

Uncertain Supply Chain Management

homepage: www.GrowingScience.com/uscm

Identifying and ranking the supply chain management factors influencing the quality of the products

Sohrab Nadali*, Seyed Foad Zarifi and Hadi Rezghi Shirsavar

^aDepartment of Management and Accounting, West Branch, Islamic Azad University, Tehran, Iran

CHRONICLE

Article history:

Received April 2, 2016
Received in revised format June 12, 2016
Accepted August 7 2016
Available online
August 8 2016

Keywords:

Quality
SMEs
Supply chain management

ABSTRACT

This paper presents a survey to identify and rank the supply chain management factors influencing the quality of the products for small and medium enterprises (SMEs) in food industry. The study designs a questionnaire in Likert scale and distributes it among 238 randomly selected managers of SMEs in food industry in city of Tehran, Iran. Cronbach alpha is calculated as 0.851, which is well above the acceptable level. Using principle component with Varimax rotation, the study has determined four important factors including strategic management, product management, manufacturing process management, organizational resources, customer orientation, industry capacity, which influence the most on product quality improvement.

© 2017 Growing Science Ltd. All rights reserved.

1. Introduction

During the past few decades, there have been substantial efforts on locating important factors for stimulating small and medium-sized enterprises (SMEs) (Ritchie & Brindley, 2000). In fact, many believe that SMEs are the backbone of the sustainable economy and any boost on economy can be expected through empowering SMEs (Thakkar et al., 2008). Most SMEs in the world are known for their entrepreneurial marketing powers and it is important to detect factors influencing entrepreneurial marketing. Nikfarjam and Zarifi (2015) reported that innovative approach, flexible marketing, customer, product strategy and resources could influence the most on entrepreneurial marketing factors. Gilmore et al. (2001) performed a survey on SME characteristics and determined how they could affect marketing characteristics within SMEs. They studied for “alternative” marketing approaches, the inherent existence of the owner/manager’s “network” in its various guises such as personal contact networks, social networks, etc. and how these networks could be implemented.

* Corresponding author
E-mail address: sohrabnadali@gmail.com (S. Nadali)

Supply chain management (SCM) plays an important role for the success of SMEs. Lenny Koh et al. (2007) determined the underlying dimensions of SCM practices to examine a framework for determining the relationships among SCM practices, operational performance and SCM-related organizational performance with special emphasis on SMEs in Turkey. They concluded that an efficient outsourcing could help SMEs optimize their performance. Hong and Jeong (2006) explained that SMEs have significant effects on supply chain performance. Bayraktar et al. (2009) examined a framework determining the causal links among SCM and information systems (IS) practices, SCM–IS related inhibiting factors and operational performance using the data of 203 manufacturing SMEs operating in the manufacture of fabricated metal products and general purpose machinery in Turkey. They reported that both SCM and IS practices positively and significantly could affect the operational performance of sample firms. The results of the structural model also reported a strong support for negative relationships between SCM–IS related inhibitors and the implementation levels of both SCM and IS practices. They also found a negative relationship between SCM–IS inhibitors and operational performance of SMEs. Moreover, they also verified the moderating effect of SCM–IS enablers on the link between SCM practices and operational performance and reported a similar moderating effect between IS practices and operational performance.

Harland et al. (2007) performed an investigation on the barriers for adoption of eBusiness technologies in order to achieve an integrated information in supply chains by examining the differences among companies in supply chains and among supply chains. The survey disclosed disparity between existing and planned use of eBusiness by bigger downstream companies compared to upstream SMEs. In their survey, the SMEs were cautious, only planning to make investment in eBusiness when dominant downstream customers forced them; nevertheless, they did not appreciate the full advantages to be reached from eBusiness adoption. The downstream larger businesses were forging ahead with eBusiness in ‘eIsolation’ and were not giving supply chain leadership. Ciliberti et al. (2008) analyzed the practices used and difficulties experienced by SMEs to transfer socially responsible behaviors to suppliers on five Italian socially responsible SMEs. They reported that firms use various strategies as well as diverse management systems and tools to address Corporate Social Responsibility (CSR) problems along their supply chains (SCs).

