An Insight into Supplier Evaluation Parameters

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Abstract: *The manufacturing process over the years has shifted from manufacturing of most products to outsourcing of key accessories. Hence it is imperative that suppliers play a key role in the manufacture of a product. The manufacturer has to be very careful while making the choice of supplier. Hence a pertinent issue for all manufacturing organization is the identification, evaluation and choice of supplier. The paper is focused on the possible criteria that purchasers need to focus while evaluating their suppliers. The research tool was established using the conceptual base of the components of supplier selection and evaluation and the circumstantial basis of the focus group upshots. Six dimensions of supplier evaluation namely supplier inherent strength, supplier competitiveness, product orientation, manpower competency, management involvement and sustenance factors were identified as suitable for the study based on auto industries situated in and around Chennai. Right suppliers can enable quality products which are of high demand in the market and ensure high degrees of customer satisfaction. The above paper will be of significant use to personnel in need of supplier evaluation. In future the same study can be extended to other geographical areas, to other sectors and can pay a larger focus on factors such as social accountability of supplier companies.*

Keywords: *Manufacturing process, supplier, social accountability, customer certification*

Introduction

The modern-day product is a summation of ingredients supplied by different vendors and assembled by the buyer. The vendor over the years would have developed an expertise in that particular product alone and it is the prudent on the part of the manufacturer to tap this expertise rather than wasting time in developing a related product. The present-day consumers often understand the quality of the total product based on the supplier who has supplied certain key parts. The manufacturing process over the years has shifted from manufacturing of most products to outsourcing of key accessories. Hence it is imperative that suppliers play a key role in the manufacture of a product. The manufacturer has to be very careful while making the choice of supplier. Hence a pertinent issue for all manufacturing organization is the identification, evaluation and choice of supplier. In the present-day scenario organizations are willing to expose their resources in evaluating and selecting the right supplier. The criteria for the evaluation of supplier becomes apparent and the need for cross functional personnel to carry out the function becomes necessary. Gules and Burgess (1996) indicated that the process of supplier evaluation has a major role in setting up the supply system

capable of responding to the needs of the market and innovation. Ting & Cho (2008) suggested that the major work in an organization is choosing the right supplier as it directly influences cost savings, profit and the dynamism of the company. Pikousová & Prùša (2013) identified the importance of supplier evaluation matrix and brought out that vendor talents, strategies and capabilities affected the operations of the sourcing company

The paper is focussed on the possible criteria that purchasers need to focus while evaluating their suppliers. Cousins, Lawson, & Squire (2006, suggested that the choices for sourcing can be complex and based on diverse criteria. Supplier evaluation does not necessarily mean looking for new suppliers alone but also looks at the possibility of opening up the existing supplier towards new products through supplier development provided one has the aptitude and other needed capabilities. Buffa & Ittner (1987) recognized that supplier evaluation isnot only meant for choosing suppliers and assessing bids, but also to motivate current suppliers and initiate remedial actions Becoming a supplier is not of choice but of accomplishments. Esposito and Passaro, (2009) posited that supplier relationship evolved from the fact that suppliers needed suitable competencies to be a part of the supply system capable of facing competition. Nair (2015) suggested that supplier performance is dependent on the selection suppliers whose activities match purchasing goals and thereby improve the purchasing firm's competitive position. Supplier selection is the stage where one zeroes in on a supplier post which the supplier is evaluated

Objective of Study

- The study is focused on the possible criteria that purchasers need to focus while evaluating their suppliers.
- This study aim to explore different supplier evaluation parameters

Review of Literature

Kumar, Vrat, and Shankar (2006) found that since 1990s many organizations in order to improve their competitiveness and their management capability have started developing strategic alliances with vendors. Thompson, (1990) indicated that the sourcing policies and methods have an indirect influence on the organizations marketing mix and the satisfaction levels of the ultimate customer. Handfield, Monckza, giunipero & Patterson (2011) stated that the very purpose of the evaluation process is to minimize purchasing risk and maximize total value to the buyer. Zubar & Parthiban (2014) predicted that the collaboration enabled the vendor and the manufacturer to work together while scheming the mechanisms of the final production. Weber, Current& Desai (1998) recognized that suppliers have different performance metrics across different criteria and it is this factor that complicates the supplier selection decisions. Watts and Hahn (1993) considered Supplier development as a pointer of a supportive buyer-supplier relationship. Modi & Mabert (2007) identified suppliers as a critical resource supplying both direct and indirect supplies which are inputs to the buyer company's product offerings. Lamming (1993) termed the supplier and buyer relationship as a quasi-organization that possesses its own culture, behaviour and operation style. Sollish, J. Semanik, found that the purchase manager should ideate and use an effective strategy to spot qualified suppliers as the supplier process is a vital organizational action. Lin & Chang (2008) claimed that the major factors in supplier selection are communication, repute, industry position, rapport with buyer, customer responsiveness, and conflict-resolution capabilities. Weber, Current and Benton, (1991) found quality, delivery routine and price as the most important factors influencing supplier selection.

