

Assessing Supply Chain Competitive Position In Medium Size Manufacturing Companies

Yanamandra Ramakrishna*

This paper identifies the practices which influence the supply chain related competitive position in medium size manufacturing companies through an empirical survey. A regression model to assess the competitive position is developed by considering competitive position as a dependent variable and set of supply chain practices as independent variables. Also, the influence of these practices on supply chain performance measures is identified. Responses were obtained from the owners and senior management employees through a mail survey. It is found that competitive position related to supply chain is influenced by eight practices out of which inventory management and operational efficiency play a significant role. Similarly, six out of eight performance measures got significantly influenced due to these practices. Outcomes of this study would help the medium size manufacturing companies to focus more on the identified supply chain practices leading to competition position and achieve better performance outcomes towards their sustainability.

Keywords: Competitive position, supply chain strategies and practices, organizational performance measures, medium size manufacturing companies

Introduction

In the past two decades, supply chain management (SCM) is found to be one of the major strategies of organizations (Thakkar et al., 2012; Dong-Wook Kwak et al., 2018). Implementation of SCM has enabled organizations to improve their performance by reducing their overall costs and increasing their profits through its practices like information, mutual coordination, early supplier involvement, supplier training and development and digital technology (Chen et al., 2004; Koh et al., 2007; Coyle et al., 2013; Francis, 2015; Anwer et al., 2017; Chih-Jou, 2019).

It is also found that SCM can play a very vital role in the sustainability and scalability of small and medium firms by improving their overall performance (Quayle, 2003; Martin and Matthias, 2011; Fetter, 2019). But, at the same, the scope and influence of SCM is found to be limited only to companies which have adequate resources like ability to invest, updated technology, expert manpower and well-structured supply chain network. The implementation of SCM is found to be lagging behind the expectations in MSMCs. Also, there are lot of differences in the way SCM is implemented in large size manufacturing companies versus the MSMCs (Paul and Jungsik et al., 2006; Koh et al., 2007; Ramakrishna, 2016). This is due to some of the challenges and issues encountered by these organizations like limited awareness, lack of knowledge and motivation to implement SCM, and lack of resources (Rajesh et al., 2008; Rajesh and Suresh, 2008; Al-Esmael et al., 2019; Jesca, 2019). Moreover, MSMCs pay lot of attention to sustain their businesses rather than experimenting with new and innovative concepts of SCM (Quayle, 2003; Wagner et al., 2003; Wagner and Hoegl, 2006; Arend and Wisner, 2005; Terje and Morten, 2007; Joanne and Lindsey, 2008; Dubihlela and Omoruyi, 2014).

One of the reasons for lesser known success of SCM in MSMCs is that many studies focused only on the SC practices of large firms, while medium companies were treated mostly from the viewpoint of larger firms (Lambert and Cooper, 2000; Chopra and Meindl, 2008). Therefore, it is not clear whether all those SC strategies and practices which are fit for large size organizations are also fit for MSMCs (Chen et al., 2003; Sahay et al., 2006; Paul and Jungsik et al., 2006; Fetter, 2019). Moreover, the influence of SCM in improving the organizational performance measures and the achievement of competitive position in these companies is also not established. Also,

no effort has been made to assess competitive position by identifying significant SC practices through empirical study (Trąpczyński, 2016). Studies related to identification of influence of SC practices on SC related organizational performance outcomes are also limited (Anwer et al., 2017).

Therefore, the present study contributes to this gap in the existing literature and becomes unique in its contribution. Two research aspects are empirically studied in this study. The first one is the identification of significant SC practices contributing to competitive position and development of a regression model to assess the competitive position (the dependent variable) through SC practices (independent variables) in MSMCs. This model would enable MSMCs to predict their SC related competitive position reasonably well by analyzing the implementation of highly significant SC practices. The second one is the identification of influence of SC practices on specific SC related organizational performance outcomes.

Accordingly, this study attempts to answer the following two research questions:

RQ1. Do all SC practices equally influence the competitive position and how the competition position can be assessed through SC practices?

RQ2. Which performance measures of SC get significantly influenced due to SC practices?

The research aims to contribute to providing new insights through an empirical study. It would add immense value to all the owners and SC managers of MSMCs and researchers for further research. The study was conducted focusing on four leading sectors of MSMCs, i.e., electronics, engineering, chemical and pharma sectors in India. As most of the countries provide similar business environment for MSMCs, the results of this study should be applicable to other geographical areas of the world as well.

Literature Review

In the wake of new opportunities due to globalization, MSMCs can achieve scalability and sustainability through the practices of SCM (Quayle, 2003; Martin and Matthias, 2011) and improve their business performance by using information systems and technology (Bala, 2007). SCM practices can provide an opportunity for MSMCs in areas like cost reduction, effective communication with the stakeholders (James and Alam, 1997), improve profits and achieve competitive advantage (Rouhollah and Shivraj, 2011; Francis, 2015). Some of the most commonly used practices of SCM by MSMCs include, supplier relationship management, collaboration, coordination, inventory management and information sharing through digital technologies (James and Alam, 1997; Singh and Teng, 2016; Anwer et al., 2017;

Yanamandra Ramakrishna*

Assistant Professor, Skyline University College, University City
Sharjah, United Arab Emirates

Email: ramakrishna@skylineuniversity.ac.ae

Sharma, 2020). However, MSMCs face challenges in the implementation of SC practices and in achieving competitive position. These challenges include, lack of top management support (Maguire and Magrys, 2001), lack of long term vision towards SCM (Gunasekaran et al., 1996), resources crunch, lack of awareness, lack of training in SC practices and focus (Blackhurst et al., 2011; Thakkar et al., 2012; Jesca, 2019; Maureen et al., 2020), difficulty in the implementation of technology and finally issues related to SC collaboration (Al-Esmael et al., 2019; Jesca, 2019). These challenges in the implementation of SC hinder the growth of MSMCs and reduce the chances of achieving the competitive position. MSMCs need to achieve resilience and integration of processes to be sustainable and to achieve competition position (Arunachalam, 2017; Shibin et al., 2020). Successful implementation of SC practices leads to competition position. This needs MSMCs to identify their SCM practices and implement the practices which significantly contribute to the competitive position.

