

Measuring the influences of supplier selection and supply chain tasks on firm performance among manufacturing firms in India

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Abstract: The primary objective of this research is to empirically probe the various aspects and variables that have been already addressed in the previous literature related to supplier selection criterion, supply effort management and firm performance. Further, this research aims to develop a measurement framework and pragmatically prove the framework through a measurement model. First, a factor structure for various constructs is made and the initial validity is determined from practicing managers and academicians. This research employs survey method and the data is collected from 358 supply chain professionals working in manufacturing firms in India. A measurement model is developed and proved with various tests of reliability and validity. Finally, three major latent constructs were formulated, namely, criterion of supplier selection, supply effort management and firm performance. The factor scores of these latent variables were used for further analysis. A six-stage approach was followed in the analysis of data. Firm performance was regressed against supplier selection criterion and supply effort management. The results indicate that the predictive variable has positive and significant effect on firm performance and they do not have any interaction and multicollinearity effects.

Key words: firm performance; supplier selection; supply chain management; supply effort management

1. Introduction

The current studies in management have shown that supply chain management practices play a key role for companies to achieve overall business performance. The previous studies focused on decisive factors influencing supplier selection that include quality, delivery, price, production facilities and capacities, technical capability and financial position. Similarly, the earlier studies of supply chain management, which focused upon on the several aspects and tasks for managing the supply chain, dwelt upon managing supplier relationship, supplier involvement in business process, emphasizing quality on supplier selection, leaning the levels of supplier base and augmentation of information. Such tasks are operationally defined in this research work as “supply effort management”. The purpose of this research is to examine and build a causal model to exhibit how the criteria of supplier selection and the efforts involved in managing the supply chain influence the overall business performance.

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2. Literature review

This study pays attention to the basic question of whether the supply chain management tasks, which are predominantly practiced in industry and most important criteria for supplier selection, lead to improvement in a firm's performance. As it is our purpose to answer this question, we take cues from the works of Kenneth, McGaughey and Casey (2006), Tracey, Lim and Vondermbse (2005), Carr, et al (2008), Tracey and Tan (2001) and Vonderembse and Tracey (1999). This research aims to build a theoretical model for firm performance in the context of supplier selection and supply effort management. Data collected from national sample of Indian manufacturers and supply chain professionals are used to assess the models using hierarchical multiple regression analysis.

2.1 Supply chain tasks

Managing the tasks of supply chain needs a clear understanding of boundary spanning roles of value creation teams in an organization. In this research, supply effort management is a process that involves planning, implementation and regulating the interconnectedness functions of supply chain, which aims to create value for the organization and to the stakeholders. Previous literature in supply chain stressed that decisions relating to managing the supply chain influence the firm's performance. The decisions include developing and maintaining a long and sustainable relationship with suppliers (Bensou & Venkatraman, 1995; Chen, Paulraj & Lado, 2004; Tracey & Tan, 2001; Guimaraes, Cook & Natarajan, 2002), involving supplier in business process (Tracey & Vonderembse, 2000; Kuei, Madu & Lin, 2001); selection of quality suppliers (Dickson, 1966; Dempsey, 1978; Weber, Current & Benton, 1991; Shin, Collier & Wilson, 2000), leaning the levels of supplier base (Kekre, Murthi & Srinivasan, 1995; Newman, 1988; Shin, Collier & Wilson, 2000; Kale, Singh & Perlmutter, 2000; Shin, Collier & Wilson, 2000; Stanley & Wisner, 2001; Guimaraes, Cook & Natarajan, 2002) and managing information and communication (Cooper & Ellram, 1993; Galt, 1991; Levy, 1997; D'Amours, 1999; Zollo, Reuter & Singh, 2002; Mohr, 1995).

2.2 Supplier selection

The criteria for supplier selection have an immense impact on every task from operational decisions to strategic decisions. The process of supplier selection is usually devised with a multicriteria decision problem (Liu, Ding & Lall, 2005). Many studies in the area of supplier selection show the usage of supplier selection criteria in large numbers. Basically the supplier selection is the process by which suppliers are reviewed, evaluated and chosen to become part of the company's supply chain. The supplier selection criteria are important for organizations as they enable them to choose vendors (Morgon, 1996). Decision related to vendor selection process is complicated as many criteria have to be considered (Weber, Current & Benton, 1991).

