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Achieving a Competitive Advantage by SCM

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Abstract

The supply chain concept is theorized from the formation of a value chain network consisting of individual functional entities committed to provide resources and information to achieve the objectives of efficient management of suppliers as well as the flow of parts.

The understanding and practicing of supply chain management have become an essential prerequisite for staying competitive in the global race and for enhancing profitability.

In this paper, the role of SCM (Supply Chain Management) will be described and the results of the empiric research conducted in Croatian graphic companies will be presented. Research framework is based on a theoretical framework and includes two main dimensions: SCM practices (strategic supplier, partnership, customer relationship, level of information sharing and quality of information sharing, postponement) and competitive advantage (price and cost, quality, delivery dependability, product innovation, time to market).

All findings of this empiric research will provide better understanding of SCM benefits for graphic, and production companies as well, which will be able to achieve competitive advantage through the tactical planning and control, but also with respect to strategic intent. Also, results of the empirical research provide justification of a framework that identifies five key dimensions of SCM practices and describe the relationship among SCM practices and competitive advantage observed through the five dimensions.

Keywords: Supply Chain Management, Competitive Advantage, Graphic Companies

Introduction

The supply chain concept is theorized from the formation of a value chain network consisting of individual functional entities committed to providing resources and information to achieve the objectives of efficient management of suppliers as well as the flow of parts (Lau and Lee, 2000).

Supply chain management (SCM) is recognised as a contemporary concept that leads in achieving benefits of both operational and strategic nature (Al-Mudimigh et al., 2004). SCM and other similar terms such as network sourcing, supply pipeline management, value chain management and value stream management have become subjects of increasing interest in recent years, to academics, consultants, and business management (Croom et al., 2000).

Effective SCM has become a potentially valuable way of securing competitive advantage through the improving of organizational performance and most companies have been increasingly implementing SCM practices.

Theoretical Framework

Research framework is based on theoretical framework and includes two main dimensions: SCM practices (strategic supplier, partnership, customer relationship, level of information sharing, quality of information sharing, postponement) and competitive advantage (price and cost, quality, delivery

dependability, product innovation, time to market).

Supply Chain Management

Supply chain management has been emerged during late 1980s (Harland, 1996) and can be defined as the systematic, strategic coordination of the traditional business functions and tactics across these business functions within a particular organization and across business within the supply chain for the purpose of improving the long-term performance of the individual organizations and the supply chain as a whole. SCM has been defined to explicitly recognize the strategic nature of coordination between trading partners and to explain the dual purpose of SCM: to improve the performance of an individual organization and to improve the performance of the whole supply chain.

SCM also could be described as the chain linking each element of the manufacturing and supply process from raw materials and ending with the user, encompassing several organizational boundaries (Scott and Westbrook, 1991; New and Payne 1995). According to this broad definition, SCM encompasses the entire value chain and addresses material and supply management from the extraction of raw materials to its end of useful life (Tan, 2001).

SCM focuses on how companies utilize their suppliers' processes, technology and capability to enhance competitive advantage, and the coordination of the manufacturing, logistics and materials management functions within an organization (Farley, 1997; Lee and Billington, 1992).

The goal of SCM is to integrate both information and materials flows seamlessly across the supply chain as an effective competitive weapon (Childhouse and Towill, 2003; Feldmann and Müller, 2003; Li et al., 2006). Also, SCM is concerned with smoothness, economically driven operations and maximizing value for the end customer through quality delivery (Al-Mudimigh et al., 2004).

SCM is managed by the supply chain which can be expressed as the sum of parts involved in fulfilling a customer requests and consists of suppliers, manufactures, warehouses, retailers, transporters and customers. The purpose of a supply chain analysis is to maximize company's profit in the process of generating value for the customer, namely maximizing the difference between the final product worth and the total cost expended by the supply chain to provide the product to the customer (Franca et al., 2010).

Basically, SCM manages business activities and relationship internally within an organization, with immediate suppliers, with first and second-tier suppliers and customers along the supply chain, and within the entire supply chain (Tan, 2001). Internal supply chain is a part of external supply chain (see Fig 1).