Therefore, there is a need to create awareness of influence of SCM practices towards achievement of competitive position among MSMCs globally. This paper emphasizes this aspect through an empirical study and provides suggestions and recommendations to the owners and managers of MSMCs.

SC related Competitive Position

This section of literature review focuses on identifying SC practices which contribute to the achievement of competitive position. Role and influence of SCM in achieving competition position was emphasized by many authors by focusing on MSMCs (Tracey et al., 2005; Chopra and Meindl, 2013). It is defined as an effective management of internal activities related to production and management of external activities related to the stakeholders and it is the result of market evaluation of a firm's offering. It is dynamic by its nature and reflects the rivalry between the competitors (Trąpczyński, 2016). It is also called as 'competitive space' and the word 'position' is explained as a place occupied by the company among its SC networks (Baines et al., 2005). It comprises of activities like interactions with suppliers, customers, and development of SC related infrastructural abilities (Baines et al., 2005). It is considered as a decision related to the degree of span of vertical, horizontal and forward integration with members of the SC. Some authors consider it as a competitive advantage resulting from a tactical utilization of existing potential of a firm by appropriately deploying the available competitive instruments (Gorynia, 2004; Gorynia et al., 2013). It is measured through three dimensions such as financial results, market related results and shareholder related results (Richard et al., 2009).

It is important for companies to manage their strategies to keep them sustainable to secure their competitive position (Dubihlela and Omoruyi, 2014; Fetter, 2019). One of the important areas of a firm for achieving competitive position is found to be effective management of supply chain. Implementation of practices related to SCM develops the competitive capabilities required to secure competitive position of MSMCs (Hove-Sibanda and Pooe, 2018). Firms can gain maximum advantage by managing and redesigning their supply chains in the dynamic business environment where forces related to competition always change (Chih-Jou, 2019).

Therefore, it is essential to identify the SC practices which contribute towards the competitive position. Majority of the studies focused on SC practices such as, corporate strategy, drivers of supply chain, relationship between buyer and supplier, initiatives related to quality improvement, operational efficiency and customer satisfaction, and effective management of inventory for achieving competitive position (Vallespir and Kleinhans, 2001; Murali and George, 2008; Anwer et al., 2017). Authors also tried to classify SC practices as upstream (supplier related) and downstream (distribution related) practices and concluded that firms can achieve competitive advantage through the effective management and integration of these two streams (Handfield and Nicholas, 1999; Tan, 2001; Tan et al., 2002; Tracey et al., 2005; Simchi-Levi et al., 2009; Martin and Matthias, 2011; Chopra and Meindl, 2013; Singh and Teng, 2016). Empirical studies also

found that SC integration, mutual coordination and cooperation among all the stakeholders of SC improves the competitive position (Tan, 2001; Tracey et al., 2005).

Further analysis of studies reveals that the top management awareness and support towards SCM is more important for achieving the strategic objectives of MSMCs (Larry and Richard, 1996). This leads to the understanding of SC dynamics in a broader perspective, leading to increased focus of firms towards the integration of overall business strategy with that of SC strategy to achieve the competitive advantage and to secure a sustainable competitive position (Lee and Billington, 1992; Tan, 1999; Quayle, 2003; Murali and George, 2008; Chopra and Meindl, 2013; Fetter, 2019). Thus the role of business strategy is considered as an important aspect of competitive position of a company. Also, competitive position of the firm enables an organization to compare how it is different with that of other organizations in terms of its customer service. Identifying the SC variables and factors contributing towards SC related competitive position enables companies to understand their progress. This indicates that there is a significant link between effective management of SC and competitive position of firms. However, at the same time, research contributions to establish empirically the influence of SC practices on competitive position of a company are found to be less (Tan, 2001; Tan et al., 2002; Thakker et al., 2012). Therefore, the need to study SC related competitive position in a detailed manner and to identify the significant SC practices contributing towards it (Quayle, 2003) is once again emphasized.

For the purpose of the present study, the model of SC related competitive position developed by Murali and George (2008) for multinational companies has been expanded by the author and applied to MSMCs. This model considered totally six SC practices contributing to competitive position. These are: i) Corporate Strategy and SCM Efforts (CSSCM), ii) SC Drivers (SCD), iii) Buyer-Supplier Relationship (BSR), iv) Operational Efficiency (OE), v) Quality Practices (QP) and vi) Customer Satisfaction Strategies (CSS).

In addition to the above SC practices, based on the literature review, two additional practices were also considered to be contributing to competitive position. These are inventory management (Pagel, 1999; Mohanty and Deshmukh, 2001; Fröhlich and Westbrook, 2002; Sanjay and Ravi, 2004; Sanjay and Ravi, 2006; Singh and Teng, 2016; Anwer et al., 2017; Sharma, 2020) and SC collaboration (Olhager and Erik 2004; Al-Esmael et al., 2019; Jesca, 2019). Therefore, in this expanded model of competitive position, totally eight SC practices are considered towards competitive position. These eight SC practices are treated as independent variables and the competitive position of an MSMC is considered as a dependent variable. Thus, in this paper, the influence of SC practices on competitive position applicable for multinational enterprises is studied for its applicability for MSMCs by including two additional SC practices. A regression model to measure the competitive position is developed.

Influence of SC practices on Performance Measures

Performance Measurement (PM) of SC is an important aspect to obtain feedback and to monitor the gaps between expected and actual achievements. SC Performance Measurement system is formed on the basis of mutually developed and acceptable objectives and outcomes, metrics, processes and formal methods to quantify these metrics, key result areas of members of SC and their responsibilities (Holmberg, 2000).

To measure the performance of any SC, it is essential to consider all aspects of it which contribute to the performance. The SC performance metric tool should be able to integrate the performance of each member of the total SC network (Sharman, 1984). Ballou et al., (2000) identifies parameters of SC for performance measurement as i) line item fill rates, ii) average order cycle time, iii) average lateness or earliness of deliveries, iv) average backorder levels, v) order-size constraints, and vi) delivery times and flexibility.

Literature review reveals that there is no single aspect of SCM which can be attributed to the overall performance of a company but only a combination of several aspects of SCM enables the achievement

of better organizational performance. Though many authors pointed out that extensive work has been done to develop SC performance metrics, a section of other authors is of the opinion that there is a lack of serious effort in designing and developing SC metrics (Gunasekaran et al., 2004) as mentioned by Lee and Billington (1992).

