

A Study on the Employees' Opinion on the Effectiveness of Input Procurement System

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Abstract:

The input procurement system is a core function of supply chain management of an organisation, which involves the planning and execution of supply chains to meet the requirements of an organisation. It mainly includes regulating and controlling the flow of material and simultaneously assessing variables like demand, price, availability, quality and delivery schedules. Hence, this emphasizes the proper planning necessarily adopted for adequate materials management and control, the small saving in materials input cost can reduce the manufacturing cost and thus add to the profits. Therefore, the present study analyses the employees' opinions towards the dimensions of the effectiveness of the input procurement system and also examines the demographic profile of the respondents. The study stated that the identified six dimensions of the input procurement system have a positive opinion by the respondents. The results indicate that the determinants quality, time and human resource are significantly associated while quantity, cost and accessibility are not significantly associated with the input procurement system.

Keywords: Quality, Quantity, Time, Cost, Accessibility, Human Resource

Introduction

Steel plays a major role in any country's economy, as the steel industry is both a basic as well as a core industry. India has the necessary resources for a rich and vibrant steel industry. The growth of GDP and the steel industry are intimately connected and the growth of the steel industry and infrastructure are interdependent. Steel is a versatile commodity and is used either directly or indirectly in most of the items one comes across in regular life. Its versatility is due to three reasons i.e., it is the only metallic item whose mass production is convenient and economical, it has very good strength, ductility and malleability, and its properties can be changed over a wide range by heat treatment and making alloys.

The world's important engineering and construction material is steel. It is interesting to note that the world's total crude steel production grew at a much slower rate during the first half of the century and the growth rate picked up at a significant rate after the second world war. During the seventies, the world witnessed one of the most severe economic crises on account of petroleum oil. This had a pronounced impact on the overall economy of the world and particularly on the steel industry. The world steel industry has shown positive improvement during the last few years. The international market, as a result, has become highly competitive and volatile.

In a process industry like Visakhapatnam Steel Plant, Rastriya Ispat Nigam Limited., where the production process goes on a round-the-clock basis, continuous & regular supply of raw material, spare parts and consumables is ensured. For this set of approaches to generate efficiently, the input procurement process has to be efficient to achieve the organisation's targets. Much of the research has been done on the policies and procedure of the procurement process at Vishakhapatnam steel plant-Import and domestic, which are based on established guidelines and amended from time to time and identifying the areas in the procurement process where improvements can be made for increasing the productivity of the materials team thereby resulting improvement in production. The procurement function includes purchasing materials and services, strategic sourcing, vendor development, vendor management, logistics management, inventory management at stores, disposal of

unserviceable items etc. This department ensures a seamless supply chain till the delivery of services to the customers.

Review of Literature

Daniel (2019) studied the effects of materials management on the productivity of an organisation in Nigeria. This study specifically aims to find out how an organisation can tackle the problems identified and how effective material management can increase the profitability of an organisation. The material management activity used by the organisation involves continuous procurement for uninterrupted production processes and manages storage facilities, amongst other things and thus adds to the profitability of the organisation. It was mentioned that there is a significant relationship between materials management problems and the frequent breakdown of the plant, whereby quick decision-making is carried out at the time of breakdown. Out-of-stock of any materials and lack of spare parts interrupts production and hinder profitability. Organisations should computerise their material management system in line with global changes in order to be able to track the movement of materials in the store. It was suggested that a good record system of materials and training of staff to obtain new skills and knowledge are required for the profit of the organisation.

Atul Gupta et. al. (2015) studied the supply chain management framework in the public procurement environment and the evolution of supplier relationship management and its impact on key performance indicators. The study also provides an integrative framework for the management of public procurement through a case study of the Indian railway. The findings of inefficiencies are reflected in high cycle time, high costs associated with the supplier selection process, poor accountability, bluring of responsibility and poor value creation for all the partners. The current procurement mechanisms are not crafted around the development of long-term strategic partnerships. Nripendra and Ganguly (2020) studied the impact of professionalism (PR) of the workplace learning support team on learning outcomes in an e-procurement system implementation. Management provides initial formal training (TR) to potential users of the system and also arranges informal learning support by deploying the support team for technical guidance/resolving issues on a day-to-day basis for successful implementation. Learning outcome has been measured in terms of perceived ease of use (PEU) by employees and also in terms of the actual use (AU) of the system. The role of timely and appropriate initial TR on learning outcomes was studied. The final required outcome in terms of the AU of the system mentions the impact of PR of the workplace learning support team and appropriate initial TR in enhancing the learning outcome in the context of e-procurement implementation.