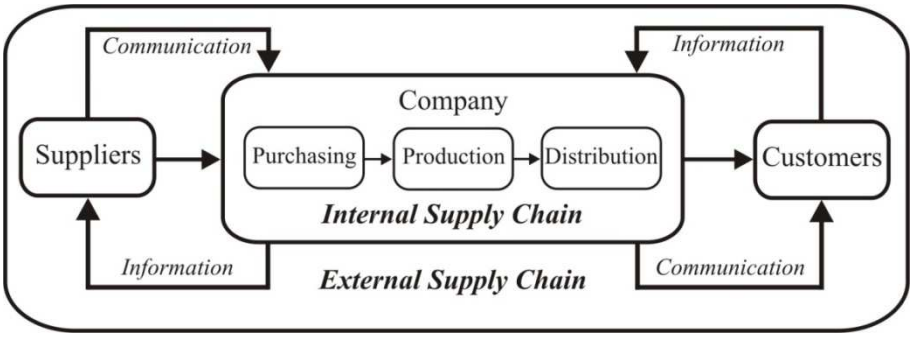

Fig.1. Internal and External Supply Chain

The concept of SCM has been involved from two separate paths: purchasing and supply management, and transporting and logistics management (Tan et al., 1998).

Regarding purchasing and supply management perspective, SCM is synonymous to the integration of supply base that involved from the traditional purchasing and materials function (Banifield, 1999; Lamming, 1993). In the perspective of transporting and logistics management, SCM is synonymous to the integrated logistic system and hence focuses on inventory reduction both within and across organizations in the supply chain (Van Hoek, 1998; Alvardo and Kotzab, 2001; Bechtel and Jayaram, 1997; Romano and Vinelli, 2001; Rudberg and Olhager, 2003).

SCM practices are defined as the set of activities undertaken by an organization to promote effective management and supply chain. The practices of SCM are proposed to be a multi-dimensional concept, including the downstream and upstream sides of the supply chain (Li at al., 2006).

SCM has to be integrated with inventory management, supplier management, production management, information management, technology management and quality management (Jacobs, 2003).

Leading companies have recognised that they must eliminate any inefficiency in their supply chains, but there still exist some barriers to supply chain optimisation such as technology incompatibility, inappropriate knowledge and leadership management in company, price pressures, low communication etc.

SCM Practices

SMC practices have been defined as a set of activities undertaken in an organization to promote effective management of its supply chain (Li et al., 2006).

SCM practices involve suppliers in strategic and operational decision making, encouraging information sharing and searching for new ways to integrate upstream activities. It also involves developing customer contacts through the use of customer feedback to integrate the downstream activities and delivering orders directly to customers at point of use. To effectively achieve these goals, it is necessary to locate closer to the market, help suppliers and vendors develop JIT capability, create a compatible information platform and create SCM teams for quality and operational efficiency (Chow et al., 2008; Tan, 2002; Ramdas and Spekman, 2000; Narasimhan and Kim, 2001; Chopra and Meindl, 2004).

Supply chain practices are related to supply and materials management issues, operations, information technology and sharing (ICT) and customer service (Tan, 2002). Supply chain practice also includes: technology, cost competitiveness, inventory management and external regulation (McMullan, 1996). All those have to be managed effectively to realize supply chain's strategic position which allows competitive advantage.

SCM practice depends on business strategy and collaboration in the organization, plan and execution, logistic performance and information technology and its implementation in the organization and including five distinctive dimensions: strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing and postponement (Li et al., 2006).

Strategic supplier partnership is defined as the long-term relationship between the company and its suppliers and it is designed to leverage the strategic and operational capabilities of individual participating companies to help them achieve significant emphasized benefits (Stuart, 1997; Balsmeier, 1996; Noble, 1997; Li et al., 2006). A strategic partnership emphasizes direct, long-term association and encourages mutual planning and problem solving efforts (Gunasekaran et al., 2001).

