

BUYING BEHAVIOR OF INDUSTRIAL LUBRICANT BY INDIAN PRIVATE INDUSTRIES: AN EMPIRICAL STUDY

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Abstract: Industrial lubricant is the one of the important material which is needed for smoother movement of various machines in most of all industries. For an organization, supplier selection of industrial lubricant is part of purchase decision making exercise. Therefore, this decision making straightway influences the financial and operational positions of that industry. Supplier selection of industrial lubricant is a complex multi-criteria decision problem. While some of the parameters may be similar across different products, it is true that the some criteria are likely to be exclusive for industrial lubricant. This research aims to understand what constitutes the suitable supplier selection criteria for industrial lubricants for Indian private industries based on Odisha & Jharkhand states. This empirical study exposes few interesting findings- how a purchaser perceives the value of each criterion and strongly suggests that product quality, performance history & reliability, delivery, recommendation by original equipment manufacturer (OEM) and price are key determination in the supplier evaluation process in private industry. Fifteen criteria considered for this study were mapped onto their respective cluster namely: techno-commercial values, buyer-supplier relationship and intangible factors. The conclusions of this empirical study should help various clusters of stakeholder (e.g. suppliers, buyers and end-users) to acquire a healthier understanding of social behavior in making decisions of purchase, particularly with regard to industrial lubricants for any private industry.

Keywords: Industrial lubricant, procurement; evaluating purchasing performance; supplier selection; case study; statistical analysis

1. INTRODUCTION

Since sixties, the various supplier selection criteria have been discussing in various research literature. Quality and delivery were identified as the significant criterion during supplier selection. Subsequently, several studies were conducted in order to determine which all criteria the most important for the process. Only management of

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core activity does not give success to any organisation; supply chain also plays a major role for the organisational achievement. Responsibility of purchase is for coordinating and organising the supply (Monczka, Patterson & Waters, Handfield, Guinipero 2010). Therefore, purchasing plays a very important role within every organisation by linking them and at the same time makes available the flow of materials in the course of supply chains. This function focuses on finding the correct product, at a right price, with accurate quantities, and at the right time. As per Langley, Coyle, Novack, Gibson and Bardi (2008), managers of leading companies consider purchase as an important constituent in supply chain management and supplier-vendor relationships are a basic part of this process. To minimise complaints and reduce additional costs generated by low quality of materials; purchased materials from vendors become one of the most strategic parts of the final quality of the product (Gonzalez, Quesada & Monge, 2004). Any organisation is able to gain a significant competitive advantage with the help of well performed purchase. As per Ting & Cho (2008), supplier selection plays a crucial role in any company; it represents a significant production of the unity prices and also improves organisational price competitiveness. As per Langley et al. (2008) - quality is the most vital factor in supplier selection; the second is reliability and third is performance history criterion for the majority of buyers. Monczka et al., 2010 considered purchasers must list all potential suppliers, evaluate them, then reduce the list to a realistic shortlist and finally identify the best supplier for a particular order. During selection of the most suitable vendor for any industry, it is necessary to have a balance between tangible and intangible factors, some of which may clash also (Gonzalez et al., 2004). Choosing which suppliers to engage in the supplier chain has being taken more and more into consideration as a strategic key (Choi & Hartley, 1996). As per Johnson & Leenders, 2006- various factors should have a high degree of equilibrium among each other, such as technology, task specialisation, size, extent of control and administrative responsibility, levels of hierarchy and integration.

In this current climate of global economic uncertainty, evaluation of suppliers with due diligence in any industry is becoming crucial for business-related success. With the introduction of corporate governance, there is a greater importance placed on organization's accountability. Implementations of transparent, internal "key measures" enable industries to protect its long-term success. Long-term focused supply chain is a process called strategic sourcing (Cavinato et al., 2006). These proceed necessitates for a more 'systematic' and 'transparent' approach to the decision making of supplier selection (De Boer et al., 2001). The decision-making's objective is influenced by the selection criteria (Tan et al., 2012). Supplier selection decision based on only the price parameter is no longer significant in current supply chain management practices (Cebi and Bayraktar, 2003). The supplier selection literature has acknowledged price, delivery, support services, and product quality are primary criteria to assess supplier performance (Sen et al., 2008). Identification of suitable supplier selection criteria is an important step towards facilitating a transparent supplier selection process in an industry. As part of on-going study to capture the purchaser's perceptions of suitable

supplier selection criteria for developing a decision making predictive model, the results of a questionnaire survey is presented. The findings of this study show that product quality is primarily emphasized by the purchaser as a key criterion. Initially this paper presents a review of selection criteria. Thereafter an assessment of the methodological situation of the study is undertaken. Ultimately, conclusions are drawn based on the findings of the empirical research.