Ambekar et. al. (2020) studied supplier relationships and information and communication technology through purchasing practices on firm performance. The use of information technology in materials management affects supplier relationships and purchasing practices both. Though the firms are running after improving technology, it can only affect firm performance through proper purchasing practices. The study provides empirical evidence for the practical notions that exist in purchasing practitioners.

Rohit et. al. (2018) studied the vendor supplier rating system for an Indian start-up and prioritized the criteria based on the industry inputs to develop a vendor rating model. The data were collected from an Indian start-up working in product development using three-dimensional printing (3DP). Methodologies adopted by factors of importance for vendor rating were identified through industry visits and interactions with the industry experts from the start-up under consideration, substantiated by an extensive review of relevant literature. A questionnaire-based survey was carried out further to narrow down the factors important to the industry, prioritizing them with a pairwise comparison analysis; as envisaged in the analytical hierarchy process (AHP) technique along with the calculation of consistency ratios. The technique for order preference by similarity to ideal solution (TOPSIS) methodology was further used for data aggregation. This research brought forward the criteria that are useful for rating vendors or suppliers with reference to the 3DP sector.

Research Objectives and Hypotheses

The specific objective of the study is to identify and analyse the dimensions of the effectiveness of the input procurement system. Also, analyse the general information of the employees. Based on the literature the following hypotheses are developed:

There is a significant association between age, gender, designation, total experience and education qualification and the determinants of input procurement system *viz.*, Quality(H1), Quantity (H2), Time (H3), Cost (H4), Accessibility (H5) and Human resource (H6).

Research Methodology

The study collected primary data from the executives of Visakhapatnam steel plant using a selfadministered questionnaire. However, the study also conducted focused group discussions and interviews with target respondents to get more qualitative insights. The self-administered questionnaire is designed carefully based on the attributes identified. The validity and reliability of the survey instrument are tested carefully. The pilot study is conducted before collecting the full-scale data from the target respondents. The secondary data is collected from the records of VSP and annual reports of companies, the Ministry of Steel, reports of trade associations, websites, etc.

The study collected data from primary sources through a representative sample. A total number of 103 executives are working in the materials division of VSP. A sample of 50 per cent of the executives will be selected randomly which comes to 61. The executives will be contacted personally to obtain the information. A simple random sampling technique will be used to select the sample unit. The responses are validated with the use of statistical techniques. The sample is determined based on Krejcie and Morgan, (1970) formula. To analyze and interpret the perceptions of the sample respondents, the data were inserted into the database. The tabulations and the results for analysis were done using SPSS (Statistical Package for Social Sciences) version 22 and Microsoft Excel 2016 for statistical measurements such as percentages, mean values, factor analysis, regression analysis etc., for category-wise analysis was administered. ANOVA test is conducted for more than two categories of variables. For simple percentages and percentage scores, the researcher has drawn diagrams to get clear representations.

Demographic profile of the respondents

The demographic profile of the respondents related to the age, gender, designation, total experience and educational qualification is presented in table-1. The analysis reveals that the largest groups of the respondents representing 44.26 per cent are above 50 years of age. Out of the total, 24.59 per cent of the respondents are in the range of 36 - 40 years of age. There are 16.39 per cent of the respondents in the range of 31 - 35 years of age. The respondents representing 3.28 per cent are in the age group of 46 - 50 years and 1.64 per cent are in the range of 41 - 45 years age. The average age of the respondents is 44.40 years. It can be observed that the majority of the respondents representing 78.69 per cent are male whereas, 21.31 per cent of the respondents are females.

Table-1. Demographic Profile of the respondents							
Parameter	Frequency	Percent					
Age							
Below 30 years	6	9.84					
31 - 35 years	10	16.39					
36 - 40 years	15	24.59					
41 - 45 years	1	1.64					
46 - 50 years	2	3.28					
Above 5 <mark>0 ye</mark> ars	27	44.26					
Total	61	100.0					
	Gender						
Female	13	21.31					
Male	48	78.69					
Designation							
Up to Senior Manager 41 67.21							
Assistant General Manager	3	4.92					
Deputy General Manager	9	14.75					
General Manager & Above	8	13.11					
Total	61 100.0						
Total Experience							
Below 5 years	4	6.56					
6 - 10 years	11	18.03					
11 - 15 years	14	22.95					
16 - 20 years	5	8.20					
21 - 25 years	2	3.28					
Above 25 years	25 40.98						

Table-1. Demographic Profile of the respondents

Total	61	100.0		
Education Qualification				
Under Graduate	3	4.92		
Graduate	35	57.38		
Post Graduate	23	37.70		
Total	61	100.0		

The analysis states that the majority of the respondents representing 67.21 per cent are up to the senior manager level. There are 14.75 per cent of the respondents with the designation of deputy general manager, 13.11 per cent of the respondents with general manager & above designation, and only 4.92 per cent are the cadre of assistant general manager. The descriptive statistics related to the employee's total experience that the respondents representing 40.98 per cent are having above 25 years of total experience. There are 22.95 per cent of the respondents have a total experience in the range of 11 - 15 years, 18.03 per cent of the respondents have a total experience in the range of 6 - 10 years, 8.20 per cent of the respondent's total experience range between 16 - 20 years, 6.56 per cent of the respondent's total experience is below 5 years, and only 3.28 per cent of the respondent's total experience ranges between 21 - 25 years. The average total experience of the respondents is 20 years. It is found that the majority of the respondents representing 57.38 per cent are graduates. The respondents are undergraduates.