Strategic supplier partnership enables companies to work more effectively with a few important suppliers who are willing to share responsibility for the success of the product. Suppliers participating early in the product-design process can offer more cost-effective design choices, help select the best components and technologies and help in design assessment (Tan et al., 2002b).

An effective supplier partnership can be a critical component of a leading edge supply chain (Noble, 1997).

Customer relationship comprises the entire array of practices that are employed for the purpose of managing customer complains, building long-term relationships with customers and improving customer satisfaction (Tan et al., 1998; Claycomb et al, 1999; Li et al., 2006). Good relationships with supply chain members, including customers, are needed for successful implementation of SCM programs (Moberg et al., 2002). Close customer relationship allows an organization to differentiate its products from the competitors, and sustain customer loyalty.

Level of information sharing; information sharing has two aspects: quantity and quality and both of aspects are important for SCM practice (Morberg et al., 2002, Li et al., 2006). Level of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner (Monczka et al., 1998, Li et al., 2006). Shared information can vary from strategic to tactical in nature and from information about logistic activities to general market and customer information (Mentzer et al., 2000).

Quality of information sharing includes such aspects as the accuracy, timeliness, adequacy and credibility of information exchanged (Li et al., 2006; Moberg, 2002).

While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared and with whom (Holmberg, 2000). Companies need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion (Li et al., 2006).

Postponement is defined as the practice of moving forward one or more operations or activities (making, sourcing and delivering) to a much later point in the supply chain (Van Hoek, 1998; Beamon, 1998). Postponement allows an organization to be flexible in developing different versions of the products in order to meet changing customer needs, and to differentiate a product or to modify a demand function (Waller et al., 2002; Li et al, 2006). Postponement needs to match the type of products, market demands of a company and structure or constrains within the manufacturing and logistics system (Pagh and Cooper, 1998). In general, the adopting of postponement may be appropriate in the following conditions: innovative products, products with the monetary density, high specialization and wide range, markets characterized by long delivery time, low delivery frequency and high demand uncertainty, and manufacturing or logistic systems with small economies of scales and no need for special knowledge (Li et al., 2006; Pagh and Cooper, 1998).

Competitive Advantage

Competitive advantage is the extent to which companies are able to create a defensible position over its competitors (McGinnis and Vallopra, 1999).

In today's global competition environment, facing the rapid technology progress and high customer expectations, companies find it hard to win the competition only depending one's own capacity (Su et al., 2008). In this situation, the establishment of the supply chain partnership among companies and the coordination of the partners are highly valued.

Also, many companies struggle in justifying the cost of quality within their supply chain, but many companies fail to see the cost associated with varying quality levels from their suppliers. In order to create a quality product, which is one of the competitive advantages, company must

address all aspects of the supply chain, including individual processes and supplier selection (Franca et al., 2010). This is the main role of the supply chain management.

There are some dimensions of supply chain performance based on supply chain processes and management which have direct influence to competitive advantage: resource, output, flexibility, innovativeness and information. So, improving supply chain performance has become one of the critical issues for gaining competitive advantage for companies. Supply chain is a dynamic management tool and continuously improving performance has become a critical issue for most suppliers, manufactures and the related retailers to gain and sustain competitiveness (Cai et al., 2009).

Increasing competitive pressure and the rapid pace of technological change are motivating companies to focus on partnership with suppliers as a means of distributing risks and enhancing business processes, through the development of joint skills and shared interorganisational routines (Anderson and Christensen, 2000; Trent and Monczka, 1999). Companies are enhancing their innovative and competitive ability by focussing on their core competencies and leaving marginal activities to a selected group of competent suppliers (Sheth and Sharma, 1999).

A lot of companies emphasize quality as a means to stay competitive in the marketplace over the long run. They have a reputation of high quality as representing future market share for new customers and maintaining market share for existing customers over their lifetime. Further, improving quality can provide term financial savings (Franca et al., 2010).

For purpose of this paper, next dimensions of the competitive advantage are chosen: price/cost, quality, delivery dependability, product innovation and time to market.