Nourmohamadi et al. (2017), found supplier selection to contribute a major part in the financial, environmental and social aspects of sustainable development. Lokpriya et al 2019 identified that purchase manager utilize supplier evaluation to select the best possible vendor among the available suppliers. Bohner & Minner (2017) identified supplier selection as a major

activity that had a major influence on the efficiency and success of the total supply chain. Groves et al (2014) stated that companies need to work collaboratively with suppliers on continuous improvements and in developing new products in order to achieve better performance. Kefer et al. (2016) found that companies should create and apply standards that can be used to evaluate, select and monitor suppliers. Chen et al. (2016), identified that only a limited number of studies have used economic and environmental criteria simultaneously in selection of suppliers. Imran & Tuqureer (2019) found the preference of vendors to collaborate with organizations that provide significant importance to environment as such activities ensure good reputation for the sourcing company and in turn enjoy loyalty and customer retention. Vahidi (2018) found that it would be easier for manufacturers to observe sustainability strategies when suppliers tend to maintain sustainability requirements. Luthra (2017) enumerated the role played by suppliers in executing sustainable supply chainactivities that result in financial, social, and conservational gains

Research Methodology

The main research instrument was an interviewer administered survey. The research tool was established using the conceptual base of the components of supplier selection and evaluation and the circumstantial basis of the focus group upshots. The conceptual base of the factors of supplier evaluation was derived from the twenty three factors discussed in the formative article on supplier selection norms by Dickson (1966), the fifteen factors deliberated by Ellram (1990), Weber (1991) selection criteria that included ten items, the fifteen components as discussed by Çebi & Bayraktar, (2003) The subsequent questionnaire encompassed36 Likert scales. Exploratory factor analysis through varimax rotation was carried on the total 36 questions. Six dimensions of supplier evaluation was identified as suitable for the study. These supplier evaluation components were measured on a five point scale measured as I, 2, 3, 4 &5 and coded as no importance, mild importance, moderate importance, high importance and very high importance respectively. A total of 100 personnel working in the purchasing and production section of the different auto companies in and around Chennai were taken for the study.

Table 1 – Components of Supplier Evaluation

	Components of supplier Evaluation	**Dimension**	**Loading**
SE20	Pricing	Supplier Competitiveness	0.976
SE09	Ability to cut cost		0.976
SE30	Financial stability		0.949
SE03	Turnaround time in case of maintenance		0.948
SE32	Ease of use		0.939
SE21	Continuous improvement efforts in the product		0.923
SE31	Warranty		0.900
SE11	Quality	Product orientation	0.980
SE23	Timeliness		0.980
SE35	Current manufacturing capability		0.967
SE36	Supplier design capabilities		0.964
SE17	Time taken to develop a new product		0.938
SE15	Flexibility to increase production		0.911

	Components of supplier Evaluation	**Dimension**	**Loading**
SE19	Technical capability	Manpower competency	.977
SE02	Work force capabilities		.971
SE01	Conducive environment for work force		.968
SE29	Maintaining confidentiality to privilege design information f buyer		.946
SE28	Training provided to workforce at every stage of career		.944
SE13	Trouble shooting capability in the case of future complaints		.938
SE06	Credibility	Supplier inherent strength	.975
SE24	Brand name		.968
SE22	Track record		.960
SE33	Attitude		.948
SE18	Location advantages		.947
SE34	Present customer base of supplier		.946
SE25	Management Vision	Management involvement	.908
SE07	Ability to understand the needs of the buyer		.893
SE14	Customer connect with end users		.840
SE27	Ability to work with buyer in product development		.810
SE26	Empathetic approach to buyer needs		.808
SE08	Proper communication between management and work force		.794
SE05	Allowing buyer personnel to inspect the supplier manufacturing process		.687
SE16	Environmental compliance	sustainability practices	.968
SE12	Supplier safety record		.966
SE10	Supplier sourcing details		.926
SE04	Quality control certifications / procedure		.921

Summary Statistics

Summary Statistics	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**
Eigen Values	6.825	6.232	6.071	4.832	4.591	3.094
% of variance explained	18.959	17.312	16.865	13.421	12.752	8.596
Cum % of variance explained	18.959	36.271	53.135	66.557	79.309	87.905

The first factor identified as supplier competitiveness corresponds to the strength of suppliers and their ability to weather the competition. This factor accounts for 18.96 percent of variance. This dimension includes components such as pricing, ability to cut costs, financial stability, turn around time, ease of use, effort towards continuous improvement and

warranty. Tracey & Tan (2001) found that the choice and evaluation of suppliers, on the basis of quality, dependability and product performance were found positively correlated to the dimensions of organizational performance and customer satisfaction. Ellram,(1990) stated that both buyers and vendors are careful in their decision making process about the economic position of probable partners. Manufacturers definitely prefer to deal with suppliers who are competitive and provide the best value to the manufacturer and in turn to the final consumer. This dimension accounts for 18.96 percent of variance.