Measurement of success of SC has been a major research concern during the last 15 to 20 years. The literature review reveals that major focus was on SC related financial measures and some other non-financial and intangible outcomes like brand image of the organization, competitive position, leadership, employee skill development, employee motivation due to the implementation of SC practices etc. Popular models developed in the early days of studies related to this area are by Beamon (1999), Bowersox et al., (1999) and Gunasekaran et al. (2004). Beamon (1999) developed a Dimension Based Measurement System (DBMS) and views SC performance measurement from three dimensions - resources, output and flexibility. Whereas, the model developed by Bowersox et al. (1999) identified five key SC performance areas which are management of quality, cost, assets and productivity, customer service. Gunasekaran et al., (2004) classified SC related organizational performance measures into three levels - Strategic, Tactical and Operational levels of management and named the model as Hierarchical Based Measurement System (HBMS).

Organizational strategies and policies related to sourcing, vendor evaluation and rating, procurement are found to create lot of impact on organizational performance (Hartley and Choi, 1996; Thakkar et al., 2012; Dubihlela and Omoruyi, 2014; Hove-Sibanda, 2018; Fetter, 2019). Decrease in costs related to procurement, manufacturing, logistics, and decrease in lead and delivery times, increase in productivity, sales growth, and overall profit are reported in the literature due to the implementation of SC aspects and integration of these aspects with business strategy (Premaratne, 2005; Dubihlela and Omoruyi, 2014; Hove-Sibanda, 2018; Fetter, 2019).

Based on the above literature review and the works of Beamon (1999), Bowersox (1999), Gunasekaran et al., (2004), Quayle, (2003), Chen and Paulraj (2004), Koh et al., (2007), Dubihlela and Omoruyi, (2014); Hove-Sibanda, (2018); Fetter, (2019), a total of eight SC related organizational performance measures are considered for the present study as depicted in Figure 1.

Conceptual Framework and Hypothesis

From the discussions above, it is clearly evident that the implementation of SC practices as a part of SC strategy is found to influence the competitive position of an organization. But, the literature review reveals that there is no single practice of SC which can be attributed directly to the overall SC related organizational performance of a company and only a combination of several practices of SC enables the achievement of better competitive position and this aspect is not empirically established properly. Therefore, there is a necessity to identify SC practices significantly influencing the competitive position. Eight SC practices are identified to influence the competitive position of MSMCs from the above review of literature. To examine whether the influence of these eight SC practices is uniform on the competitive position, the first hypothesis H1 is developed as,

H1. Influence of all SCM practices on SC related competitive position is uniform

In order to assess the SC related competitive position of MSMCs, a regression based model is developed by considering all the SC practices as independent variables and the SC related competitive position as a dependent variable. Development of this model provides the answer for the second research question. Validation of hypothesis 1 provides the answer for first research question.

To identify the influence of SC practices on SC related organizational performance measures, the second hypothesis is developed based on the discussion in the literature review.

H2. The influence of SC practices is uniform on all the SC related organizational performance measures

The research framework depicting the relationship between SC practices and competitive position and the influence of SC practices on SC related organizational performance measures is presented in Figure 1.

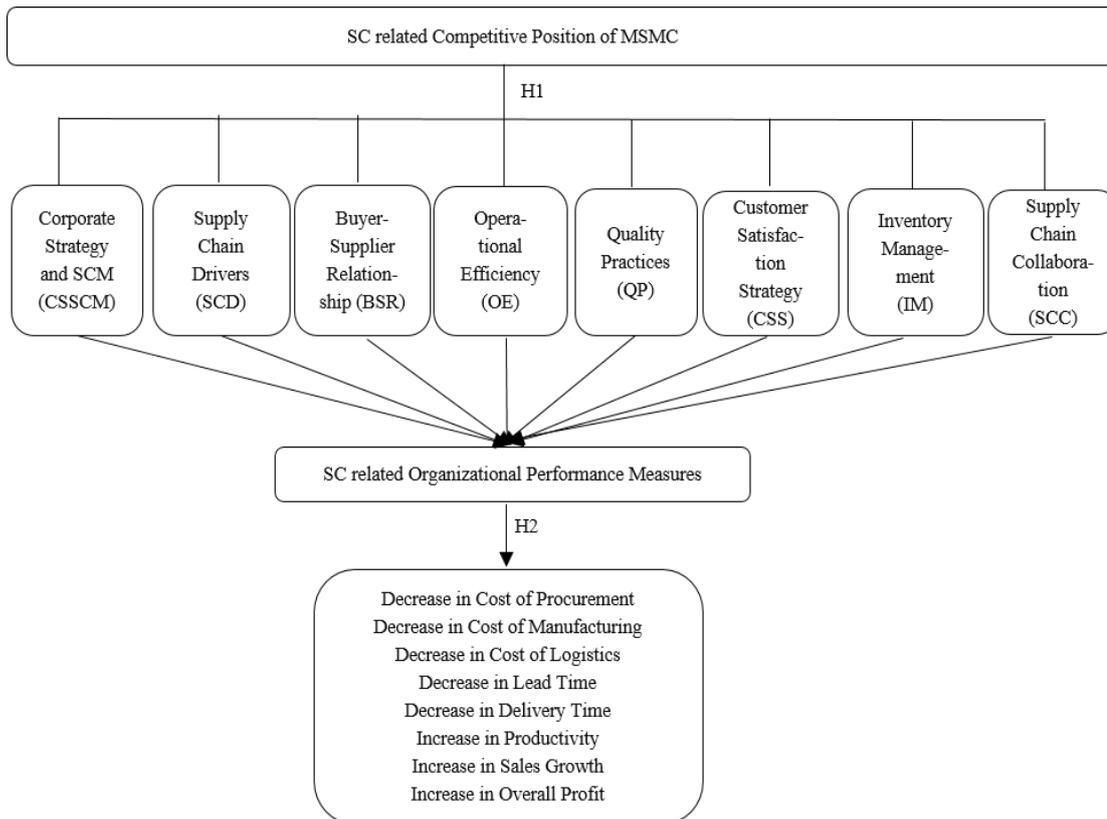
The above conceptual framework is developed based on the discussions in the literature review section. The SC related competitive position of a MSMC is found to be influenced by eight SC practices. Implementation of these eight practices is found to influence the eight SC related organizational performance measures. Therefore, the framework depicts the relationship between competitive position and organizational performance measures. These two aspects are tested through the validation of two hypotheses as depicted in the framework. Validation of these hypotheses provides answers to the two research questions.