Graphic Industry

Graphic industry involves printing, publishing and production of pulp and paper, paper processing and reproduction of recorded media and it's a part of manufacturing industry which accounted for 11.52% of GDP generated by manufacturing industry in Croatia. Also, the manufacture and processing of paper, publishing and printing employ 7.21% of total workforce in the Croatian manufacturing industry. The subsections of graphic industry comprise the manufacture of wood pulp and cellulose, graphic paper and paperboard, other uncoated paper and paperboard, corrugated paper and paperboard, carton, boxes and cases of corrugated paper or paperboard, sacks and bags of paper, folding cartons, boxes and cases of paper or paperboard, household, sanitary or toilet articles of paper, paper envelopes, printed, embossed or perforated paper, labels, waste paper, cigarette filter-tips, newspapers and magazines, business commercial products, forms, notebooks and account books, books and brochures, printed products directly onto materials other than paper and textile.

Modern printing and publishing is based on high technology, specially information and communication, and new way of production satisfies the following needs (Glykas, 2004):

- Printing-On-Demand
- Just-in-time printing
- Distributed printing
- Personalised printing
- Repurposing

The printing and publishing production process is rapidly shifting from analogue to digital technology as the basis for workflows. The efficiency of the production process requires the digitalization of all steps and elimination of analogue methods and materials from the process flow apart from the starting and finishing phase. Across networks printing and publishing want to be dial tone service simple, reliable, ubiquitous, fast and cheap (Glykas, 2004).

Whole process is based on seven main phases: ordering, designing, electronic production, film production, printing, finishing and delivering.

Sticking to core competencies, downsizing production and increasing focus on suppliers' complementary skills are evolving into a common practice in graphic companies and principles of SCM have also inducted the recent restructuring of procurements departments' role in managing the buyer – supplier relationship of these firms.

Specifics of the graphic technology, and production processes, with specialization and diversification request from top management to establish an efficient supply chain management.

Because business conditions are mainly seen as the characteristic of demand (uncertainty of customer demand, manufacturing and supply) supply chain management has to know more about uncertainties, reduce it and be able to drive co-operation in a supply chain, especially in lead-time gap (the gap between the logistic lead-time and the customers' order cycle).

Empirical Research

Aim and Objectives of the Research

The empirical research is based on hypothesis that companies with high levels of SCM practices will have high level of competitive advantage because having a competitive advantage suggests that companies have some capabilities in comparison to its competitors. This can be lower prices, higher quality, higher dependability or shorter delivery time and can lead to high levels of economic performances, customer satisfaction and loyalty and relationship effectiveness.

The aim of this research is providing justification for a framework that identifies five key dimensions of SCM practices and describing relationship among SCM practices and competitive advantage.

Research Methodology and Data Collection

Research methodology is developed by Li et al. (Li et al., 2002), and instruments that measure competitive advantage were adopted from Zhang (Zhang, 2001). The items for these instruments are listed in Appendix.

The empiric research has been conducted on defined sample of 150 Croatian graphic companies in a period from October 2009 to January 2010.

The questionnaires have been collected by e-mails. The companies in sample are graphic production companies involved in printing and publishing. A majority of the respondents belong to middle and upper management and have average 12.5 years of experience.

The examinee was able to answer using a 5-point Likert scale between the endpoints "strongly disagree" and "strongly agree". Also, demographic data for the respondents is given.

The collection of data was completed in January 2010, followed by data processing. The final sample included 113 questionnaires. The questionnaire return rate was 75.3 %.

Data Analysis and Results of Empirical Research

For SCM practices (SCMP) a factor analysis which was conducted, using the 25 items that measure the five dimensions. Variables were analyzed by examining the factors analysis with Varimax rotation (see Table 1 and Table 2). This shows the loadings of each of the variables on the two selected factors. The highest loading variables in each component help to identify the nature of the underlying latent variable represented by each component. The factor loadings have to be above 0.60. The cumulative variance explained by the five factors is 64,37%.

For simplicity, only loadings above 0.50 are displayed. The competitive advantage (CA) construct was initially represented by 5 dimensions and 16 items. It is visible that all items loaded on their respective factors, with most of loadings greater than 0.60. The cumulative variance explained by the five factors is 69,42%.

