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Factors influencing industrial procurement for supply chain professionals in Bangladesh

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Abstract: Procurement is one of the key re-investing areas for business. Where 55% of revenue is spent on procurement of raw materials (Baily, 1987). For procurement, Supplier selection is core activity, as Shen and Yu (2013) and (Jafarnejad and Salimi, 2013) considers the efficiency of suppliers and is one of the most important competencies for the success of the entire supply chain. This study learns and contributes the factors that affect Industrial Procurement decision while selecting suppliers. The purpose of this study is to observe the effect of independent variable (Cost of Product, Ease of Business Transaction, Delivery Performance, Reliability) on dependent variable (Procurement decision).The study describes that the relation between dependent variable have significant relationship with Procurement intention. This is quantitative study and sample size of this study is 204 and 12 questionnaires were used for collection of data. All of the respondents were supply chain/Procurement professionals from 140 organizations in Bangladesh. The results of the study identified the mutual relationship among the all variables. But Cost of Product and Reliability are highly considered followed by medium extent of consideration for Ease of Business and Delivery performance.

Keywords: Industrial Procurement, Quantitative study, Procurement decision, Procurement professionals, Factors affect supplier selection

Supplier selection is one of the most critical variable for Procurement as it directly influence sourcing high quality products and ultimately achieving customer satisfaction (Gonzalez et al., 2004). Also, modern supply chain selecting suppliers bears strategic importance for achieving overall business objectives (Liao and Kao, 2011). The necessity of suitable supplier selection became more important as Davis, (1993) emphasized that the failure of suppliers to replenish the promises regarding delivery is one of the three main uncertainty troubling the supply chain of a business. According to (Gencer and Gurpinar, 2007) suppliers selection represents a key activity for companies to be successful in today's tough market conditions, while according to Shen and Yu (2013) and (Jafarnejad and Salimi, 2013) considers the efficiency of suppliers and is one of the most important competencies for the success of the entire supply chain. Kagnicioglu (2006) states the supplier selection is critical procurement activity because of the

evaluate suppliers on price, quality, delivery and service in accomplishing the goals of supply chain and having direct impact overall performance of organizations (Singh et. al.,2012)

The industrial customers and/or buyers are responsible for procuring items in bulk, spending considerable amount of their revenues on purchasing (Cebi and Bayraktar, 2003). This makes Industrial Procurement important including suppliers selection. In fact, Hou and Su (2007) insist that selecting suitable suppliers is a vital issue to achieve the improvement strategy of producers. In this respect, a number of supplier selection factors such as their Price, Quality, Reliability, Distance, Distribution, technical support, flexibility, and relationships are among the important criteria of the industrial purchasers.The decision making procedure of industrial merchandise procurement is therefore more complicated compared to the consumer decision-making process. Selecting the best offers from various suppliers is a complex problem that takes into account tangible and intangible criteria (Kirytopoulos et al., 2008).

There are different kinds of industrial goods and services procured in organizations. Webster (1991), suggests construction, heavy equipment such as machine tools, turbines, supercomputers, locomotives, tugs and barges, and earth-moving equipment, light equipment materials, components and subassemblies, raw materials, process materials, maintenance, repair supplies. The industrial customers are manufacturing and processing firms, service providers and distributors who are involved in Business to Business and Business to retail Business (Webster, 1991).

LITERATURE REVIEW

Sallauddin's (1999) Donna & Ramaseshan (2007) Fernandez (1995) Reeder et al. (1991) found Price is one of the dominant factor. Out of the nine factors surveyed, five factors such as performance, long lasting, reparability, service, and warranty topped the pricing factor. A recent study by Donna and on supplier performance confirmed this finding where the influence of price on repurchase intention is insignificant.

Leender and Fearon (1991), some of the more important supplier attributes related to these prime purchasing objectives include past history, facilities and technical strengths, financial status, organization and management, reputation, systems, procedural compliance, communication, labor relations, and location. Besides, buyer-seller relationship is also an important factor (Szwejczewski et al., 2005 ; Kannan and Tan, 2006 ; Jiao et al., 2008; Lau and Goh, 2005 ; Deeter-Schmelz and Kennedy, 2004; Herbig and O'Hara, 1994). A number of studies have singled out product quality, service capabilities, payment facilities and relationship commitment as some o f the most important criteria (Donna and Ramaseshan, 2007; Hsu et al., 2007; Pressey et al., 2007).