2. The proposed study

This paper presents a survey to identify and rank the supply chain management factors influencing the quality of the products for small and medium-sized enterprises (SMEs) in food industry. The study designs a questionnaire in Likert scale and distributes it among 238 randomly selected managers of SMEs in food industry in city of Tehran, Iran. Cronbach alpha is calculated as 0.851, which is well above the acceptable level. Table 1 presents the results of KMO and Bartlett’s tests. In our survey, there are 32 questions and Table 2 demonstrates some basic statistics including min, max, standard deviation, etc. As we can observe from the results of the table, all statistics associated with Skewness and Kurtosis are within desirable level and we may use principle component analysis to extract the main factors.

Table 1
KMO and Bartlett's Test

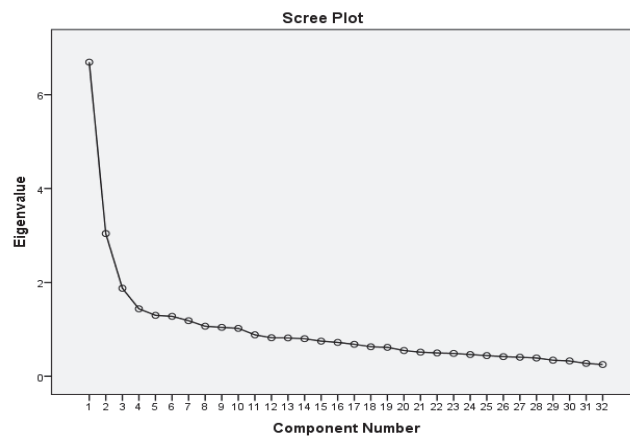
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.826
	Approx. Chi-Square	2209.979
Bartlett's Test of Sphericity	df	496
	Sig.	.000

Table 2

The summary of some basic statistics

	N	Minimum	Maximum	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
q1 Optimizing existing processes	238	1	5	-0.51	0.158	0.187	0.314
q2 Systematic combination of resources	238	1	5	-0.525	0.158	0.371	0.314
q3 Outsourcing existing resources	238	1	5	-0.191	0.158	-0.739	0.314
q4 Development of new products	238	1	5	-0.345	0.158	-0.314	0.314
q5 Internet marketing	238	1	5	-0.368	0.158	-0.334	0.314
q6 Organizational capabilities	238	1	5	-0.48	0.158	-0.444	0.314
q7 Customer relationship management	238	1	5	-0.156	0.158	-0.571	0.314
q8 Customer requirements	238	1	5	-0.088	0.158	-0.633	0.314
q9 Networking	238	1	5	-0.307	0.158	-0.148	0.314
q10 Packaging	238	1	5	-0.375	0.158	-0.137	0.314
q11 Logistics	238	1	5	-0.171	0.158	-0.705	0.314
q12 Strategic mergers	238	1	5	-0.455	0.158	-0.516	0.314
q13 Product life cycle management	238	1	5	-0.417	0.158	-0.443	0.314
q14 Operations management	238	1	5	-0.469	0.158	-0.497	0.314
q15 Product diversification	238	1	5	-0.33	0.158	-0.684	0.314
q16 Product commercialization	238	1	5	-0.13	0.158	-0.654	0.314
q17 Trust among different layers of	238	1	5	-0.181	0.158	-0.744	0.314
q18 Supply management	238	1	5	-0.461	0.158	-0.065	0.314
q19 Sharing resources	238	1	5	-0.516	0.158	-0.085	0.314
q20 Providing maximum value to all	238	1	5	-0.427	0.158	-0.636	0.314
q21 Organizational infrastructure	238	1	5	-0.196	0.158	-0.66	0.314
q22 Number of dealers	238	1	5	-0.321	0.158	-0.259	0.314
q23 Upstream	238	1	5	-0.015	0.158	-0.458	0.314
q24 Rate of return in industry	238	1	5	-0.596	0.158	0.399	0.314
q25 Using technology opportunities	238	1	5	-0.353	0.158	0.117	0.314
q26 Property distribution channel	238	1	5	0.027	0.158	-0.469	0.314
q27 Supply of raw materials	238	1	5	-0.611	0.158	0.233	0.314
q28 Quality management	238	1	5	-0.529	0.158	0.791	0.314
q29 Production process management	238	1	5	-0.399	0.158	0.412	0.314
q30 Inventory management	238	1	5	-0.631	0.158	1.098	0.314
q31 Industry growth rate	238	1	5	0.087	0.158	-0.059	0.314
q32 Organizational market share	238	1	5	-0.38	0.158	0.236	0.314

Table 3 and Fig. 1 present the results of total variance explained and Scree plot, respectively. As we can observe from the results of Scree plot, the first six factors represent the most influential items.