2. HYPOTHESIS DEVELOPMENT

This study seeks to develop a ranking of the preferred selection criteria by purchasers who are responsible for decision-making concerning suppliers in the procurement of industrial lubricant. Now the effort is to aggregating individual rankings to obtain a group ranking which will be a representative of the coherent results. All fifteen relevant criteria will be represented by three clusters: techno-commercial values, buyer-supplier relationship and intangible factors as shown in Figure 1. These three factors might act independently or inter-dependently in comprehending the actual decision-making process. However, this will be beyond the scope of this study. Below, the hypotheses are presented.

2.1. Techno-Commercial Value

In spite of product type, buyers expect their investment must benefit them for a long time. Therefore, product quality has achieved a competitive importance (Garvin, 1984). Product quality of the supplier certainly influences the buyer’s perception regarding the supplier’s organizational performance. Different organizations have different perceived importance on price as a preferred criterion during supplier selection (Kelly and Coaker, 1976). Key supplier selection criterion for buyers is on-time delivery with correct quantity of products supplied is considered to be a foundation of effective

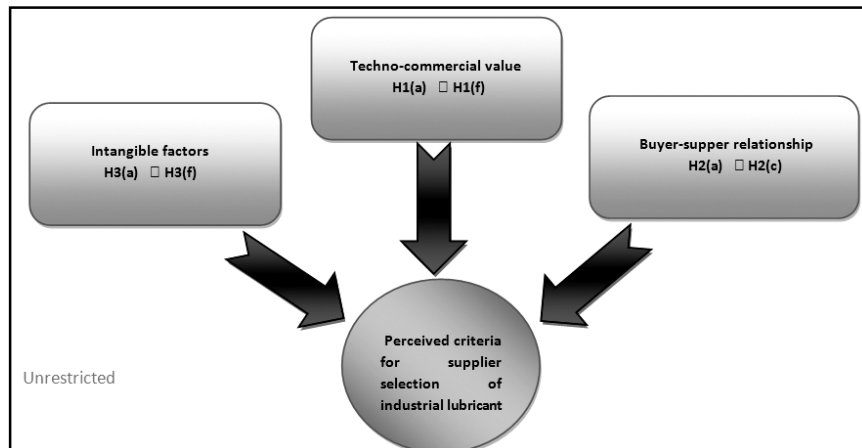


Figure 1: Hypothetical model of supplier selection criteria.

supply chain management. Unpredictable suppliers in terms of uncertainty in delivery lead time may origin or deepen supply risks (Ernst et al., 2007). On the other hand, prompt delivery by suppliers has great bearing to retain the buyer's customer base (Bharadwaj, 2004). Financial performance of the supplier can also influence buying organization's capability to meet customer requirements (Cheraghi et al., 2004). A financially strong supplier not only demonstrate cost reduction at their part, but may influence their buyer's market competitiveness in term of cost, lead time, and quality (Chung and Kim, 2003). Thus, it is expected that:

- H1(a) : Product *quality* remains to be perceived as important by purchaser
- H1(b) : Product *delivery* considered to be important by purchaser
- H1(c) : *Price* perceived to be as important by purchaser
- H1(d) : *Warranty policy* remains to be perceived as important by purchaser
- H1(e) : *Financial position of the supplier* considered to be important by purchaser
- H1(f) : *Payment terms* of supplier considered to be important by purchaser

2.2. Buyer-Supplier Relationship

The assessment derived from support services will certainly influences buyer's decision to retain existing suppliers or switching to new ones (Liu, 2006). Although earlier experience with suppliers should not be considered as a hurdle for engaging new vendor, it acts as a useful criterion which could eliminate the underperformers (Spekman, 1988). Past performance history will reduce decision-making time. Buyer's awareness of the supplier's performance history may influence the conclusion on buyer-supplier relationships (Kotabe et al., 2003). Through a buying agreement, suppliers are usually compelled to provide training for the employees on the buyer's side. Buying organization could get benefit from customer training provided by the suppliers. Employee training and development is a prerequisite for suppliers to reduce operational problems (Hartley and Jones, 1997). Continuous interaction with the customer improves interpersonal relationship which gives benefit over competitor's during purchase decision making. Thus, it is hypothesized that:

- H2(a) : *Performance history & reliability* is perceived to be important by purchaser
- H2(b) : *Training & development for buyer's* is considered to be important by purchaser
- H2(c) : *Customer focus & salesmanship* is perceived to be important by purchaser