Method

The sample data was collected from four popular sectors of MSMCs, namely, electronics, engineering, chemical and pharmaceutical sectors. These four sectors are considered for the purpose of this study as they occupy more than fifty percent of the MSMCs companies in the selected geographical region of the study. The membership Directory of Industries of an authentic and popular industry association in India was used for the purpose of selection of sample of MSMCs from these four sectors. The definition of MSMC provided by the Ministry of Micro, Small, and Medium Enterprises, Government of India was used as a base to identify them from this directory. As per this definition, company is classified as a medium size manufacturing company if the initial capital investment of the company is more than five crores and less than ten crores (Indian Rupees). A total of 276 MSMCs were qualified for the study from the four sectors based on this definition and classification. All these MSMCs were approached through emails seeking their response to the survey instrument. Out of this, 138 MSMCs (fifty percent) responded to the questionnaire properly. Incomplete responses were eliminated for the purpose of the study. As the sample size covers fifty percent of total number of MSMCs existing in the geographical area of the study, the sample is considered to be a true representative of the population.

A structured questionnaire was used as a survey instrument to collect responses from these MSMCs. The owners, middle and senior level SC managers of these companies were requested to respond to the questionnaire through email. The first part of the questionnaire consisted questions related to each variable under each of the eight SC practices contributing to the competitive position as depicted in the conceptual framework and Table 1. The second part of the questionnaire consisted questions related to the influence of these eight SC practices on eight SC related organizational performance measures. The respondents were asked to mention the influence of each variable of SC practice on a scale of 1 to 5 (1 – no importance and 5 – very high importance). As discussed in the literature review section, the questionnaire consisted of eight variables, Corporate Strategy and SCM Efforts (CSSCM), SC Drivers (SCD), Buyer-Supplier Relationship (BSR), Operational Efficiency (OE), Quality Practices (QP), Customer Satisfaction Strategies (CSS), Inventory Management (IM) and SC Collaboration (SCC) contributing to the competitive position of MSMCs and the eight SC related organizational performance measures. All eight practices were treated as independent variables and competitive position is treated as the dependent variable. Similarly to identify which organizational performance measures get

Figure 1. Conceptual Framework of the study



significantly influenced due to the implementation of SC practices, eight SC related organizational performance measures are considered based on the literature review. Table 1 depicts the details of each SC practice and related variables contributing towards competitive position and the eight organizational performance measures.

Based on a pilot test data, the reliability test was conducted using Cronbach's Alpha whose results are presented in Table 2. This test indicated that the lower bound of true reliability in this data is 0.979, revealing the high reliability. Therefore, the study was continued further and the responses were obtained from the selected sample of MSMCs.

Results

Competition Position

Competitive Position through SCM was considered as the dependent variable and other SCM eight related variables (SC practices) which influence the competitive position are considered as independent variables in this study. The works and models developed by Murali and George (2008) and Olhager and Erik (2004) are expanded by including two additional variables by the author for the purpose of present study. The first one is SC collaboration (Olhager and Erik 2004; Al-Esmael et al., 2019; Jesca, 2019) and the second one is inventory management (Pagel, 1999; Mohanty and Deshmukh, 2001; Frohlich and Westbrook, 2002; Sanjay and Ravi, 2004; Sanjay and Ravi, 2006; Singh and Teng, 2016; Anwer et al., 2017; Sharma, 2020). These two SC practices were not considered in the earlier studies related to the achievement of SC related competitive position. Therefore, this study becomes unique in this aspect.

The process of analysis followed is detailed in this section. The responses for all eight SC practices (independent variables) are collected on a 5-point scale. Using Optimal Scaling Technique, these responses were transformed into quantitative values separately for each variable (Normalization). Optimal Scaling Technique (OST) quantifies the data optimally and is one of the effective approaches for

the treatment of multivariate (categorical) data (Meulman, 1998; Starkweathe and Herrington, 2014).

Based on the quantitative scores, it is observed that there is an interdependency among these eight variables. Hence to remove the interdependency, a Categorical Principal Component Analysis (CatPCA) is performed to group the eight independent variables into a single component called 'Competitive Position Score' (CPS) using appropriate weights obtained through component loading (Object Score). CatPCA is an appropriate technique to reduce the data if the variables are categorical (Starkweathe and Herrington, 2014) as in the present study.

To identify the individual influence of SC practices on competitive position, a bivariate correlation is performed as depicted in Table 3 between CPS (the dependent variable) and the quantified and integrated values of each of the independent variable (Murali and George, 2008).

Table 3 indicates that the competitive position of a MSMC is getting correlated with almost every SCM aspect and practice to some extent or the other. But it is getting significantly correlated (>50% correlation) with Inventory Management (IM) variable with a value of 0.667 and Operational Efficiency (OE) variable with a value of 0.508. The CPS of all the other variables is below 0.5. This indicates that one of the new variable SC collaboration, considered in this study is not contributing significantly to SC competitive position. The other new variable, inventory management is contributing significantly to SC competitive position.

Using multiple regression, a model is built to assess the competitive position for MSMCs by using the responses given by the respondents for independent variables. The model summary is presented in Table 4. The results of One-way ANOVA test are presented in Table 5 and values of regression coefficients are presented in Table 6.