Dickson (1966) is considered to be a pioneer in this field for studying on the supplier evaluation process and set 23 factors for evaluation and selection of suppliers. The factors are 1. Quality, 2.Delivery, 3.Performance history, 4.Warranty, 5. Production facility, 6. Price, 7. Technical capability, 8. Financial position, 9. Procedural compliance, 10. Communication system, 11. Reputation & position, 12. Desire for business, 13. Management and Organization, 14. Operating control, 15. Repair service, 16. Attitude, 17. Impression, 18. Packaging ability, 19. Labor relations, 20. Geographical, 21. Amount of past business, 22. Training Aids, 23. Reciprocal Arrangements

Ellram (1990), focused on long term cooperation between the company and suppliers to securing sources of supply for a longer period of time. He divided into four groups: financial aspects, organizational culture and strategic issues, technology issues, and other factors. The two financial factors are: Economic performance and Financial stability. Organization culture and strategy issues are Trust, Management, Strategic fit, Top management capability across levels and functions of buyer and supplier firms, Supplier organizational structure and personnel. Technology issues are Assessment of current manufacturing facility, Assessment of future manufacturing facility, Suppliers design capability, Suppliers speed in development. The two other factors according to Ellram (1990), are Safety record of supplier and Business reference Suppliers customer base

Weber et. al. (1991) compiled the criteria for supplier selection in manufacturing and retail industry. Identified Net Price, Delivery, Quality, Production facility and capabilities, Geographical location, Technical capabilities, Management and position in industry, Reputation and position in industry, financial position and Performance history as dominant factors from the 74 papers published from the year 1966 to 1991.

Cheraghi et. al. (2011) found weather as determining factor. Verma and Pullman (1998) found quality as the top priority followed by delivery and price from a survey among a large number of managers. Also reliability of delivery (Karpak et. al., 2001), innovation (Kraus et. al., 2001), relationship between customer and supplier(Birch, 2001), technology and service (Bhutta and Huq, 2002).

Çebi and Bayraktar (2003) created a model that distinguishes between qualitative and quantitative criteria similar as Birch (2001), and here are the criteria classified as: (1). Logistics, where they included Delivery, Support lots, Flexibility Reliability as determining factor. Where under (2) Technology they considered Capacity to meet demand, Improvements to formulate new products, Improvement effort to improve new products and process Problem solving capability. In (3) Business category Çebi and Bayraktar (2003) kept Reputation and position, Financial capability, Management skills and comparability and Under (4) Relationship category they kept Easy communication, Past experience and Sales representative competence

After reviewing the related literatures, we can summarize Supplier selection factors under four categories. Cost of product, Delivery, Ease of Business and Reliability. We can summarize the common factors found and researched by differed authors in following two tables.

	Chan & kumar 2007	Cebi & Bayraktar 2003	Dickson 1966	Ellram 1990	Gencer & Gurpinar, 2007	Hruska et.al, 2004	Hudymacova et al, 2013	Jamil et. al 2013	Kannan & choon, 2006
Costs of Product			√						
Price of Material	√				√	√		√	
Price of Transport	√					√	√	√	
Volume discounts								√	
Delivery									
Delivery time	√	√	√		√	√	√	√	√
Logistics capacity			√	√		√		√	√
Percentage of delivery								√	

Speed of response of requirements								√	
Ease of Business									
Flexibility	√	√					√	√	√
Clean of Business								√	
Communication system	√	√	√						
Reliability	√	√			√		√	√	
Financial stability	√	√	√	√	√	√		√	
Quality of material	√		√		√	√		√	√
Warranty period			√						
Certification of products							√	√	
Reputation	√	√	√	√					

	Kahraman et al 2003	Lee, 2009	Muralidharan et. al., 2003	Ozbek, 2015	Simpson et al., 2002,	Tam and Tummala ,2001	Ting and Cho, 2008	Uygyn, 2013	Wang et.al., 2004	Weber.al., 1991
Price										
Price of Material		√	√	√	√	√	√	√	√	√
Price of Transport	√	√					√			
Volume discounts										
Delivery										
Delivery time		√	√	√	√	√	√	√	√	√
Logistics capacity	√	√			√	√		√		√
Percentage of correct delivery							√	√	√	
Speed of response of requirements	√			√		√	√	√	√	
Ease of Business										
Flexibility			√					√	√	
Clean of Business		√								
Communication system	√	√		√	√			√		
Reliability		√	√						√	
Financial stability		√	√		√		√	√		√
Quality of material		√	√	√	√	√		√		√
Warranty period					√					
Certification of products					√		√	√		
Reputation		√		√		√				√

As such, this study intends to reveal the issues related to the industrial goods procuring decision making process. This covers factors influencing supplier selection, the influencing factors within and outside the organization. In other words,

This research intends to achieve the following research objectives:

1. To examine the factors influencing the industrial procurement.
2. To understand the factors determining selection of suppliers
3. To determine the areas suppliers and procurement professionals could focus more to achieve efficiency.