2.3. Intangible Factors

OEM recommendation plays a major role during selection of industrial lubricant. Apprehension for warranty void- is the main factor for considering the OEM's recommendation. However, recommendation by the user also considered to be the important criterion for purchase decision making. IT competency improves the

effectiveness of buyer-supplier relationships (Baglieri et al., 2007). It increases the transparency of supply and demand information within the supply chain (Christiaanse and Kumar, 2000). As a result, the supply chain lead time can be reduced (Bertolini et al., 2007). Today's dynamic nature of supply chain is equally worried about supplier's safety awareness and environmental attributes (Huang and Keskar, 2007) which has the potential of reducing the buyer's environmental and occupational safety expenses (Ninlawan et al., 2010). Thus, the combination of turnover, safety awareness, and environmental attributes leads to sustainable business practice (Gahan and Mohanty, 2011). With the increasing state of societal hope, many organizations embrace the concept of corporate social responsibility (CSR) to guarantee socially responsible business practices throughout the supply chain (Pedersen and Andersen, 2006). Thus, buyers alarmed with CSR in the supply chain might have high preference for socially responsible suppliers (Lee and Kim, 2009). People are brand conscious. Brand loyalty may influence decision making. Some purchaser has mindset about product's manufacturing location. So, country of origin is also considered as an emerging decision making criterion. Thus, it is predicted that:

- H3(a) : *Recommendation by OEM* is perceived to be important by purchaser.
- H2(b) : *Recommendation by user* is perceived to be important by purchaser.
- H2(c) : *Brand image* is perceived to be important by purchaser.
- H2(d) : *Environment consciousness & CSR activity* is considered to be important by purchaser.
- H2(e) : *Country of origin* is perceived to be important by purchaser.
- H2(f) : *IT competency of the supplier* is perceived to be important by purchaser.

3. RESEARCH METHODS

3.1. Sample & Data Collection

The target population for this study consisted of private industry (mostly limited company) in the state of Odisha and Jharkhand of India. 56 industries from Odisha & 23 industries from Jharkhand were selected. Industries were from metal, mine, power, tyre, paper, chemical and automobile. Questionnaire sent to the purchase department of all 79 industries in Odisha & Jharkhand state of India. The respondents were drawn from purchase department of various industries those were experienced in purchasing of industrial lubricants - but for confidentiality purposes, names & designations will not be mentioned. Data for this research study was collected during March'15 to September'2015. Collected data by telephonic interviewing or many cases physically present and interviewed. To complete the questionnaire no benefits were provided to respondents. Finally 54 industries replied, representing a response rate of 68.35%. All 54 questionnaires were analyzed.

3.1. Measures

The measures of supplier selection are adapted from Roth et al. (2008) and 15 criteria used to select suppliers were identified. Against each criterion, respondents were requested to specify the degree of importance based on a five-point *Likert rating scale* ('1' representing 'not important' and '5' representing 'extreme important'). In this research analysis the overall *Cronbach's alpha* (α) value for the 15 individual criteria is 0.91, it indicates that there is acceptable internal consistency in terms of the correlations amongst the 15 criteria. Therefore, the implemented measurement scale is reliable (Forza, 2009).

3.2. Data Analysis

For the sample size of this study demands *one sample t-test*. The *t-test* will be carried out to examine whether the population considered a specific criterion to be important or otherwise (Antonius, 2003; Elliott and Woodward, 2007). In the Table 2, the mean ranking for each criterion including the associated standard deviation and standard error is reported. For each criterion, the *null hypothesis* was that the criterion was unimportant ($H_0: \mu = \mu_0$) and the *alternative hypothesis* was that the attribute was important ($H_a: \mu > \mu_0$), where μ_0 is the population mean and was considered at 3.0; as it is a midpoint of five point *Likert rating scale*. Based on sample size the authors set out the risk level at 5 % in making inferences for this study (Antonius, 2003; Sharpe et al., 2010). Therefore, a criterion was deemed important if the mean was 3.0 or more which is based on the five-point *Likert rating scale*. During analysis if, two or more criteria found to be with the same mean; the one with the lowest standard deviation should be given the highest ranking of weight (Sharpe et al., 2010).

4. RESULTS AND DISCUSSION

The mean value of each perceived criterion for every respondent was calculated. According to the mean score values all were ranked in descending order as shown in Table 2. *Hypothesis* for all 15 criteria tested. Only one *null hypothesis* accepted. This result indicates the 14 *null hypotheses* that respondents' sets of rankings are not related to each other. Hence, it has to be rejected. This test ensures that the data and followed by opinions collected from the questionnaire are legitimate and reliable enough for further analysis.

All respondents rated mean values for all criteria from 3.093 to 4.852. Here fourteen mean values are above 3.0 with exceptional to IT competency of the supplier, it provides strong empirical support for the strong competitive significance of these fourteen criteria in the private industries in the Odisha & Jharkhand state of India. Therefore, fourteen *alternative hypotheses* were supported and one was rejected. All respondents believed and ranked product quality (Mean = 4.852; SD = 0.359), performance history & reliability (Mean = 4.370; SD = 0.808), delivery (Mean = 4.315; SD = 0.668), recommendation by OEM (Mean = 4.241; SD = 0.799) and price (Mean = 4.222; SD = 0.691) to be the top five

Table 2
Perceived supplier selection criteria.

