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Effect of product variety management strategies on supply chain performance – Furniture industry

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Abstract – *Most of the firms are now behind introducing product variety so as to improve their sales and profit. But the crucial fact is product variety enhances the sales of the product but dependent on several factors. First we should know how to tackle the adverse effect of product variety on an industry. In order to tackle that, we should know the impact of product variety on different levels of an industry. We study the effect of product variety management strategies (modularity and postponement) on supply chain performance of furniture industry sector by means of survey analysis. Analysis was done in IBM SPSS software. Data Analysis showed that there is corresponding relationship between variety control strategies and supply chain performance.*

Key Words: Product variety, Variety control strategy, Modularity, Postponement, Supply chain performance.

1. INTRODUCTION

Success of a manufacturing industry is based on the capability of the industry generate new ideas and introduce new products in the market based on the trend that exist. More often sales growth is totally based on the capability of the manufacturer to introduce new choices for the customers. Thus new product development has become more fast, and also manufacturing system should be more flexible to adapt changes. Management of the complexities based on the above said procedure makes competitive advantage. Decisions regarding the product variety are focused on how to manufacture and engineer the product related to customer choice.

1.1 Product variety

The word "product variety" is indefinite as it is used with a number of diverse theoretical meanings. Product variety is classified to various levels. In order to achieve product variety industries introduces variety control strategies (Modularity and postponement). Modularisation enables the standardisation of materials and component sharing, which in turn reduces product development costs as well as that of procurement and part inventory. Postponement of the point of product differentiation reduces complexity of the supply chain and this approach has recently received considerable attention as one of the most beneficial concepts for reducing the costs and risks of product variety and improving the performance of supply chains.

1.2 Supply chain performance

The management of a network of relationships within a firm and between interdependent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction. Manufacturing flexibility enables the manufacturing system to respond to changes in demand, product design, process technology, and material supply. Agility represents an externally focused competence focusing more on speed at the organisational level such as market responsiveness, delivery reliability and frequency of product introduction. Costs are related with inventory and operating costs such as cost minimization, sales maximization, profit maximization, inventory investment minimization and return on investment maximization. Customer responsiveness measures include lead time, delivery, stock-out probability and fill rate.

2. LITERATURE REVIEW

Modularity in product design has been employed to speed up new product development (NPD), to reduce NPD cost, and to enhance customisation possibilities for consumers (1). Managing product variety is challenging given the complexities of today's supply chains. Another solution for managing product variety is to postpone the configuration of a product to customers' specifications as late as possible in the supply chain. Postponement of the point of product differentiation reduces complexity of the supply chain and this approach has recently received considerable attention as one of the most beneficial concepts for reducing the costs and risks of product variety and improving the performance of supply chains (2). A firm attains agility by tapping into the various synergies among different forms of flexibility within a firm (3). Supply chain flexibility is concerned with internally focused capability and adaptability of a firm's internal supply chain functions of purchasing, engineering, manufacturing and distribution, while agility represents an externally focused competence focusing more on speed at the organisational level such as market responsiveness, delivery reliability and frequency of product introduction (4).

3. DATA ANALYSIS

Survey was conducted using questionnaire in 125 furniture manufacturing industries within Kerala state and the data collected was tested using IBM SPSS software. Correlation matrix was plotted and Regression analysis was done in the software to evaluate the relationship between Variety control strategy, Supply chain flexibility, Supply chain agility, Cost efficiency, Customer service.

Table -1: Correlation matrix

	VCS	FLEX	COE	CUS	AGIL
VCS	1	.481**	.699**	.806**	.454**
FLEX	.481**	1	.476**	.432**	.363**
COE	.699**	.476**	1	.613**	.434**
CUS	.806**	.432**	.613**	1	.428**
AGIL	.454**	.363**	.434**	.428**	1
**. Correlation is significant at the 0.01 level (2-tailed).					

From the correlation matrix we can conclude that variety control strategy is positively related to flexibility and agility with a correlation coefficient of 0.482 and 0.454 with significance at α = 0.01 level. Flexibility and agility show correlation coefficient 0.363 with significance at α = 0.01 level. Flexibility is positively correlated with cost efficiency and customer service with a coefficient value of 0.476 and 0.432 with a significance at α = 0.01 level. Agility is correlated positively with cost efficiency and customer service with coefficient 0.434 and 0.428 with significance at α = 0.01 level.

Table -2: Regression analysis result

	Coefficients	t-value	Sig
VCS – FLEX	0.332	4.029	0.000
VCS – AGIL	0.364	4.549	0.000
FLEX – AGIL	0.363	4.318	0.000
FLEX – COE	0.338	3.423	0.001
AGIL – COE	0.275	2.739	0.007
FLEX – CUS	0.225	2.280	0.024
AGIL - CUS	0.259	2.577	0.011

Regression analysis was conducted and the result is as follows: The coefficient on the path between variety control strategy and supply chain flexibility had a value of 0.332 at the 0.001 significance level. The result supported that variety control strategy improves supply chain flexibility. The path coefficient between variety control strategy and supply chain agility had a value of 0.364 at the 0.001 level of statistical significance, which shows that variety control strategy improves supply chain agility. For the path between supply chain flexibility and agility, the coefficient was 0.363 and was significant at the 0.001 level. This concludes that supply chain flexibility improves supply chain agility. Coefficients on the path from supply chain flexibility to cost efficiency and from supply chain flexibility to customer service had values of 0.338 and 0.225 at the 0.001 and 0.05 levels of significance, respectively. Hence, increased supply chain flexibility improves supply chain cost efficiency and increased supply chain flexibility improves supply chain customer service. Coefficients on the paths from supply chain agility to cost efficiency and from supply chain agility to customer service had values of 0.275 and 0.259 at the 0.01 and 0.05 levels, respectively, which revealed that supply chain agility improves cost efficiency and customer service. Table 2 displays regression weight with t-value and significance level.

4. CONCLUSION

There exists a relative relationship between Variety control strategy, Supply chain flexibility, Supply chain agility, Cost efficiency, Customer service. In order to find that we developed the correlation matrix and conducted regression analysis. The results showed that as variety control strategies in a firm increases it gradually improves the supply chain performance. As variety control strategy (modularity and postponement) is improved in a furniture manufacturing industry it gradually improves the supply chain flexibility and agility of that firm. Likewise, we could identify from the study that flexibility and agility improvement gradually improves the cost efficiency and customer service of the industry.

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