Opinion on Determinants of Input Procurement System

The descriptive statistics related to the opinions of the respondents on the effectiveness of the determinants of the input procurement system are presented in table-2. Among the six determinants, cost is the highly-rated variable with a mean value of 4.45 followed by the determinants human resource (4.42), quality (4.37), time (4.31), quantity (4.11) and accessibility (3.87).

Table-2. Determinants of input i focurement system				
Sl.No.	Parameters	Mean		
Quality		4.37		
1	Procedures/guidelines are strictly followed for the effective procurement of quality materials	4.56		
2	In the e-reverse auction, auto start bid price is more transparent and competitive	4.41		
3	Procurement system strictly adheres to the rejection of poor-quality materials supplied in deviation to the ordered specifications	4.34		
4	Contract outcomes relating to the quality of goods delivered are well managed and reported	4.18		
Quantity		4.11		
1	In case of default in supplies, contractual remedies viz. Risk purchase, short closing, punitive actions etc. are strictly enforced as per the terms of the Purchase order	4.31		
2	If slow moving items are flagged in the system, the monitoring and the consumption of such materials can be regulated	4.11		
3	The quantity tolerance provision for bulk materials viz. coal, iron ore etc., helping to the fulfilment of the quantity requirement	4.08		
4	Provisions of buyer's option for procurement of consumables helping to exercise buyer's option based on the consumption pattern	3.92		
Time		4.32		
1	Continuous monitoring of each activity in the procurement process is necessary for reduction in the lead time	4.44		
2	There is a need to adopt a well-defined strategy for dealing with shelf-life items	4.34		

Table-2. Determinants of Input Procurement System

3	Timely submission of bids by the prospective tenderer is necessary for arriving at a competitive price	
4	The lead time to be adopted for dealing with slow moving / fast moving items should depend on the consumption pattern and cost involved	4.23
Cost		4.45
1	Clubbing of requirement of same material indents in different departments by processing single tender for higher quantity will accrue quantity discount	4.57
2	Procurement of bulk raw materials of same material in two or more PSUs together result in better bargaining power Viz., coal	4.56
3	Bartering of surplus commodities with other PSUs in exchange for the required material will help reduction in the inventory carrying cost	4.38
4	Scrutinizing raw materials by considering seasonal variation of prices will help in reduction of material cost	4.31
Accessi	bility	3.87
1	There is a benefit to organisation by rotation of experienced purchase manager across the department	4.28
2	Human resource personnel implement various initiatives viz. suggestion schemes, quality circle schemes etc., to motivate the purchase managers	3.89
3	Difference of opinion between employees in the hierarchy hinder the performance of purchasing manager	3.72
4	Function based refreshing workshops are arranged by the training centre at regular intervals to the purchase managers	3.59
Human	Resource	4.42
1	There is need of exchange of ideas among the purchase officers on advanced techno-economical information	4.51
2	A user-friendly search engine for access information in the system is necessary	4.48
3	The procurement process must be necessarily be supported by acts, regulations and guidelines	4.36
4	Timely information on the recent changes in the procurement methods including strategic and operational e-procurement to the employees enhances their ability to take quality decision	4.34

The opinion of the respondents on the quality determinant reveals that the variable 'procedures/guidelines are strictly followed for the effective procurement of quality materials' secured the highest rating of 4.56 followed by the variables 'in e-reverse auction, auto start bid price is more transparent and competitive (4.41)', and 'procurement system strictly adheres to the rejection of poor-quality materials supplied in deviation to the ordered specifications (4.34)'. For quantity determinant the analysis reveal that the variables 'in case of default in supplies, contractual remedies *viz.*, risk purchase, short closing, punitive actions etc. are strictly enforced as per the terms of the purchase order' secured highest rating with 4.31 followed by the variables 'if slow moving items are flagged in the system, the monitoring and the consumption of such materials can be regulated (4.11)', and 'the quantity tolerance provision for bulk materials *viz.*, coal, iron ore etc., helping to the fulfilment of the quantity requirement (4.08)'.