Results indicate that price, quality and time to market are stronger indicators of competitive advantage than the delivery dependability and product innovation.

Table 1: Rotated Component Matrix for SCM Practice

Item	F1-SSP	F2-CRP	F3-IS	F4-IQ	F5-POS
SCMP/SSP1	**0.886**				
SCMP/SSP2	0.569				
SCMP/SSP3	**0.614**				
SCMP/SSP4	**0.744**				
SCMP/SSP5	**0.663**				
SCMP/SSP6	**0.618**				
SCMP/CRP1		**0.723**			
SCMP/CRP2		**0.854**			
SCMP/CRP3		**0.770**			
SCMP/CRP4		**0.639**			
SCMP/CRP5		**0.684**			
SCMP/IS1			**0.795**		
SCMP/IS2			**0.627**		
SCMP/IS3			0.593		
SCMP/IS4			**0.628**		
SCMP/IS5			**0.739**		
SCMP/IS6			**0.642**		
SCMP/IQ1				0.544	
SCMP/IQ2				**0.601**	
SCMP/IQ3				**0.637**	
SCMP/IQ4				**0.725**	
SCMP/IQ5				**0.677**	
SCMP/POS1					**0.659**
SCMP/POS2					**0.740**
SCMP/POS3					**0.814**

Table 2: Rotated Component Matrix for Competitive Advantage

Item	F1-PC	F2-QL	F3-DD	F4-PI	F5-TM
CA/PC1	**0.891**				
CA/PC2	**0.786**				
CA/QL1		**0.754**			
CA/QL2		**0.697**			
CA/QL3		**0.763**			
CA/QL4		**0.811**			
CA/DD1			0.518		
CA/DD2			**0.796**		
CA/DD3			**0.688**		
CA/PI1				0.534	
CA/PI2				0.460	
CA/PI3				**0.612**	
CA/TM1					**0.728**
CA/TM2					**0.574**
CA/TM3					**0.619**
CA/TM4					**0.665**

Table 3 presents means, standard deviations, correlations and reliability values for each of constructs. The reliability values for all constructs are all greater than 0.70, which are considered acceptable.

Table 3: Means, Standard Deviations, Correlations and Reliability of SCM Practice and Competitive Advantage

Variables	Mean	S.D.	1	2	3	4	5	Reliability
SCM practice								
Strategic supplier partnership	3.46	0.63	-					0.82
Customer relationship	3.22	0.72	0.57**	-				0.82
Level of information sharing	3.01	0.83	0.44**	0.31**	-			0.85
Quality of information sharing	4.28	0.64	0.16*	0.38**	0.09	-		0.79
Postponement	3.93	0.59	0.12	0.22**	0.51**	0.26**	-	0.74
Competitive advantage								
Price/cost	3.76	0.75	-					0.86
Quality	4.12	0.69	0.19*	-				0.91
Delivery dependability	4.31	0.78	0.26**	0.47**	-			0.73
Product innovation	3.97	0.61	0.23**	0.08	0.33**	-		0.78
Time to market	3.36	0.81	0.36**	0.18*	0.26**	0.30**	-	0.81

* Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

All obtained results could be used for structural modelling the model of SCM practices and competitive advantage. Developing and validating a multi-dimensional, operational measure of the construct of the best SCM practice, provide to SCM managers a useful tool for evaluating the comprehensiveness of their current SCM practices. Through the analysis of the relationship of SCM practice and competitive advantage, it is shown that SCM practice may directly impact to competitive advantage.

Conclusion

The challenges for production and graphic companies as well, are shifting from internal efficiency to supply chain efficiency to reach competitive advantage.

This paper describes the role of supply chain management and its effects on competitive advantage, and presents the results of empirical research i.e. identifying the relationship between supply chain management practice and competitive advantage of graphic companies.
SCM has been defined to explicitly recognize the strategic nature of coordination between trading partners and to explain the dual purpose of SCM: to improve the performance of an individual organization and to improve the performance of the whole supply chain.