**Fig. 1.** Scree plot

3. The results

In this section, we present details of our findings on the supply chain management factors influencing the quality of the products for small and medium-sized enterprises (SMEs) in food industry. In our survey, there are six categories including strategic management, product management, manufacturing process management, organizational resources, customer orientation, industry capacity, which influence the most on quality of products and they are summarized in Table 5 as follows,

Table 5
The summary of the SCM factors influencing the quality of the products

Factor	Loading	Variable	Q.	Rank
Strategic management Rank = 0.829 Sig. = 0.000	.676	Sharing resources	q19	0.027
	.662	The level of trust between stakeholders in the chain	q17	0.035
	.549	Outsourcing of manufacturing capacity	q3	0.053
	.539	Networking	q9	0.166
	.528	Strategic Integration	q12	0.073
	.507	Providing maximum value to all corporate stakeholders	q20	0.018
Product management Rank = 0.821 Sig. = 0.000	.661	Product lifecycle management	q13	0.033
	.647	New Product Development	q4	0.034
	.621	Commercialization of product	q16	0.035
	.581	Diversity Products	q15	0.032
	.486	Retail packaging	q10	0.049
Organizational resources Rank = 0.904 Sig. = 0.000	.635	Organizational capabilities	q6	0.027
	.566	Optimization of existing processes	q1	0.032
	.463	Systematic resource combining	q2	0.059
	.445	Logistics	q11	0.073
Customer focus Rank = 0.916 Sig. = 0.000	.755	Customer needs	q8	-
	.743	Customer Relationship Management	q7	-
	.357	Internet marketing	q5	-

According to the results of Table 5, customer focus is the most important factor followed by organizational resources, strategic management and product management. Table 6 demonstrates the results of examining the effects of six factors in terms of hypotheses.

Table 6
The summary of testing the effects of six main factors

Main factor	β	Sig.	Result
Strategic management	.829	P<0.001	Accept
Product management	.821	P<0.001	Accept
Production process management	-.037	P>0.05	Reject
Human resources	.904	P<0.001	Accept
Customer orientation	.916	P<0.001	Accept
Industry capacity	.226	P>0.05	Reject

According to the results of Table 6, the effects of strategic management, product management, human resources and customer orientation on quality of products are confirmed and the effects of production process management and industry capacity are not confirmed.

4. Conclusion

In this paper, we have presented a survey to identify and rank the supply chain management factors influencing the quality of the products for small and medium-sized enterprises (SMEs) in food industry. The study has designed a questionnaire in Likert scale and distributed it among 238 randomly selected managers of SMEs in food industry in city of Tehran, Iran. Using principle component analysis with Varimax rotation, the study has determined four important factors including strategic management,

product management, human resources and customer orientation on quality of products, which influence the most on quality of products.

