cost	5.1
Administration cost	1.5
Warehouse cost	0.4
Distribution cost	0.8
Capital cost	0.4
Total SCC	**9.2**

Delivery precision: 95%; Lead-time: 16 days

Delivery precision and lead-time is measured based on figures from the ERP system. How delivery precision and lead-time are measured was mentioned above.

Step 3: Design and define suggested improvements from version

one In this case a group of supply chain managers at Ericsson started a project with the purpose to reduce cost while maintaining or improving the level of delivery precision and lead-time. The group agreed to the following improvement: Ship direct from the external supplier to the customer. By implementing the suggested improvement the group believed that the total SCC should decrease and that the lead-time should be decreased.

The reason for that was that transportation between warehouses in different countries was removed. By that they expected that the distribution and the warehouse cost should be reduced. The new supply chain is presented in Figure 3 with marks where SCC comes from. Manufacturing cost is added at External supplier, marked with External S in Figure

3. Administration cost is added at LC and Order Desk. Distribution cost is added when transporting material from External Supplier to Customer Warehouse. Capital cost is added when the external supplier is paid for their manufacturing work until the customer has paid

for the delivered material.
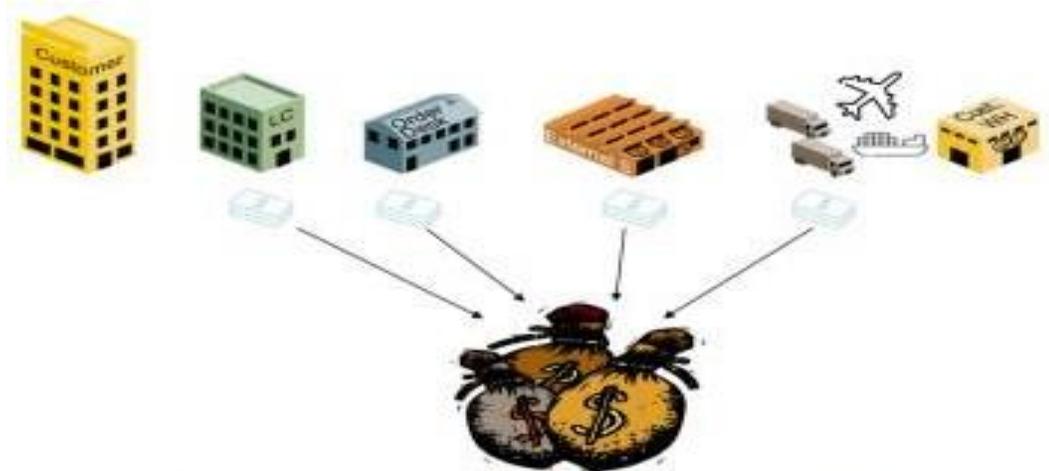
Figure 3. Example 1: New distribution channel

Step 4: Measure SCC customer service measures for version two of the supply chain

Total SCC measured the month after changes in the supply chain were implemented:

SCC	(MU)
Manufacturing cost	5.1
Administration cost	1.3
Warehouse cost	0
Distribution cost	0.2
Capital cost	0.3
Total SCC	**7.1**

Delivery precision: 98%; Lead-time: 8 days

The cost parts, delivery precision and lead-time are measured according to was mentionedabove. The cost measurements come from the financial measurements in the company and

are based on reports from the ERP system Ericsson is using. Measurements of delivery precision and lead-time come from the ERP system and are measured every month.

Step 5: Compare and evaluate the different versions

The total SCC was reduced by 2.1 MU (23%). Delivery precision was increased by 3 percentages and the lead-time was reduced by 8 days. To ship direct from the external supplier to the customer is in this case a favourable change. It is important in an analysis to evaluate both total cost changes and measures treating customer satisfaction.