With regard to the time determinant the analysis states that the variables 'continuous monitoring of each activity in the procurement process is necessary for reduction in the lead time' secured the highest rating of 4.44 followed by the variables 'there is a need to adopt a well-defined strategy for dealing with shelf-life items (4.31)', and 'timely submission of bids by the prospective tenderer is necessary for arriving at a competitive price (4.26)'. Regarding determinant cost the analysis reveal that the variables 'clubbing of requirement of same material indents in different departments by processing single tender for higher quantity will accrue quantity discount'

secured highest rating with 4.57 followed by the variables 'procurement of bulk raw materials of the same material in two or more PSUs together results in better bargaining power *viz.*, coal (4.56)' and 'bartering of surplus commodities with other PSUs in exchange for the required material will help reduction in the inventory carrying cost (4.38)'.

The respondent's perception towards the determinant accessibility reveals that the variables 'there is need of exchange of ideas among the purchase officers on advanced techno-economical information' secured the highest rating with 4.28 followed by the variables 'a user-friendly search engine for access information in the system is necessary (3.89)' and 'The procurement process must be necessarily be supported by acts, regulations and guidelines (3.72)'. In the case of human resource, the analysis reveals that the variables 'there is a benefit to an organisation by rotation of experienced purchase manager across the department' secured the highest rating with 4.51 followed by the variables 'human resource personnel implement various initiatives *viz.*, suggestion schemes, quality circle schemes etc., to motivate the purchase managers (4.48)' and 'difference of opinion between employees in the hierarchy hinder the performance of purchasing manager (4.36)'. Thus, it can be inferred that the stated six dimensions has significant positive opinion by the respondents in the input procurement system.

		Sum of		Mean		
		Squares	df	Square	F	Sig.
Quality	Between Groups	1.839	5	0.368	1.649	0.012
	Within Groups	12.263	55	0.223		
	Total	14.102	60			
Quantity	Between Groups	1.486	5	0.297	0.877	0.503
	Within Groups	18.650	55	0.339		
	Total	20.136	60			
Time	Between Groups	1.265	5	0.253	1.056	0.035
	Within Groups	13.186	55	0.240		
	Total	14.451	60			
Cost	Between Groups	0.714	5	0.143	0.807	0.549
	Within Groups	9.723	55	0.177		
	Total	10.437	60			
Accessibility	Between Groups	4.236	5	0.847	2.821	0.124
	Within Groups	16.517	55	0.300		
	Total	20.753	60			
Human	Between Groups	1.126	5	0.225	1.890	0.011
resource	Within Groups	6.556	55	0.119		
	Total	7.682	60			

Table-3. ANOVA^b

^b Predictors: (Constant), Age, Gender, Designation, Total Experience and Education Qualification

The results of the ANOVA test related to the respondent's opinion on determinants for the effectiveness of the input procurement system are shown in table-3. The results indicate that the dependent variables quality (F=1.649, p=0.012 < 0.05), time (F=1.056, p=0.0.5 < 0.05), and human resource (F=1.890, p=0.011 < 0.05) shows a significant association with the independent variables age, gender, designation, total experience, and education qualification. However, the dimensions quantity (F=0.877, p=0.503 > 0.05), cost (F=0.827, p=0.549 > 0.05) and accessibility (F=2.821, p=0.124 > 0.05) does not show a significant association with the independent variables age, gender, designation, total experience, and education qualification.

Thus, the regression analysis results provide strong support for the acceptance of the hypothesis relating to the association between independent age, gender, designation, total experience, and education qualification with the dependent variables quality (H1), time (H3), and human resource (H6), and rejection of hypothesis relating to the association between independent age, gender, designation, total experience, and education qualification qualification with the dependent variables quantity (H2), cost (H4) and accessibility (H5).

Conclusion

The study specifically identified the six dimensions to know the respondent's opinion towards the effectiveness of the input procurement system. The study found that the input procurement system dimensions quality, time and human resource have a significant association with the employees' demographics *viz.*, age, gender, designation, total experience, and education qualification. However, the dimension of quantity, cost and

accessibility does not have a significant association with the employees' demographics age, gender, designation, total experience, and education qualification. Accordingly based on the findings certain recommendations are made for increasing the effectiveness of the input procurement system in the steel sector.

Material management should strictly adhere to the defined purchase procedure w.r.t procurement cycle, i.e., processing of indents should be done on an annual requirement basis, which would give competitive prices. More focus should be necessitated by material management to develop new sources by means of new vendors to get better quality products. Inputs on procurement activity of material management outsourcing would reduce lead time. i.e., inter-departmental manpower experience would give better decision-making and would reduce lead time. HR has to rethink and examine the satisfactory levels of material management professionals. It has to motivate the professionals at regular intervals to improve job satisfaction in their working area.

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