The second factor classified was product orientation and explained for 17.31 percent of variance and included statements such as quality, timeliness, present manufacturing capability, design capability, Time taken to develop a new product and the flexibility to ramp up production. Evans (1980) postulated that the major norms for supplier evaluation are price, quality and delivery. Weber, Current and Benton, (1991) found quality, delivery routine and price as the most important factors influencing supplier selection. The manufacturer can move towards new products only if the suppliers are flexible to tweak their offering to suit the new products.Lambert and Pohlen (2001) found that conventionally companies used logistics based measures such fill rate, lead time or on-time performance to appraise the suppliers. Juthathip & Kwang (2019) found that the object of a purchasing department is to decrease costs while the manufacturing department is focused on delivering a quality product which necessitated sustainable supplier management that included a collaboration between the two entities on selection and evaluation of suppliers

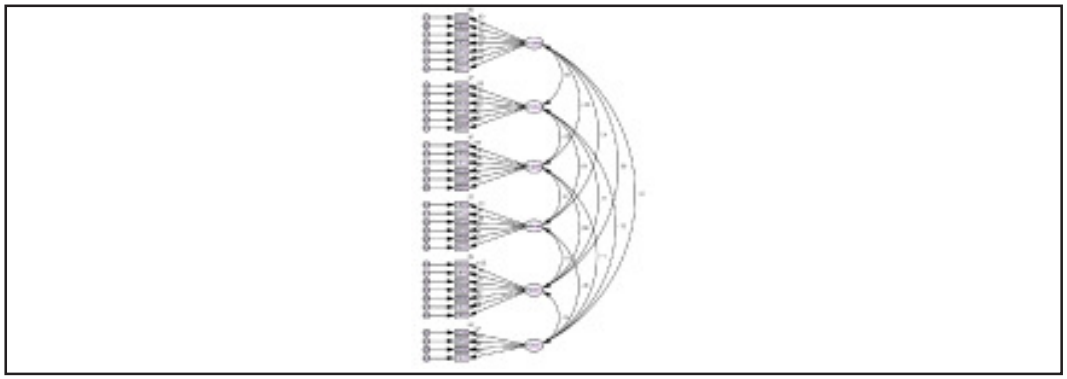
The next factor that emerged was manpower competency that explained for 16.87 percent of variance and encompassed factors such as technical capability, workforce capabilities, Labour relations record, Training provided to workforce at every stage of career, maintaining confidentiality to privilege design information of buyers and trouble shooting capability in case of future complaints. Droge, Jayaram, & Vickery (2004) stated that communication between sourcing company staff and technical staff of the supplier concern becomes really vital from the moment sophisticated products are developed. Jayaraman, Srivastava and Benton (1999) identified that the introduction of a new supplier may cause additional fixed costs as a company as it can result in investment in new machinery or novel technology and can create the need for training staff personnel. Hence it is apparent that work force capabilities are a major contributor to supplier relationships.

The fourth factor categorized as Supplier inherent strength brings out the strengths of the supplier such as brand name, track record, attitude, location advantages and the present customer base of supplier. Minand Galle (1993)found that a large number of firms have started local sourcing rather than developing supply base around the world post the globalization process. Hence it becomes easier if the customer is located as close to the buyer organization as possible. This dimension accounted for 13.42 percent of variance

The next factor recognized was labelled management involvement and included factors such as management vision, ability to understand the needs of the buyer, customer connect with end users, ability to work with buyers in product development, empathetic approach to buyer needs, proper communication between management and workforce and allowing buyer personnel to inspect the supplier manufacturing process. Zubar, Abdul & Parthiban (2014) predicted that the collaboration enabled the vendor and the manufacturer to work together while scheming the mechanisms of the final production. Jafarnejad and Salimi, (2013) stated that the selection of suppliers determines the success of the whole supply chain. Ordoobadi (2009)found that the degree of importance given to supplier selection is as indispensable as the suppliers output based on the above said criteria. The above dimension constituted 12.75 percent of variance

The last dimension to classify was sustainability factors that included environmental compliance, supplier safety records, Quality control procedures and supplier sourcing procedures. Gone are the days when manufacturers looked for suppliers on the basis of low quotation and today manufacturers are equally concerned if the supplier have a good environmental track record. Humphreys et al. (2003) developed an outline for including environmental criteria into the vendor selection procedure and recognized quantitative environmental measures such as sustainability friendly products and qualitative environmental measures such as green management capabilities and green image. Xiongyong & Zhiduan (2018) found that the increasing awareness of present-day consumers on whetherthey purchase products that are manufactured through sustainable process results in manufacturers obligation to transparency and sustainability not only in their process but their reputation tends to depend on green initiatives to be observed by upstream supplier companies.