Table 1: Variables related to SC practices contributing to Competitive Position and SC related organizational performance measures

1. Supply Chain related Competitive Position	
SC Practice	Variables
Corporate Strategy	Governance and Leadership, Vision and Mission, Functions of Management, Efficiency in Logistics, Efficiency in Operations, Trust and Cooperation among all entities of SCM, Importance of Customer Feedback, Suppliers' Training and Development, Production Capacity Planning, Demand Forecasting, Financial Strategy, Marketing Strategy, Information Planning, HR Strategy
Supply Chain Drivers	Facilities Location and Layout, Inventory Management, Transportation Cost, Information Sharing, Identification of Suppliers, Product Pricing, Digital Technology, Web Portals
Buyer-Supplier Relationship	Product Quality Improvement, Customer Satisfaction Enhancement, Inventory Optimization
Operational Efficiency	Standardization of Components, Standardization of Processes, Implementation of JIT, Training and Development
Quality Practices	Quality Policy, Quality Standards, Top Management Commitment, Involvement of employees in continuous improvement, Quality Control, Research and Development
Customer Satisfaction Strategies	Customer Relationship Management, Changing Customer Needs, Information Sharing with Customers, Handling Customer Complaints, In-time Customer Service, Customer Feedback Mechanism
Inventory Management	Reduction in Order Fulfilment Time, Optimum Supplier Base, Postponement of Point of Differentiation, Collaborative Information Sharing
Supply Chain Collaboration	Collaborative Forecasting, Collaborative Capacity Planning, Collaborative Inventory Planning, Collaborative Production Planning
2. SC related Organizational Performance Measures	
Decrease in Cost of Procurement	
Decrease in Cost of Manufacturing	
Decrease in Cost of Logistics	
Decrease in Lead Time	
Decrease in Delivery Time	
Increase in Productivity	
Increase in Sales Growth	
Increase in Overall Profit	

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.979	.980	28

Table 3: Values of Bivariate Correlation between SC practices and competitive position

		CPS	CSSCM	SCD	BSR	OE	PRQ	CS	IM	SCC
Pear-son Corre- lation	CPS	1.000	.386	.188	.421	.508	.294	.143	.667	.386
	CSSCM	.386	1.000	.470	.710	.658	.651	.477	.484	.469
	SCD	.188	.470	1.000	.509	.477	.529	.296	.253	.209
	BSR	.421	.710	.509	1.000	.747	.712	.542	.452	.506
	OE	.508	.658	.477	.747	1.000	.717	.385	.564	.548
	QP	.294	.651	.529	.712	.717	1.000	.566	.344	.380
	CSS	.143	.477	.296	.542	.385	.566	1.000	.299	.364
	IM	.667	.484	.253	.452	.564	.344	.299	1.000	.563
	SCC	.386	.469	.209	.506	.548	.380	.364	.563	1.000
Sig. (1- tailed)	CPS	.	.000	.014	.000	.000	.000	.047	.000	.000
	CSSCM	.000	.	.000	.000	.000	.000	.000	.000	.000
	SCD	.014	.000	.	.000	.000	.000	.000	.001	.007
	BSR	.000	.000	.000	.	.000	.000	.000	.000	.000
	OE	.000	.000	.000	.000	.	.000	.000	.000	.000
	QP	.000	.000	.000	.000	.000	.	.000	.000	.000
	CSS	.047	.000	.000	.000	.000	.000	.	.000	.000
	IM	.000	.000	.001	.000	.000	.000	.000	.	.000
	SCC	.000	.000	.007	.000	.000	.000	.000	.000	.

Table 4: Model Summary for Competitive Position

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.704 ^a	.495	.464	.73486
a. Predictors: (Constant), CSSCM, SCD, BSR, OE, QP, CSS, IM, SCC				

Table 5: Results of One-Way ANOVA test for Competitive Position

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	68.337	8	8.542	15.818	.000 ^b
	Residual	69.663	129	.540		
	Total	138.000	137			
a. Dependent Variable: Competitive Position Score						
b. Predictors: (Constant), CSSCM, SCD, BSR, OE, QP, CSS, IM, SCC						

Table 6: Values of Regression Coefficients related to competitive position

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.000	.063		.003	.998
	CSSCM	-.002	.130	-.001	-.012	.990
	SCD	-.110	.119	-.071	-.921	.359
	BSR	.221	.137	.183	1.607	.111
	OE	.225	.144	.183	1.556	.122
	QP	-.034	.138	-.027	-.247	.805
	CSS	-.175	.099	-.144	-1.763	.080
	IM	.695	.099	.585	6.999	.000
	SCC	-.065	.093	-.058	-.703	.484

It is observed that only inventory management variable is playing a significant role in the measurement of competitive position with a significance value (p-value <0.05) followed by operational efficiency variable. This answers the second research question.

Overall the model is able to exhibit 50% of the variation in the competitive position meaning that the remaining 50% could be because of non SCM related factors. Therefore, it is found that the influence of all SCM practices on the competitive position of a MSMC

Influence of SC practices on SC related Organizational Performance Measures

The responses of all the companies associated with the questions related to eight SC related organizational performance measures have been quantified using Optimal Scaling Technique and following Categorical Principal Components analysis. Responses of all the eight

is not uniform, contradicting the first hypothesis. Only two variables, i.e., inventory management variable is playing a significant role followed by operational efficiency and all other independent variables are playing less significant role. This leads to the conclusion that MSMCs should implement strategies to effectively manage their inventory and improve their operational efficiency to achieve the competitive position. Therefore, the first hypothesis is not supported.

questions got integrated into two components explaining approximately 95.08% of the variance of the original responses and each component carrying an Eigen value of more than 1. The model summary and Eigen values of these two components are provided in Table 7 and the individual component loadings for each variable are mentioned in Table 8.

Table 7: Eigen Values of Quantitative Organizational Performance Measures

Model Summary			
Component	Cronbach's Alpha	Variance Accounted For	
		Total (Eigenvalue)	% of Variance
Operations Cost and Time	.971	6.664	83.300
Productivity	-.070	.943	11.785
Total	.993 ^a	7.607	95.085

a. Total Cronbach's Alpha is based on the total Eigenvalue.

It is observed from Table 8 that Component-1 is loaded heavily on Decrease in Cost of Procurement, Decrease in Cost of Manufacturing, Decrease in Cost of Logistics, Increase in Sales Growth, Decrease in Lead Time, and Decrease in Delivery time. Therefore, it is concluded that SC practices significantly influenced costs related to procurement, manufacturing, logistics and resulted in increased sales and decrease in lead and delivery times. Thus, the second hypothesis is not supported. It leads to the conclusion that the influence of SC practices is not uniform on all the SC related organizational performance measures. The influence of SC practices is significant on only six of the eight SC related organizational performance measures. This answers the second research question of the study.