Hypothesis Development

H1: "Cost of Product" has significant relation with Industrial Procurement decision.

H2: "Delivery Performance" has significant relation for Procurement decision.

H3: "Ease of Business" Transaction has significant relation with Procurement decision.

H4: "Reliability" has significant relation for Industrial Procurement decision.

Demographic Information of the Respondents

This study conducted study on 204 Supply chain/Procurement employees in Bangladesh. Among the respondents, 82.80% of the respondents were male and 17.20% were female (Table 1).

Table 1. Gender Distribution of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	169	82.8	82.8	82.8
	Female	35	17.2	17.2	100.0
	Total	204	100.0	100.0	

The respondent bank employees mostly (36.3%) had 8 years and above work experience. While 18.6 % respondents had 5-6 years' experience, 16.7 % respondents had 7-8 years, 14.7 % respondents had 0-2 years and 13.7 % respondents had 3-4 years' work experience (Table 2).

Table 2. Work experience Distribution of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-2 years	30	14.7	14.7	14.7

	3-4 years	28	13.7	13.7	28.4
	5-6 years	38	18.6	18.6	47.1
	7-8 years	34	16.7	16.7	63.7
	8 years and above	74	36.3	36.3	100.0
	Total	204	100.0	100.0	

Most of the professionals are working as Senior Officer/Executives, followed by Officer/executive, Asst. Manager years, Manager/General Manager and Director and above (Table 3).

Table 3. Position/Designation Distribution of the Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Officer/executive	50	24.5	24.5	24.5
	Senior Officer/Executive	58	28.4	28.4	52.9
	Asst. Manager	45	22.1	22.1	75.0
	Manager/General Manager	43	21.1	21.1	96.1
	Director and above	8	3.9	3.9	100.0
	Total	204	100.0	100.0	

Sample Design and Determination of Sample Size

This study interviewed 204 supply chain professionals from 140 organizations under study. All of the respondents were working in supply chain or procurement department in different organizations of Bangladesh with industrial procurement experience from Private, Government, Multinational and National companies.

Questionnaire Design

The structured questionnaire was used in this research to collect information from different organizations in Bangladesh. Responses to all the statements in the questionnaire were measured on a five-point scale ranging from 1 to 5 with 1 indicating strongly disagree and 5 indicating “Every time” choice, eventually

4=”Most of the time”, 3= “Average times”, 2= “Sometimes”, 1 indicating “Never” choice in terms certain procurement scenario. One of the relative advantages of using this scale is its suitability for the applications of multifarious statistical tools used in marketing and social research study (Malhotra, 1999). The collected data were statistically processed subsequently to get useful information. The reliability statistics show that the internal consistency of the questionnaire is under the acceptable limit (Nunnally, 1978). The reliability statistics are at the acceptable level (Table 4).

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.742	.739	12

Table 4 Cronbach's Alpha score

Data Collection & Analysis

Data were collected from both primary and secondary sources. Primary data were used for the purpose of analyzing the effect of work stress on the performance of readymade garment workers in Bangladesh. The survey was conducted among the 204 supply chain/procurement professional from 140 organizations of Bangladesh. The survey was conducted in 2019. The interviewers were properly trained on the items included in the questionnaire for data collection before commencing the interview. Along with descriptive statistics, inferential statistical techniques such as, Factor Analysis and Multiple Regression Analysis were used to analyze the data. A Principal Component Analysis (PCA) with an Orthogonal Rotation (Varimax) using the SPSS (Statistical Package for Social Sciences) was performed on the survey data. Multiple Regression Analysis such as, Multiple Regression was conducted by using SPSS to identify the relationships between the dependent and independent variables and the significant factors.

The execution of this study took a lot of time and effort to prepare this research paper. Specially, the survey section was very difficult to execute. Procurement employees are very busy people and with close deadlines and massive workloads. It was also difficult to manage them to participate and respond to the survey.

Results and Discussions

This section of the study includes the analysis of the results of factor analysis and multiple regression analysis.