EXAMPLE 2: MOVE OF PRODUCTION TO LOW WAGE COUNTRIES

The second example treats another supply chain also controlled by Ericsson. The studied supply chain had recently been changed at Ericsson. The reason for the change was to reduce costs, especially manufacturing costs, and at the same time keep the same grade of service to customers. Changes that have been done are that the production facilities have been moved from England to China and Mexico. The study is performed to evaluate if the change has resulted in the cost savings the company was aiming for**.**

Step 1: Analyse, describe and define version one of the supply chain

The supply chain is described as it looks like before the change was implemented. Customers are sending orders to the local company in the country the customer are located. Thereafter is the order sent to the order desk. The order desk sends a purchase order to an external production facility. The produced material is sent to a delivery centre in another country. After that the ordered material is sent to a local a warehouse in the country where the customer is situated. The last step in the supply chain is from the local warehouse to the customer,
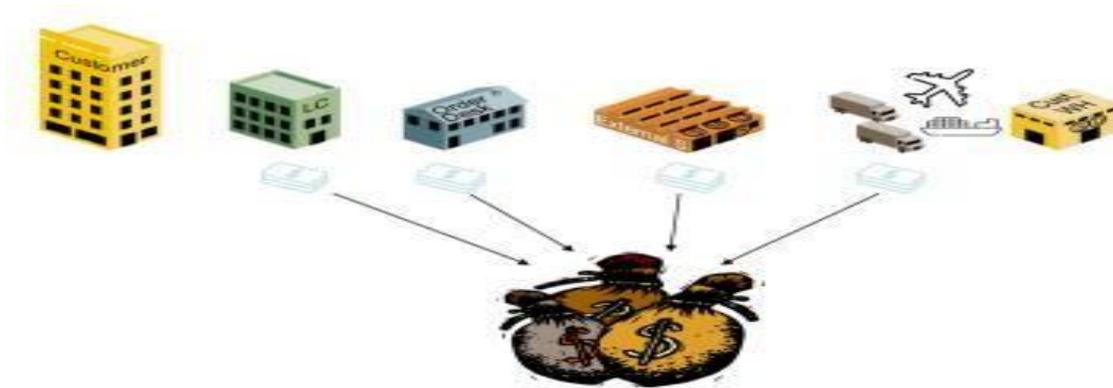
Figure 4. Example 2: Original flow creating costs

Step 2: Measure SCC and customer service measures for version one

Both costs and customer service measures, delivery precision and lead-time, were measured during the period of time the changes in the supply chain were implemented. Therefore both total SCC and performance towards the customers before and after the change can be measured. All measurements are measured in the same way as described inExample 1.

Total SCC measured the month after changes in the supply chain were implemented : SCC(MU)

Manufacturing cost	8.2
Administration cost	1.3
Warehouse cost	0.3
Distribution cost	0.9
Capital cost	0.3
Total SCC	**11.0**

Delivery precision: 97%; Lead-time: 12 days

Delivery precision and lead-time is measured based on figures from the ERP system.