Conclusions

Implementation of SC practices is found to contribute to the competitive position significantly. All the eight SC practices considered in this study are found to contribute to the achievement of competitive position of MSMCs. But the significance of their influence is not uniform. Out of the two additional SC practices, inventory management is found to be more influencing but the significance of SC collaboration is found to be less. As the existing models related to competitive position have not considered these two SC practices, this

study is unique. These results corroborate with the results obtained by Murali and George (2008) for the six SC practices considered by the authors.

A regression model is developed using the eight SC practices as independent variables contributing to the SC related competitive position as a dependent variable. The model is tested for its validity and found to be reasonably able to assess the competitive position. Therefore, it is concluded that effective implementation of SC practices will enable the MSMCs to assess their competitive position. These firms should focus more on inventory management and achieving operational efficiency to significantly improve their competitive position. Owners and managers responsible for the implementation of SC practices should give more attention towards building the competitive capabilities of their firms by adequately training the employees in supply chain related activities. Also, these companies should redesign their existing SC practices by optimally utilizing the resources to achieve SC related competitive position. At the same time, these organizations can focus on implementation of identified SC practices of this study to achieve the positive outcomes in SC related organizational performance measures.

Table 8: Component Loadings of Quantitative Organizational Performance Measures

Component Loadings		
Quantitative Performance Measures and their abbreviations	Component	
	1	2
Decrease in Cost of Procurement (DCP)	1.065	-.324
Decrease in Cost of Manufacturing (DCM)	.988	-.852
Decrease in Cost of Logistics (DCL)	1.067	-.362
Decrease in Lead Time (DLT)	1.062	-.296
Decrease in Delivery Time (DDT)	.988	-.851
Increase in Productivity (IP)	.870	1.752
Increase in Sales Growth (ISG)	1.063	-.302
Increase in Profit (IIP)	.870	1.752
Object Principal Normalization.		

Implications

Analysis of results of this empirical research provided some interesting insights into SC practices contributing towards the achievement of competitive position by MSMCs. These implications can be classified into two categories, i.e., theoretical and managerial.

Theoretically, the implications to the academicians and researchers are the identification of SC practices precisely contributing to the achievement of competitive position in MSMCs, assessment of competitive position through SC practices and influence of these practices on the organizational performance measures. There has been lot of ambiguity among the researchers in all these three aspects till now. Therefore, the outcomes of this study provide clarity for the researchers on all these three aspects. First, SC practices which contribute significantly in the achievement of SC related competitive position are identified precisely along with the significance level of each practice. Second, a reliable regression model is developed to assess the competitive position. This kind of assessment has not been attempted by researchers in the area of supply chain management. Third, the influence of SC practices on different SC related

organizational performance measures is established through this research. Moreover, this influence is also identified for its significance on specific measures.

Managerially, this study provides information about various SC practices, identifies which of these practices should be focused by the MSMCs specifically, and enables the owners and managers of these companies to assess their competitive position through supply chain. Also, it guides them about specific performance measures through SC practices. As mentioned in the literature review, MSMCs suffer from many challenges and issues in identifying SC practices correctly. Therefore, this study would add value to their existing awareness about SCM and its importance in achieving long-term sustainability.

Limitations and Future Research

In spite of its positive outcomes, the study has some limitations. First, it is based on the individual opinions of owners and managers of MSMCs. These opinions may differ depending on the degree of awareness of these individuals. Second, responses related to the significance of SC practices on organizational performance measures is not based on the actual quantitative data of MSMCs. It also based on the individual opinions. Third, it may not be possible for the respondents to express the intangible influence of SC practices in the overall achievement of competitive position in the survey instrument provided by the researcher.

This study can be expanded further by overcoming some of the above limitations by collecting the data related to variation in quantitative financial results due to the implementation of SC practices. Also, a greater number of SC practices can be included as variables in future studies. Scope of this study can also be extended by including some more sectors of MSMCs and by collecting data from different geographical regions globally.