Research framework is based on theoretical framework and includes two main dimensions: SCM practices (strategic supplier, partnership, customer relationship, level o information sharing and quality of information sharing, postponement) and competitive advantage (price and cost, quality, delivery dependability, product innovation, time to market).

Results of empirical research provide justification for a framework that identifies five key dimensions of SCM practices and describing relationship among SCM practices and competitive advantage observed through the five dimensions (price/cost, quality, delivery dependability, product innovation and time to market).

The most important finding is indicating that price, quality and time to market are stronger indicators of competitive advantage than the delivery dependability and product innovation.

All obtained results could be used for structuring the model of SCM practices and competitive advantage. Developing and validating a multi-dimensional, operational measure of the construct of the best SCM practice provide to SCM managers a useful tool for evaluating the comprehensiveness of their current SCM practices. Through the analysis of the relationship of SCM practice and competitive advantage, it is shown that SCM practice may directly impact to competitive advantage. By comparing a different view of SCM practices across the supply chain, it is possible to identify the strength and weakness of the supply chain and the best common SCM practice as well.

Effective SCM has become a potentially valuable way of securing competitive advantage of graphic, and production companies as well, through the improving of organizational performance. For this purpose it is necessary to better understand SCM practices because it's the best way to increase implementation of SCM in companies.

Appendix

Instruments for SCM Practice and Competitive Advantage

Strategic Supplier Partnership (SSP)

SCMP/SSP1 We consider quality as our number one criterion in selecting suppliers

SCMP/SSP2 We regularly solve problems jointly with our suppliers

SCMP/SSP3 We have helped our suppliers to improve their product quality

SCMP/SSP4 We have continuous improvement programs that include our key suppliers

SCMP/SSP5 We include our key suppliers in our planning and goal-setting activities

SCMP/SSP6 We actively involve our key suppliers in new product development processes

Customer Relationship (CR)

SCMP/CR1 We frequently interact with customers to set reliability, responsiveness and other standards for us

SCMP/CR2 We frequently measure and evaluate customer satisfaction

SCMP/CR3 We frequently measure and evaluate customer expectations

SCMP/CR4 We facilitate customers' ability to seek assistance from us

SCMP/CR5 We periodically evaluate the importance of our relationship with our customers

Level of Information Sharing (IS)

SCMP/IS1 We inform trading partners in advance of changing needs

SCMP/IS2 Our trading partners share proprietary information with us

SCMP/IS3 Our trading partners share keep us fully informed about issues that affect our business

SCMP/IS4 Our trading partners share business knowledge of core business processes with us

SCMP/IS5 We and our trading partners exchange information that helps establishment of business planning

SCMP/IS6 We and our trading partners keep each other informed about events or changes that my affect the other partners

Postponement (POS)

SCMP/POS1 Our products are designed for modular assembly

SCMP/POS2 We delay final products assembly activities until customer orders have actually been received

SCMP/POS3 We delay final product assembly activities until the last possible position (or nearest to customers) in the supply chain

Price/Cost*: an organization is capable of competing against major competitors based on low price*

CA/PC1 We offer competitive prices

CA/PC2 We are able to offer prices as low or lower than our competitors

Quality*: an organization is capable of offering product quality and performance that creates higher value for customers*

CA/QL1 we are able to compete based on quality

CA/QL2 We offer products that are highly reliable

CA/QL3 We offer products that are very durable

CA/QL4 We offer high quality products to our customer

Deliver Dependability*: an organization is capable of providing on time the type and volume of products required by customers*

CA/DD1 We deliver the kind of products needed

CA/DD2 We deliver customer order in time

CA/DD3 We provide dependable delivery

Product Innovation*: an organization is capable of introducing new products and features in the market place*

CA/PI1 We provide customized products

CA/PI2 We alter our products offerings to meet client needs

CA/PI3 We respond well to customer demand for new features

***Time to Market**: an organization is capable of introducing new products faster than major competitors*

CA/TM1 We deliver product to market quickly

CA/TM2 We are first in the market in introducing new products

CA/TM3 We have time-to-market lower than industry average

CA/TM4 We have fast product development

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