The pioneering work by Dickson (1966) provided a comprehensive view of the 23 criteria that both the academicians and the purchasing practitioners felt as important in vendor selection decisions. Most of all the research that has been conducted so far shows that the researchers often use very few criteria for selecting the vendor. This research intensely probes the background investigation related to the most often used supplier selection criteria. They are quality, delivery, production facilities and capacities, price, financial position, technical capacity, management and organization.

2.3 Business performance

The firm performance is dependent upon many tasks in an organizational effort and how it is oriented to the overall supply chain management. The firm performance is usually affected by a number of activities, and the

firm's achievements are evidently measured as return on investment, return on assets, return on sales, overall quality of the product, customer satisfaction level, delivery performance, flexibility performance, overall competitive position of the firm in the industry and employee satisfaction level. (1) The parameter "return on investment" (ROI) is a simple and powerful tool to analyze the firm performance. ROI is widely used in research to measure the relationship of efficiency with supply chain by various authors (Chen, Paulraj & Lado, 2004; Tian, Fu-jiang & Guo, 2006). (2) Return on asset is the measure of how profitable a company's assets are used in generating revenue for the firm. It is a straightforward tool to measure the carrying value of the firm. The measure of ROA has been used in the following mentioned researches: Tracey and Tan (2001), Kannan and Tan (2005) and Zhang, Tian and Sun (2006). (3) Return on sales (ROS) is a firm's "operating profit margin" and it measures how much profit is being produced per dollar of sales. This measure is widely employed in supply chain management (SCM) research (Tracey & Tan, 2001). (4) Overall product quality is inferred as a product that is able to meet given requirements of the manufacturer, quality system followed in the firm and of the end user. Such related studies has been carried out by Tracey and Vonderembse (2000), Shin, Collier and Wilson (2000), Prahinski and Benton (2004) and Kannan and Tan (2005), Chow, et al (2008). (5) Overall customer service level of the firm is primitively probed in this research and it focuses on how the products and services are supplied by the company and how it meets or surpasses the customer expectation at various service encounters and different levels. Similar kind of work has been depicted in certain other studies (Tracy, Vonderembse & Lim, 1999; Lin, et al., 2005; Chow, et al., 2008). (6) Overall performance on delivery means delivery of the product and the services that happen without failure, which are indicated in terms of time, quantity, customer service, etc., and such measure is dealt in various researches (Tracey & Vonderembse, 2000; Shin, Collier & Wilson, 2000; Prahinski & Benton, 2004). (7) Overall performance on flexibility relates as the flexibility to adopt to new and turbulent situations like immediate sourcing, production, delivery, technology upgrading and this measure has been portrayed in the following studies (Shin, Collier & Wilson, 2000; Prahinski & Benton, 2004). (8) Overall competitive position of the firm is embedded with the overall industry structure, attractiveness of the industry, the intensity of the competition among the competitors and the firm's ability to meet the challenges. This factor has evidently been seen in many related research (Tracy, Vonderembse & Lim, 1999; Tracey & Tan, 2001; Lin, et al., 2005). (9) The variable of employee satisfaction incorporated in this research has been widely used to measure the efficiency of organizational performance. The study by Lin, et al (2005) proves that employee satisfaction leads to positive growth in organizational performance. The extensive review of literature laid the foundation for further development of constructing latent variables (supplier selection, supply effort management, business performance) and their respective observed variables. This tortuously paves for development of content validity and its associated scale formulation.

2.4 Research issues

It has been found in the past research that substantial evidence is quite available to portray the relationship among the efforts to manage supply chain, criteria for selecting the supplier selection and business performance. But, such researches are theoretical in nature and only few are proved with empirical investigations. A unified approach to measure the impact of firm performance by supply effort management and supplier selection is rarely found in the literature. This research empirically investigates the relationships among them. The basic objective of this research is to ascertain if the supply effort management factors and supplier selection factors positively influence the firm performance, and its further interest is to probe the multicollinearity and interaction effects

among the dependent factors that affect firm performance.