Step 3: Design and define suggested improvements from version one

The supply chain manager of the supply chain decided to move the production from Europe to Latin America and Asia to decrease the production cost. By implementing the suggested improvement the supply chain manager believed that the total SCC should decrease and that the lead-time and delivery precision could remain unchanged. Due to the change from one production facility to two facilities on different continents two different delivery centres have to be used, see Figure 5.
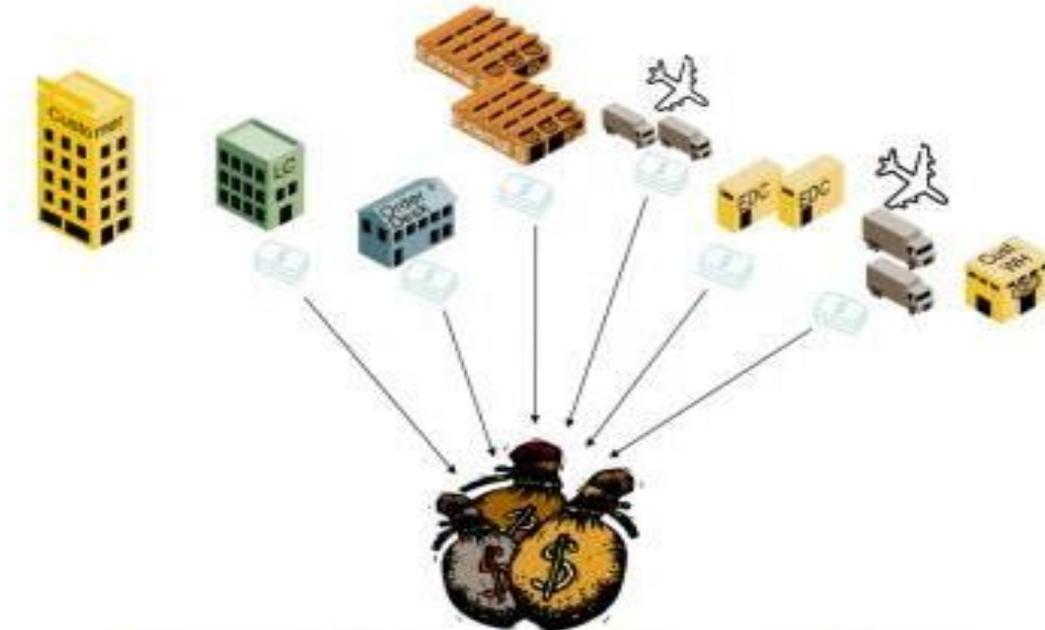
Figure 5. Example 2: The new flow, supply chain

Step 4: Measure SCC and performance towards the customers for version two of the supply chain

Total SCC measured the month after changes in the supply chain were implemented :

SCC	(MU)
Manufacturing cost	7.9
Administration cost	1.4
Warehouse cost	0.4
Distribution cost	1.1
Capital cost	0.4
Total SCC	**11.2**

Delivery precision: 93%; Lead-time: 15 days Delivery precision and lead-time is measured based on figures from the ERP system.

Step 5: Compare and evaluate the different versions Using this five step model revealed outcome of the change.

The assumed cost saving turned out to be an increase in total cost. The production cost was decreased, but cost for administration, warehouse, distribution and capital increased. The total SCC did not decrease; it increased from 11 MU to 11.2 MU. The customer satisfaction was expected to stay on the same level as before the change, but the lead-time increased and the delivery precision decreased. A conclusion drawn from this example is that it is risky to take decisions based on assumptions. The idea about cost saving in this example was based on reduced production cost. The calculation of the Total SCC showed another result. Another conclusion is to consider the total SCC and not only parts of the cost to catch correct information of the situation. The calculation of costs in both examples presented here are as far as possible based on actual costs. None of the calculations are based only on standard cost. This is also important for the reliability of the measurement.

CONCLUSIONS

A rather simple analysis model based on SCC measurement and customer service measures is presented in this paper. The five step model is applied to two real examples at Ericsson. The first example shows how the framework can be used to identify cost savings in a change of the distribution flow; more direct deliveries to end customer. The second example shows how the framework can be used to evaluate a move of production to low- cost countries. But the cases do not present any general information about the consequences of moving production to low-cost countries or changes of the distribution link; the aim is to show the use of the framework. The supply chains differ between companies and also within the company. The two examples present ideas to analyse similar problems in other companies. The five step model can be used in most types of supply chains. It is important to identify and define the supply chain that will be analysed. To get the most reliable facts actual cost should be used as much as possible instead of standard cost. Cutting costs in one area of the supply chain can be unsuccessful if not the consequences for the total supply chain is considered. The company might think that the total SCC in the company is reduced when the distribution cost has decreased, but the effect can be the opposite. Measuring the total Supply Chain Cost might show a reduced distribution cost, but higher capital cost and production cost. This gives a negative impact on the company. Therefore it is very important to have a total view on the Supply Chain Cost when working with reducing cost in the supply chain. Some cost elements in SCC may be decided not to be included if the elements are seen as not relevant in the study. In some companies the responsibility for the supply chain can be divided by many different departments within the company. Therefore it could be sufficient to exclude parts of the supply chain and also some SCC elements. For example can Manufacturing cost be excluded in a study where the production part is out of scope for the project that should work with cost savings or evaluating different changes only considering the distribution from production to end customer. This supply chain analysis framework can also be used for comparing different alternatives. A company can