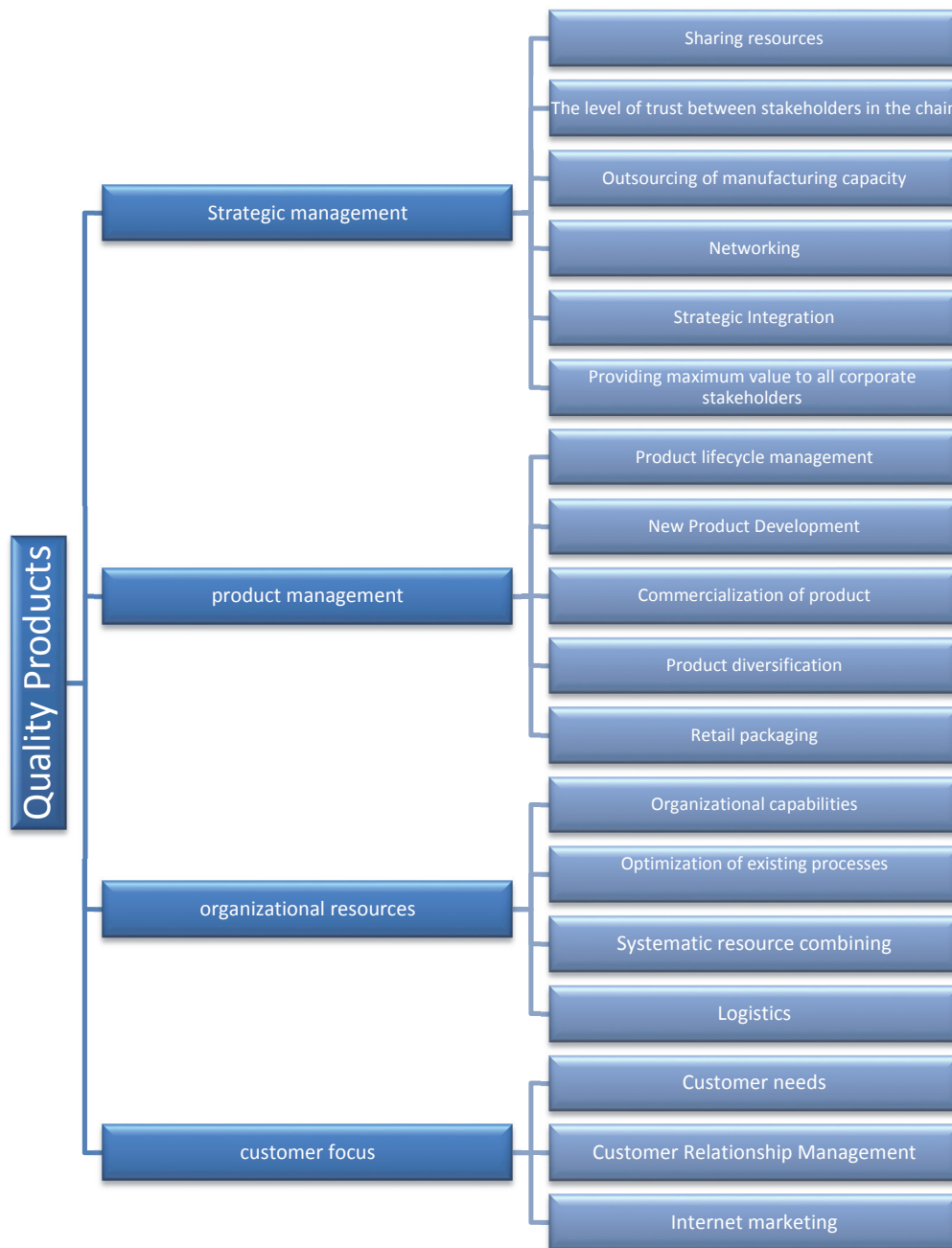


Fig. 2. The structure of the final model

Fig. 2 shows the structure of the final model. In our survey, strategic management consists of six factors. Sharing resources is one of the factors in this category, which plays an important role for the success of organizations to reach quality product. This is also a key factor for reaching a successful implementation of enterprise resource planning (Langenwalter, 1999; Bourlakis et al., 2016). The level of trust among all stakeholders in the supply chain is the second factor influencing the success of strategic management. In fact a high level of trust among managers in different levels yields better quality products. Outsourcing of manufacturing capacity is another important factor influencing on

quality. Nowadays, most organizations attempt to separate their low value added activities from their core activities and assign them to other firms with better skills for manufacturing. This is a strategic decision, which helps organizations concentrate on their own core business and increase the quality of their products. Networking is another important component of the strategic management, which plays an important role on increasing necessary knowledge within organization. Strategic integration and providing maximum value to all corporate stakeholders are other important factors influencing the most on quality improvement.

Product management is another important factor for quality improvement. In this category, management of the product lifecycle is the most important factor followed by new product development and commercialization of the products. In addition, product diversification may reduce the risk of investment helping organizations reach higher quality products. Finally, retail packaging is another important factor influencing on product quality. Organizational resources is the next important factor affecting quality of product. In this category, organizational capabilities, optimization of existing processes, systematic resources and having an efficient logistics are important factors. Finally, customer focus is the last factor for product quality development. In this category, three factors including locating customer needs, establishing an efficient customer relationship management help organizations reach better quality product development. Moreover, internet marketing is one of the cheapest and at the same the most efficient method for market penetration.