References

- Arunachalam, D., Kumar, N., and Kawalek, J. P. (2017). Understanding big data analytics capabilities in supply chain management: Unravelling the issues, challenges and implications for practice. *Transportation Research Part E: Logistics and Transportation Review*, <https://doi.org/10.1016/j.tre.2017.04.001>
- Al-Esmael, B., Talib, F., Faisal, M. and Jabeen, F. (2019). Socially responsible supply chain management in small and medium enterprises in the GCC. *Social Responsibility Journal*, 16(3), pp. 369-386. <https://doi.org/10.1108/SRJ-09-2017-0174>
- Anwer R. M. Al-Shboul, Kevin D. Barber, Jose Arturo Garza-Reyes, Vikas Kumar, Reza Abdi (2017). The effect of supply chain management practices on supply chain and manufacturing firms' performance, *Journal of Manufacturing Technology Management*, Vol. 28 No. 5, pp. 577-609
- Arend R.J. and Wisner, J.D. (2005). Small business and Supply Chain Management: Is there a fit? *Journal of Business Venturing*, 20(3), pp. 403-36
- Baines, T., Kay, G., Adesola, S. and Higson, M. (2005). Strategic positioning: an integrated decision process for manufacturers, *International Journal of Operations & Production Management*, 25(2), pp.180-201
- Bala S. M. H., (2007). Development strategic for Indian SMEs: promoting linkages with global transnational corporations, *Management Research News*, 30(10), pp.762 – 774
- Ballou, R. H., Gilbert, S. and Mukerjee, A. (2000). New managerial challenges from supply chain opportunities, *Industrial Marketing Management*, 29(1), pp.7-18
- Beamon, B. M., (1999). Measuring supply chain performance, *International Journal of Operation & Production Management*, 19(3), pp.275-292.
- Blackhurst, J., Dunn, K.S. and Craighead, C.W. (2011). An empirically derived framework of global supply resiliency. *Journal of Business Logistics*, 32(4), pp.374–391. <http://dx.doi.org/10.1111/j.0000-0000.2011.01032>
- Bowersox, D.J., Closs, D.J. and Stank, T.P. (1999). 21st Century Logistics: Making Supply Chain Integration A Reality, *Council of Logistics Management*, Oak Brook, IL
- Chen H., Themistocleous M., and Chiu K.H. (2003). Inter-organizational Application Integration: the Case of 15 Taiwan's SMEs, Las Vegas, Nevada, USA: *Proceedings of ISOneWorld Conference*
- Chen H., Themistocleous M., Chiu K. (2004). Approaches to Supply Chain Integration Followed By SMS: An Exploratory Case Study, *New York: Proceedings of The Tenth Americas Conference on Information Systems*, August 2004.
- Chen, I.J. and Paulraj, A. (2004). Towards a theory of supply chain management: the constructs and measurements, *Journal of Operations Management*, 22(2), pp.119-50
- Chih-Jou Chen (2019). Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage, *Management Decision*, 57(7), pp.1511-1534
- Chopra, S. and Meindl P., (2008). Supply Chain Management: Strategy, Planning, and Operations, *Pearson Education*, Third Edition, 4-11
- Chopra, S. and Meindl, P. (2013). *Supply Chain Management: Strategy, Planning, and Operations*. 5th Edition, Prentice Hall
- Coyle, C., John Langley Jr., Robert A. Novack, Brian J. Gibson, (2013). *Managing Supply Chains - A Logistics Approach, 9th Edition, CENGAGE Learning*
- Dong-Wook Kwak, Young-Joon Seo, and Robert Mason, (2018). Investigating the relationship between supply chain innovation, risk management capabilities and competitive advantage in global supply chains, *International Journal of Operations & Production Management*, 38(1), pp.2-21
- Dubihlela, J and Omoruyi, O. (2014). Barriers to Effective Supply Chain Management, Implementation, and Impact on Business Performance of SMEs in South Africa, *Journal of Applied Business Research; Laramie*, 30(4), pp.1019-1030
- Fetter, B. (2019). Small and Medium Enterprises in the Sustainable Supply Chain: A Review, *Periodica Polytechnica Social and Management Sciences*, 27(2), pp.154–163. <https://doi.org/10.3311/PPso.12564>
- Francis Ofunya Afande, Bonface Matayo Ratemo, Fredrick Nyagari Nyaribo, (2015). Adoption of Supply Chain Management Practices: Review of Determining Factors, *Innovative Systems Design and Engineering (www.iiste.org) ISSN 2222-1727 (paper) ISSN 2222-2871 (Online) 6(5)*, pp.72-77
- Frohlich, M. and Westbrook, R. (2002). Demand chain management in manufacturing and services: web-based integration, drivers and performance, *Journal of Operations Management*, 20, pp.729-45
- Gorynia, M. (2004). Competitiveness of Polish firms and European Union enlargement, *Competitiveness Review*, published on 01/01/2004. www.accessmylibrary.com/coms2/summary/0286-13567165_ITM
- Gorynia, M., Jankowska, B., and Tarka, P. (2013). Basic Concepts of Company Competitiveness. In M. Gorynia & B. Jankowska (Eds.), *The Influence of Poland's Accession to the Euro Zone on the International Competitiveness and Internationalization of Polish Companies* (pp. 17-39). Warszawa: Difin.
- Gunasekaran, A., Okko, P., Martikainen, T. and Yli-Olli, P. (1996). Improving productivity and quality in small and medium enterprises: cases and analysis, *International Small Business Journal*, 15(1), pp.59-72
- Gunasekaran, A., Patel, C. and McGaughey, R.E. (2004). A framework for supply chain performance measurement, *International Journal of Production Economics*, 87(3), pp.333-47.
- Handfield, R. and Nichols, E. L. (1999). *Introduction to Supply Chain Management*, Prentice Hall
- Hartley, J.L. and Choi, T.Y. (1996). Supplier development: customer as a catalyst of process change, *Business Horizons*, 39(4), pp.37-40
- Holmberg, S. (2000). A system perspective in supply chain measurement, *International Journal of Physical Distribution & Logistics Management*, 30(10), pp.847-68
- Hove-Sibanda, P. and Pooe, R.I.D., (2018). Enhancing supply chain performance through supply chain practices, *Journal of Transport and Supply Chain Management*, 12(0), a400. <https://doi.org/10.4102/jtscm.v12i0.400>
- James K. Higginson, Alam Ashraful (1997). Supply Chain Management Techniques in Medium-to-Small Manufacturing Firms, *The International Journal of Logistics Management*, 8(2), pp.19 – 32