for example identify two different alternatives to design their supply chain. To be able to decide which alternative is the best the company can use this suggested steps to measure and evaluate SCC for the two, or several, alternatives. It is important to combine the SCC measurement with factors that affect the customer satisfaction like for example leadtime to customer and delivery precision. A company with low SCC, but having discontented customers is not in a desired position if they lose customers due to low performance.

SUGGESTIONS

This dissertation contributes to the research domain because it combines strategic cost management in the supply chain with performance management in the supply chain and provides insights into the interactions between the domains and the importance of them in practice. The focus lies on strategic cost management in the supply chain and how performance management supports it. For the research in this dissertation, extensive case studies at multiple companies were executed. This made it possible to make valuable comparisons between theory and practice and to learn about how companies approach the topics in different ways. A literature review and empirical research were executed in this dissertation, the latter being based on the former. The central topics were supply chains, strategic cost management in the supply chain, performance management in the supply chain and enablers of cost and performance initiatives in the supply chain.

There are three types of supply chains. A lean supply chain focuses on internal efficiencies to reduce costs and increase profitability and flexibility. In companies with an agile supply chain, understanding and fulfilling customer needs are key. Hybrid supply chains combine lean as well as agile supply chain techniques to produce components with differing characteristics.

Several cost management models were described in the literature review. Direct product profitability (DPP) calculates the profit contribution of products, taking related handling and space costs into account. Activity-based costing (ABC) assigns direct and indirect costs to activities that consume an organization's resources. Subsequently, the activity costs are attributed to products in order to calculate the cost price of products. Total cost of ownership (TCO) calculates the cost that is associated with the collaboration with a certain

supplier. An extended ABC model incorporates all costs and activities over the supply chain, which makes it possible to calculate the landed marketplace cost of products. A model that combines ABC with economic value added (EVA) considers that actions do not

only influence costs but also the created value. For target costing, customer requirements are key.

Firstly, companies investigate the price that customers are willing to pay for products with specific characteristics. Subsequently, the required profit margin is deducted. The target cost is thus calculated, taking customers' requirements, market conditions and the target profit into account.

The determined target cost is broken down to the component level as requirements for the suppliers to deliver the components at that price while still creating sufficient returns for themselves.

Performance management consists of multiple processes and performance measurement was studied in particular. It is important that measurement and analysis tools are balanced and capture performance across multiple firms simultaneously. Performance measures can be classified in six categories; measures for order planning, for the evaluation of supply link, at the production level, for the evaluation of delivery link, for customer service and satisfaction and for supply chain and logistics costs.

Enablers that influence the effect of cost and performance management initiatives on performance were summarized in three classes; the buyer- supplier relationship, cost and performance information across the supply chain and organizational factors.

In the literature review was disclosed multiple times that it is nowadays important to cross the borders of the company when managing costs.