The results of this study are consistent with findings of other studies existed in the literature (Robinson & Malhotra, 2005; Kannan & Tan, 2005; Li & Lin, 2006). According to Kaynak and Hartley (2008), as competition expands from a single company to the supply chain, many people have been interested in exploring quality management (QM) in a SCM context. Previous studies indicate that SCM consists of internal practices, which are contained within a firm, and external practices. Supplier quality management and customer focus are two QM practices that are also clearly in the domain of SCM. Kaynak and Hartley (2008) investigated how these two supply chain management-related quality practices could lead to improved performance and examined the practices that precede and mediate those relationships. They found that there was positive and meaningful relationship between QM and SCM, which is consistent with findings of our survey.

As a future study, we think the proposed study needs to be performed in a bigger scale by distributing larger numbers of questionnaires among practitioners and in different regions of the country. This helps us have a better insight on the facts and guide us for better actions.

Acknowledgement

The authors would like to thank the anonymous referees for constructive comments on earlier version of this paper.

References

- Bayraktar, E., Demirbag, M., Koh, S. L., Tatoglu, E., & Zaim, H. (2009). A causal analysis of the impact of information systems and supply chain management practices on operational performance: evidence from manufacturing SMEs in Turkey. *International Journal of Production Economics*, 122(1), 133-149.
- Bourlakis, M., Maglaras, G., Aktas, E., Gallear, D., & Fotopoulos, C. (2016). Does firm size influence sustainable performance in food supply chains: Insights from Greek SMEs. In *Developments in Logistics and Supply Chain Management* (pp. 253-265). Palgrave Macmillan UK.
- Ciliberti, F., Pontrandolfo, P., & Scozzi, B. (2008). Investigating corporate social responsibility in supply chains: a SME perspective. *Journal of Cleaner Production*, 16(15), 1579-1588.

- Gilmore, A., Carson, D., & Grant, K. (2001). SME marketing in practice. *Marketing intelligence & planning*, 19(1), 6-11.
- Harland, C. M., Caldwell, N. D., Powell, P., & Zheng, J. (2007). Barriers to supply chain information integration: SMEs adrift of eLands. *Journal of Operations Management*, 25(6), 1234-1254.
- Hong, P., & Jeong, J. (2006). Supply chain management practices of SMEs: from a business growth perspective. *Journal of Enterprise Information Management*, 19(3), 292-302.
- Kannan, V. R., & Tan, K. C. (2005). Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance. *Omega*, 33(2), 153-162.
- Kaynak, H., & Hartley, J. L. (2008). A replication and extension of quality management into the supply chain. *Journal of Operations Management*, 26(4), 468-489.
- Langenwarter, G. A. (1999). *Enterprise resources planning and beyond: integrating your entire organization*. CRC Press.
- Lenny Koh, S. C., Demirbag, M., Bayraktar, E., Tatoglu, E., & Zaim, S. (2007). The impact of supply chain management practices on performance of SMEs. *Industrial Management & Data Systems*, 107(1), 103-124.
- Li, S., & Lin, B. (2006). Accessing information sharing and information quality in supply chain management. *Decision support systems*, 42(3), 1641-1656.
- Nikfarjam, A., & Zarifi, S. (2015). Exploring the effects of entrepreneurial marketing factors on SMEs. *Uncertain Supply Chain Management*, 3(4), 333-338.
- Ritchie, B., & Brindley, C. (2000). Disintermediation, disintegration and risk in the SME global supply chain. *Management Decision*, 38(8), 575-583.
- Robinson, C. J., & Malhotra, M. K. (2005). Defining the concept of supply chain quality management and its relevance to academic and industrial practice. *International Journal of Production Economics*, 96(3), 315-337.
- Thakkar, J., Kanda, A., & Deshmukh, S. G. (2008). Supply chain management in SMEs: development of constructs and propositions. *Asia Pacific Journal of Marketing and Logistics*, 20(1), 97-131.



© 2016 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).