- Jesca M N, (2019). Supply chain management constraints in Tanzanian small and medium enterprises, *African Journal of Business Management*, 13(16), 564-570. DOI: 10.5897/AJBM2019.8876
- Joanne Meehan and Lindsey Muir, (2008). SCM in Merseyside SMEs: benefits and barriers, *The TQM Journal*, 20(3), pp.223-232
- Koh, S.C.L., Sevкли, E., Zaim, S., Demirbag, M. and Tatoglu, E. (2007). The impact of supply chain management practices on performance of SMEs, *Industrial Management and Data Systems*, 107(1), pp.103-124.
- Lambert, D.M. and Cooper, M.C. (2000). Issues in supply chain management, *Industrial Marketing Management*, 29(1), pp.65-83.
- Larry C. G and Richard R. B. (1996). Purchasing Role in Supply Chain Management, *The International Journal of Logistics Management*, 7(1), pp.29 – 38
- Lee HL and Billington C (1992). Managing supply chain inventory: pitfalls and opportunities, *Sloan Management Review*, 33, pp.65-73
- Maguire, S. and Magrys, A. (2001). The potential use of IT to gain competitive advantage for small and medium-sized enterprises, *Proceedings of the 9th Annual High Technology Small Firms Conference*, Manchester Business School, Manchester.
- Maureen S. G, Laura H. J, and Igor L (2020). Trends and applications of resilience analytics in supply chain modeling: systematic literature review in the context of the COVID-19 pandemic, *Environment Systems and Decisions*, 40, 222-243. <https://doi.org/10.1007/s10669-020-09777-w>
- Martin C. and Matthias H. (2011). Supply Chain 2.0: managing supply chains in the era of turbulence, *International Journal of Physical Distribution and Logistics Management*, 41(1), pp.63-82
- Meulman J. J., (1998). Optimal Scaling Methods for Multivariate Categorical Data Analysis, A white paper on SPSS, pp 1-12 (http://hbanaszak.mjr.uw.edu.pl/TempTxt/Meulman_200X_OptimalScalingMethodsForMultivariateCategoricalData_SPSSWhitePaper.pdf)
- Mohanty, R. P. and Deshmukh, S. G. (2001). Essentials of supply chain management, New Delhi: *Phoenix Publishing House Pvt. Ltd.*
- Murali, S and George, J. (2008). An Empirical Study on the Impact of Supply Chain Practices on Competitive Position of MNEs in Malaysia, *International Journal of Economics and Management*, 2(2), pp.369-394
- Olhager, J and Erik S. (2004). Supply Chain Management Survey of Swedish Manufacturing firms, *International Journal of Production Economics*, 89, pp.353-361
- Pagel, D. (1999). Managing for optimal performance through effective coordination of the supply chain, *Production and Inventory Management Journal*, (First quarter): pp.66-70.
- Paul H., and Jungsik J, (2006). Supply chain management practices of SMEs: from a business growth perspective, *Journal of Enterprise Information Management*, 19(3), pp.292 – 302
- Premaratne S, (2005). A conceptual framework for supply chain management: a structural integration, *Supply Chain Management: An International Journal*, 10(1), pp. 47-59
- Quayle (2003). A study of supply chain management practice in UK industrial SMEs, *Supply Chain Management: An International Journal*, 8(1), pp.79-86
- Rajesh K. S, Suresh K. G and Deshmukh S.G, (2008). Competency and Performance analysis of Indian SMEs and large organizations: An exploratory study, *Competitiveness Review: An International Business Journal*, 18(4), pp.308-321
- Rajesh K. S and Suresh K. G, (2008). Strategy development by SMEs for competitiveness: a review, *Benchmarking: An International Journal*, 15(5), 525-547
- Ramakrishna, Y. (2016). Supply Chain Management: Large vs. Small and Medium Enterprises (SMEs). In A. Dwivedi (Ed.), *Innovative Solutions for Implementing Global Supply Chains in Emerging Markets* (pp. 141-151). Hershey, PA: *IGI Global*. doi:10.4018/978-1-4666-9795-9.ch009
- Richard, P.J., Devlinney, T.M., Yip, G.S., and Johnson, G. (2009). Measuring Organizational Performance as a Dependent Variable: Towards Methodological Best Practice. *Journal of Management*, 35(3), pp.718-804
- Rouhollah Z and Shivraj, (2011). Supply Chain: Barriers and Benefits in Indian SMEs, *SCMS Journal of Indian Management*, 8(4), pp.1-30
- Sahay, B.S., Gupta, N.D. and Mohan, R. (2006), Managing supply chains for competitiveness: The Indian scenario, *Supply Chain Management: An International Journal*, 11(1), pp.15-24
- Sanjay Jharkharia and Ravi Shankar, (2004). Supply Chain Management: Some insights from Indian Manufacturing Companies, *Asian Academy of Management Journal*, 9(1), pp.79-98
- Sanjay Jharkharia, and Ravi Shankar, (2006). Supply chain management: some sectoral dissimilarities in the Indian manufacturing industry, *Supply Chain Management: An International Journal*, 11(4), pp.345-52
- Sharma, N. (2020). COVID-19: Challenges and Opportunities for Small and Medium Enterprises (SMEs) (July 13, 2020). Available at SSRN: <https://ssrn.com/abstract=3650473> or <http://dx.doi.org/10.2139/ssrn.3650473>
- Sharman, G. (1984). The rediscovery of logistics, *Harvard Business Review*, 62(5), pp.71-9
- Shibin, K.T., Dubey, R., Gunasekaran, A., Benjamin Haze, David Roubaud, Shivam Gupta and Cyril Foropon (2020). Examining sustainable supply chain management of SMEs using resource based view and institutional theory. *Annals of Operations Research*, 290, 301-326. <https://doi.org/10.1007/s10479-017-2706-x>
- Simchi-Levi, D., Kaminsky, P. and Simchi-Levi, E. (2009). *Designing and Managing the Supply Chain: Concepts, Strategies, and Case Studies*, Third Edition, TATA McGraw-Hill.
- Singh, A. and Teng, J.T.C. (2016). Enhancing supply chain outcomes through information technology and trust, *Computers in Human Behavior*, 54(1), pp.290-300
- Starkweather, J and Herrington R, (2014), Categorical Principal Components with Optimal Scaling, SPSS-SC, Module-9, University of NT (http://www.unt.edu/rss/class/Jon/SPSS_SC/Module9/M9_CA_TPCA/SPSS_M9_CATPCA.htm)
- Tan, K. C. (1999). Supply Chain Management: Practices, Concerns and Performance Issues. Working Paper, Department of Management, University of Nevada, Las Vegas, NV
- Tan, K. C. (2001). A Framework of Supply Chain Management Literature. *European Journal of Purchasing & Supply Management*, 7, pp.39-48
- Tan, K.C., Lyman, S.B. and Wisner, J.D. (2002). Supply chain management: a strategic perspective, *International Journal of Operations and Production Management*, 22(6), pp.614-31
- Terje I. V and Morten H, (2007). Can the SME survive the supply chain challenge? *Supply Chain Management: An International Journal*, 12(1), pp.20-31
- Thakkar Jitesh, Arun Kanda, S.G. Deshmukh, (2012). Supply chain issues in Indian manufacturing SMEs: insights from six case studies. *Journal of Manufacturing Technology Management*, 23(5), pp.634-664
- Tracey, M., Lim, J. S., and Vonderembse, M. A. (2005). The impact of supply-chain management capabilities on business performance. *Supply Chain Management: An International Journal*, 10 (3), pp.179-191.

- Trąpczyński, P., Jankowska, B., Dzikowska, M., and Gorynia, M. (2016). Identification of Linkages between the Competitive Potential and Competitive Position of SMEs Related to their Internationalization Patterns Shortly after the Economic Crisis. *Entrepreneurial Business and Economics Review*, 4(4), 29-50, DOI: <http://dx.doi.org/10.15678/EBER.2016.040403>
- Vallespir, B. and Kleinhans, S. (2001). The positioning of the company in enterprise collaborations, *Production Planning & Control*, 12(5), pp.478-87
- Wagner, B.A., Fillis, I. and Johansson, U. (2003). E-business and e-supply in small and medium sized businesses, *Supply Chain Management: An International Journal*, 8(40), pp.343-54
- Wagner, S.M. and Hoegl, M. (2006). Involving suppliers in product development: insights from R&D directors and project managers, *Industrial Marketing Management*, 35, pp.936-43