	Ranking	Mean	Std. Deviation	Std. Error Mean	Remarks
Quality	1	4.852	0.359	0.049	Rejected H_0
Performance history and reliability	2	4.370	0.808	0.110	Rejected H_0
Delivery	3	4.315	0.668	0.091	Rejected H_0
Recommendation by OEM	4	4.241	0.799	0.109	Rejected H_0
Price	5	4.222	0.691	0.094	Rejected H_0
Recommendation by user	6	4.130	0.584	0.080	Rejected H_0
Brand image	7	4.074	0.821	0.112	Rejected H_0
Warranty policy	8	4.074	0.887	0.121	Rejected H_0
Financial position of the supplier	9	3.852	0.787	0.107	Rejected H_0
Environmental consciousness and CSR activity	10	3.852	0.998	0.136	Rejected H_0
Payment terms	11	3.833	0.841	0.114	Rejected H_0
Training & development for buyer's	12	3.685	0.773	0.105	Rejected H_0
Customer focus & salesmanship	13	3.667	0.869	0.118	Rejected H_0
Country of origin	14	3.278	1.036	0.141	Rejected H_0
IT competency of the supplier	15	3.093	1.069	0.145	Accepted H_0

criteria. These surveys results further reinforce the research findings reported by Dempsey (1978)- common three variables were found to be the primary determinants of supplier selection within the first five ranked criteria. Here quality is found to be the most important criterion for purchase decision making which supports the earlier research of Wilson, 1994. It is exciting to note that product quality is still perceived to be the most important criterion followed by price and delivery in decision making processes. Price was not consistently important for selecting vendor (Dickson W. Gary, 1966). Inferior product quality results in delays in operation which in turn reduces the profit margin and worse still results in having intangible costs of customer dissatisfaction (Sollish and Semanik, 2011). Woodside and Vyas (Narasimhan et al., 2001) advocates that it is most likely for buyers to accept bids within 4 to 6 % higher than the lowest acceptable bid for superior product performance. The financial performance (Mean = 3.852; SD = 0.787) was ranked 9th, which indicates purchaser do not pay much attention to the supplier's financial health. The crux of the matter is that having a strong financial position not only indicates the supplier's stability but guarantee the uninterrupted availability of excellent products and services (Kahraman et al., 2003). Adequate operating personnel's training needed in order to perform the necessary installation, service or maintenance procedures (Bogas et al., 2003), thus, reflects the importance of training & development for buyer's (Mean = 3.685; SD = 0.773) as being ranked 12th. Table 2 also indicates that some of the recently acknowledged new generation upcoming criteria are now also considered to be important by the purchaser: brand image (Mean = 4.074; SD = 0.821) ranked 7th, environmental consciousness and CSR activity (Mean = 3.852; SD = 0.998) ranked 10th, country of origin (Mean = 3.278; SD = 1.036) ranked 14th. Another point worth noting is that Environmental consciousness and CSR activity (Mean = 3.852; SD =

0.998) was not given a high priority, with a ranking of 10th. Similarly, the mindset about country of origin is not much important for most of all purchase decision makers. This was opposed to the findings in the literature (Björklund, 2010; Piercy and Lane, 2009). Generally these findings suggest that purchasers to focus more on criteria that contribute to the long-term success of their company. Thus, these criteria should define a new framework for the supplier selection decision-making process.

5. CONCLUSIONS

Present global economic crisis has paralyzed every business houses and which forces organization to curtail their 'Operational Expenditures (OpEx)' therefore, every industry is aiming to trim their purchasing related costs. This research was aimed to understand the perception of purchase managers of various industries while purchasing industrial lubricant. These perceptions concern critical supplier selection criteria that contribute to the supplier selection literature by finding suitable measure for supplier selection specifically for various private industries. A careful analysis of critical supplier selection criteria may help industries to improve their performance from the organizational perspective. Quality, delivery and price are three traditional criteria are still within top five of the ranking list. Few recently acknowledged new generation upcoming criteria viz. brand image and country of origin are now also perceived to be important by purchaser. Even though this is an era of information technology; but surprisingly the IT competency is not considered as a priority for purchase managers of different industries. Similarly, concept of environmental consciousness and CSR activity is not considered prime supply selection criteria. It is hoped that the framework provided in this paper will assist industry in re-examining their procurement guidelines in order to understand the critical criteria, to maximize the probability of a successful supplier selection outcome, to plan for the future and to gain a competitive edge. Extending this research to include private industries located outside India would enable testing the generalize ability of the results on a global basis. The findings from this study could serve as a guide to develop a standard supplier selection decision support model for any private industry.

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