Results of Factor Analysis

Factor analysis show that all the communalities of the variables are very high indicating that the variables constitutes the stress factors that increases turnover intention among the supply chain employs are related to each other (Table 5).

Table 5. Communalities of the Variables

	Extraction
Price of product	.466
cost breakdown	.646
Other cost excluding price	.247
Emergency need/ shipment	.249
immediate shipment	.646
Speed of Delivery and stock availability	.509
Documentary and Logistics support	.501
Organized Paperwork of supplier	.357
timely delivery of supplier	.585
Reference	.520
Frequency of communication	.523
Service level from Supplier employees	.603

Extraction Method: Principal Component Analysis

This study identified four stress factors that increase the turnover tension among the supply chain employees in Bangladesh. The factors are (i) Cost of Product (ii) Delivery performance (iii) Ease of Business and (iv) Reliability of service. The data set explains 56.91% of the variance (Table 5). The most important stress factor is Cost of Product (28.68%) followed by Delivery performance (11.54%), Ease of Business (8.52%) and Reliability of service (8.16%).

Factor	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3.442	28.684	28.684
2	1.386	11.546	40.230
3	1.023	8.522	48.752
4	.979	8.161	56.912

Extraction Method: Principal Component Analysis.

Table 6: Total Variance Explained

The rotated factors analysis results show that the factors constituted with the variables have higher level of correlations between them (Table 6).The first factor named Cost of Product followed by Reliability of service, Ease of Business and Delivery performance.

	Component			
	1	2	3	4
Cost of Product				
Cost breakdown	.807			
Other cost excluding price	.907			
Price of product	.675			
Reliability of service				
Service level from " Supplier employees		.756		
Frequency of communication		.664		
Reference		.620		
Ease of Business				
Documentary and Logistics support			.524	
Immediate shipment			.811	
Organized paperwork of Supplier			.586	
Delivery performance				
Speed of Delivery and stock availability				.528
timely delivery of supplier				.678
Emergency need/ shipment				.491

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Table 7: Rotated factor matrix

Results of Regression Analysis

Multiple regression analysis was calculated to test Procurement decision based on, Delivery performance, Ease of business Transaction, Reliability of service. A significant regression equation was found (F (4,199)= 558268.728 ,p< .001 with and R^2 of 1 . It was found that Costing of Product with b=.318, as did Delivery performance with b=.322, Ease of business Transaction b=.385 and Reliability of service, b=.337 altogether influenced Procurement decision, where t(199)= -.282 , p< .001.

Table 8: Model Summary

Model	R	R Square			Change Statistics

			Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change
1	1.000[a]	1.000	1.000	.00562	1.000	558268.728

a. Predictors: (Constant), Reliability of service, Costing of Product, Delivery performance, Ease of business_ transaction

ANOVA shows that all the factors are significantly related to procurement decision by supply chain professionals in Bangladesh (Table 8).

Table 9: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.574	4	17.643	558268.728	.000[b]
	Residual	.006	199	.000		
	Total	70.580	203			

a. Dependent Variable: Procurement decision

b. Predictors: (Constant), Reliability of service, Costing of Product, Delivery performance, Ease of business Transaction

Individual factor relationship with the factors shows that all the factors individually significantly related to the overall procurement decision.

Table 10: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.001	.002		-.282	.779
	Costing of Product	.249	.001	.318	392.847	.000
	Delivery performance	.251	.001	.322	421.295	.000
	Ease of business Transaction	.250	.001	.385	450.679	.000
	Reliability of service	.249	.001	.337	451.446	.000

Conclusions and Recommendations

The results of factor analysis show that the communalities of the variables are very high demonstrating that the relationships among the variables are high. Analysis also identified i) Cost of Product (ii) Reliability of service (iii) Ease of Business and (iv) Delivery performance as major procurement factors. The results of statistics also shows that all the factors are significantly related to the Industrial procurement in Bangladesh. The study also identified the mutual relationship among the variables as individually factors are also significantly related. But Cost of Product and Reliability are highly considered followed by medium extent of Ease of Business and Delivery performance.

However, there is an ample scope to conduct further study on this topic and there might have more factors influencing procurement. Also, in terms of reliability, "which business practice indicate reliable for procurement" can be studied further.

Implications of the Study

The outcome of the study could be a good indication for procurement professionals to the factors considered industry-wide. Also, as the study shows Reliability one of the major factors, Procurement professionals could focus more on identifying the areas for finding reliability. Besides, the study results will be beneficial for suppliers as it will help to improve on the evaluating criteria and achieve competitive position in the market.

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