FIG 1 Confirmatory Factor Analysis with the six dimensions of supplier evaluation



The CFA model considered the 36 components and was carried out for the six dimensions. The CMIN/DF ration was 2.766. Carmines and McIver (1981) divulged that a ÷2/df ratio in the range of 2:1 or 3:1 referred to an acceptable fit between the hypothetical model and the sample data. The CFI value obtained was 0.918 while Hu & Bentler (1999) stated that an suitable model fit is detailed by a CFI value of 0.90 or above. The NFI value found was 0.924 and a model is considered as suitable if Normed fit index exceeds 0.90 (Byrne, 1994)

Table 2 - CFA model fit indexes

CFI	NFI	IFI	TLI	RMSEA	÷ 2 / d.f	P value
0.918	0.924	0..846	.831	0.134	2.766	0.000

The reliability of the six dimensions were considered adequate as they are above 0.70. Lancaster (2015) indicated that KMO value above 0.5 indicated that thedata processed in the subsequent stage of analysis is valid and the KMO value is 0.791

Table 3 - Reliability analysis

Dimensions	Cronbach's Alpha
Supplier Competitiveness	0.981
Product orientation	0.948
Manpower competency	0.932
Supplier inherent strength	0.983
Management involvement	0.920
Sustainability practices	0.969

Conclusion

A god supplier selection is the first step towards quality and profitability. The competency of the supplier can add to the competitive advantage of the manufacturer. Supplier selection represents the first stage in the development of the product and enables the manufacturer to concentrate on their focused while outsourcing the other parts. Supplier evaluation is a highly critical area as poor supplier selection can lead to parts replacement and in the worst scenario can create dangerous situations. A proper evaluation serves as an indicator to the supplier as to what its strong points are and where there is room for a change. A good supplier selection enables long term relationship with suppliers and ensure launch of product improvements. Moreover, right suppliers can enable quality products which are of high demand in the market and ensure high degrees of customer satisfaction. The above paper will be of significant use to personnel in need of supplier evaluation. In future the same study can be extended o other geographical areas, to other sectors and can pay a larger focus on factors such as social accountability of supplier companies.

Annexure 1 – Supplier Evaluation factors in auto industries

Components of supplier Evaluation	Mean	SD	Dimension	Mean	SD
Pricing	2.59	1.471	Supplier Competitiveness	2.61	1.40
Ability to cut cost	2.59	1.471			
Financial stability	2.60	1.491			
Turnaround time in case of maintenance	2.62	1.509			
Ease of use	2.63	1.502			
Continuous improvement efforts in the product	2.61	1.456			
Warranty	2.60	1.435			
Quality	2.92	1.509	Product orientation	2.93	1.45
Timeliness	2.94	1.516			
Current manufacturing capability	2.95	1.493			
Supplier design capabilities	2.94	1.516			
Time taken to develop a new product	2.93	1.519			
Flexibility to increase production	2.92	1.509			
Technical capability	3.62	1.362	Manpower competency	3.56	1.37
Work force capabilities	3.59	1.386			
Conducive environment for work force	3.52	1.501			
Maintaining confidentiality to privilege design information f buyer	3.59	1.386			
Training provided to workforce at every stage of career	3.49	1.494			
Trouble shooting capability in the case of future complaints	3.52	1.396			

Components of supplier Evaluation	Mean	SD	Dimension	Mean	SD
Credibility	2.85	1.486	Supplier inherent strength	2.88	1.40
Brand name	2.91	1.450			
Track record	2.87	1.488			
Attitude	2.92	1.426			
Location advantages	2.84	1.405			
Present customer base of supplier	2.89	1.483			
Management Vision	3.80	1.356	Management involvement	3.75	1.12
Ability to understand the needs of the buyer	3.76	1.342			
Customer connect with end users	3.75	1.359			
Ability to work with buyer in product development	3.79	1.365			
Empathetic approach to buyer needs	3.61	1.238			
Proper communication between management and work force	3.74	1.375			
Allowing buyer personnel to inspect the supplier manufacturing process	3.81	1.502			
Environmental compliance	3.14	1.544	Sustainability Practices	3.12	1.46
Supplier safety record	3.11	1.517			
Supplier sourcing details	2.59	1.471			
Quality control certifications / procedure	3.11	1.517			

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