Nevertheless, the majority of companies admitted that internal cost reductions remain most important and the cost management models have a more internal focus. In the literature review, cost management models that integrate activities and costs of all parties in the supply chain were proposed, but these kind of advanced models are not yet applied in practice. However, this does not mean that there is no cost collaboration with supply chain partners. Numerous examples were given, especially about collaborations with upstream

partners. Only one out of six companies' works together with all of its supply chain partners to reduce costs, the remaining companies limit their actions to upstream or downstream partners or do not include all tiers. Four companies also try to obtain insights into the costs of its suppliers (bills of materials, open book models, imitation of cost structures, commodity management, reverse engineering, cost breakdowns), two companies adopt target costing and one company applies TCO. All companies adopt the cost management models to discover cost-reduction opportunities, while five out of six think they are important for product development and four out of six for process development and the simulation of decisions. Alongside these, a lot of other purposes were mentioned as well. In general, the respondents often deviated from the subject of cost management in the supply chain to cost management in general. Likewise, a lot of assertions that apply to cost management in general also apply to cost management in the supply chain.

The purpose of studying performance management in the empirical research was to examine whether it is supportive for strategic cost management in the supply chain. A very important conclusion that can be drawn is that KPIs do not strictly support the supply chain strategy, but rather the business strategy as a whole. Companies often opted for a certain supply chain strategy such as lean or agile, while their business strategy also values less self-evident elements such as respectively high quality or flexibility and cost-efficiency.

This has its effects on the KPIs (categories) that the companies selected as the most important. This is consistent with the fact that companies with a lean supply chain would not reduce costs when this has a negative impact on other important characteristics and that costs are certainly reduced in the company with an agile supply chain. All companies said that their KPIs provide them sufficient input for their cost management models. It is not possible to, based on the executed case studies, validate the links proposed on the summary framework. The different supply chain types do not have consistently different cost management models or launch certain initiatives with certain supply chain parties. The

companies themselves report that performance management is linked with the supply chain type and cost management in the supply chain, but the KPIs and KPI categories that were considered as the most important do not strictly support the supply chain strategy. The relationship can thus not be formally validated. Two findings are remarkable in this context: all companies with a lean supply chain premise measures at the production level, while all hybrid supply chains selected measures for customer service and satisfaction. The sample size was small and disproportional based on the supply chain type. The relationships could be very subtle, so a quantitative research is recommended to discover more about the relationships and to draw a more generalized conclusion.

REFERENCES

➢ Beamon, B. M. (2008), Sustainability and the future of Supply Chain Management, Operations & Supply Chain Management, 1 (1), pp. 4-18.

➢ Berry, D. and Naim, M.M. (1996), Quantifying the relative improvements of rede-sign strategies in a PC supply chain, International Journal of Production Econom- ics, 46-47 (1), pp. 181-196.

➢ Bogataj, David and Marija Bogataj. 2007. "Measuring the supply chain risk and vulnerability in frequency space", International Journal of Production Economics, 108(1-2): 291-301

➢ Bowersox, D. J. and Closs, D. J. (1996). Logistical Management – The Integrated Supply Chain Process. McGraw-Hill Companies Inc, New York.

➢ Byrne, P. J. and Heavey, C. (2006), The impact of information sharing and fore- casting in capacitated industrial supply chains: A case study, International Journal of Production Economics, 103 (1), pp. 420-437.

➢ Cambra, J. and Polo, Y. (2008), Creating satisfaction in the demand-supply chain: the buyer's perspective, Supply Chain Management: An International Journal, 13 (3), pp. 211-224.

➢ Canever, M., Van Trijp, H. and Beers, G. (2008), The emergent demand chain man- agement: key features and illustration from the beef business, Supply Chain Man- agement: An International Journal, 13 (2), pp. 104-115.

➢ Carter, J. R., Ferrin, B. G. and Carter, C.R. (1995), The effect of less-than-truckload rates on the purchase order lot size decision, Transportation Journal, 34 (3), pp. 35-44.

➤ Charan, P., Shankar, R. and Baisya, R.K. (2009), Modelling the barriers of supply chain performance measurement system implementation in the Indian automobile supply chain, International Journal of Logistics Systems and Management, 5 (6), pp. 614–630.

➤ Chen J. (1997), Achieving maximum Supply chain efficiency, IIE Solutions, 29, pp. 30-35.

➤ Christopher, M. (1998). Logistics and Supply Chain Management: Strategies for Reducing Costs and Improving Services (2nd ed.). Pitman, London

➤ Christopher, Martin and Helen Peck. 2004. "Building the resilient supply chain", International Journal of Logistics Management, 15(2): 1-13.

➤ Faisal, Mohd Nishat, D.K. Banwet, and Ravi Shankar. 2006. "Supply chain risk mitigation: modelling the enablers", Business Process Management Journal, 12(4):535-552.

➤ Gaonkar, Roshan S., and N. Viswanadham. 2007. "Analytical framework for the management of risk in supply chains", IEEE Transaction on Automation Science and Engineering, 4(2): 265-273.

➤ Ghoshal, Sumantra. 1987. "Global strategy: an organizing framework", Strategic Management Journal, 8(5): 425-440.

➤ Harland, Christine, Richard Brenchley, and Helen Walker. 2003. "Risk in supply networks", Journal of Purchasing and Supply Management, 9(1): 51–62.

➤ Hendricks, Kevin B. and Vinod R. Singhal. 2005. "An empirical analysis of the effect of supply chain disruptions on long-run stock price performance and equity risk of the firm", Production and Operations Management, 14(1): 35-52.

➤ Jüttner, Uta, Helen Peck, and Martin Christopher. 2003. "Supply chain risk man- agement: outlining an agenda for future research", International Journal of Logis- tics: Research & Applications, 6(4): 197-210.

➤ Jüttner, Uta. 2005 "Supply chain risk management: understanding the business re- quirements from a practitioner perspective", The International Journal of LogisticsManagement, 16(1): 120-141

➤ Khan, Omera and Bernard Burnes. 2007. "Risk and supply chain management: cre-ating a research agenda", The International Journal of Logistics Management, 18(2): 197-216.

➤ Lee, Hau L. 2004. "The triple-A supply chain", Harvard Business Review, 82(10):

102-113.

➢ Lessard, Donald, and Roger Miller. 2001. "Understanding and managing risks in large engineering projects", MIT Sloan School of Management, Sloan Working Pa-per 4214-01.

➢ Manuj, Ila and John T. Mentzer. 2008a. "Global supply chain risk management", Journal of Business Logistics, 29(1): 133-155.

➢ Manuj, Ila and John T. Mentzer. 2008b. "Global supply chain risk management strategies", International Journal of Physical Distribution & Logistics Management,38(3): 192-223.

➢ New, S.J. (1996), A framework for analysing supply chain improvement, Interna- tional Journal of Operations & Production Management, 15 (4), pp. 19-34.

➢ Pettersson, A. I. and Segerstedt, A. (2011), Performance measurements in supply chains within Swedish industry, International Journal of Logistics Systems and Management, 9 (1), pp. 69-88.

➢ Pettersson, A. I. and Segerstedt, A. (2012), Measurements of excellence in a supply chain, International Journal of Logistics Systems and Management, 13 (1), pp. 65-80.

➢ Pettersson, A. I. and Segerstedt, A. (2013), Measuring Supply Chain Cost, Interna- tional Journal of Production Economics, 143 (2), pp. 357-363

➢ Sachan, A., Sahay, B. S. and Sharma, D. (2005), Developing Indian grain Supply chain cost model: system dynamics approach, International Journal of Productivity and Performance Management, 54 (3), pp. 187-205

➢ SCOR handbook version 8 Shahabuddin, S. (2011), Supply Chain Management and its effect on company's performance, International Journal of Logistics Systems and Management, 8 (1), pp. 101- 117.

➢ Shapiro, J. F. (2001). Modeling the Supply Chain. Duxbury, Pacific Grove. Simchi-Levy, D., Kaminsky, P. and Simchi-Levy, E. (2000). Designing and Managing the Supply Chain. McGraw-Hill, USA