3. Research design and analysis

3.1 Scale development process and sampling

Table 1 Reliability and convergent validity of survey instrument

Variable	Factor estimate	t-value	Error variance	R ²	Coefficient alpha	Cronbach's alpha	Std. Cronbach's alpha
How do you agree with the importance of following criteria when selecting/evaluating your supplier? (7—Strongly agree, 1—Strongly disagree)							
Quality	1.26	17.80*	0.94	0.63	0.9525	0.958806	0.958985
Delivery	1.34	20.10*	0.64	0.74	0.9527		
Production facilities and capacities	1.35	20.66*	0.58	0.76	0.9506		
Price	1.29	17.74*	0.65	0.72	0.9491		
Financial position	1.24	18.39*	0.80	0.66	0.9510		
Technical capacity	1.22	18.41*	0.78	0.66	0.9520		
Management and organization	1.17	16.92*	0.96	0.59	0.9576		
Total					0.9588		
State your agreement on the following decisive factor on firm's/business performance. (7—Strongly agree, 1—Strongly disagree)							
ROI	1.23	17.29*	0.97	0.61	0.9035	0.915840	0.914634
ROA	1.27	19.72*	0.66	0.71	0.9007		
ROS	1.26	19.03*	0.71	0.69	0.8983		
Overall quality of the product	1.28	17.90*	0.93	0.64	0.9017		
Customer satisfaction level	1.02	12.86*	0.61	0.39	0.9104		
Delivery performance	1.07	14.26*	1.33	0.46	0.9077		
flexibility performance	1.06	14.41*	1.28	0.47	0.9040		
Overall competitive position	1.00	14.01*	1.22	0.45	0.9068		
Employee satisfaction level	0.63	07.60*	2.06	0.16	0.9215		
Total					0.9158		
How do you agree with the importance of the following issue concerns to your firm's supply chain efforts management? (7—Strongly agree, 1—Strongly disagree)							
Communication	0.64	08.12*	1.78	0.19	0.9016	0.891681	0.890543
Long term relationship	0.93	12.48*	1.34	0.39	0.8723		
Supplier involvement	1.18	16.63*	0.99	0.59	0.8411		
Leaning the supplier base	1.24	18.92*	0.60	0.72	0.8496		
Quality on supplier selection	1.15	15.88*	1.03	0.56	0.8699		
Total					0.8917		

Note: * variables significant at $p \leq 0.05$.

Initially the survey instrument was developed based on the previous literature, which addresses the basic theoretical construct related to supply effort management, supplier selection and business performance. It has generated initially 87 items altogether, which includes 21 items on supplier selection criteria, 29 items on supply effort management and 37 items on business performance. All 87 items are initially measured using a 7-point Likert scale with anchoring range from strongly disagree (1) to strongly agree (7). The scale was pre-tested with an in-depth

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interview conducted with 5 vice-presidents/chief general managers of operations management, 7 procurement managers, 7 chief financial officers, 5 business consultants and 8 elite academicians in top B-schools in India. They were evaluated on all the 87 items on how they understand the wordings of each question in the questionnaire, how they interact and respond to the content of the items, structure of the question, ease of answering, and time taken to complete the questionnaire was also taken into consideration. Suggestion through feedback regarding the format and the content of the questionnaire was considered and changes were made to the questionnaire to reflect the recommendations of the respondents. During this process, the items were reduced to 58. Then a pilot study was conducted with 30 samples to further test the intercorrelation among the items. The correlation score of each inter-item is estimated and the scores, which are less than 0.5, are summarily deleted from the constructs and finally 21 items were selected. After developing the final instrument (see Table 1), a further pilot test (among procurement managers, supply chain managers, financial officers and managers, general managers and other academicians) was conducted to estimate the sample size with the measures related to the 21 attributes of supply effort management, supplier selection and business performance, which were measured on a 7-point Likert-type scale. The ratings range from 1 to 7 (1—strongly disagree, 7—strongly agree). The estimated confidential interval from the pilot study is 4.8 and maintaining the confidence level at 95% as arbitrary value, the population size estimated to be nearly 2,600 firms and the estimated sample size is 358. The data was collected through an interview schedule. The target respondents for the survey are middle and top level managers who actively take decisions related to procurements and supplier selection decision in the organization that ranges from 125 to 5,000 employees.

3.2 Scale validity and measurement analysis

Table 2 Fit index of SEM model

Fit index	Acceptable threshold levels and description	Fit indices of SEM model
(1) Absolute fit indices		
χ^2	Low χ^2 relative to degree of freedom with an insignificant p value.	χ^2 for the independent model with 210 df is 19,137.51. χ^2 value is high due to large sample size.
Root mean square error of approximation (RMSEA)	Has a known distribution, favors parsimony. Value ≤ 0.03 represents excellent fit. Value ≤ 0.05 represents good fit, and Value ≤ 0.08 represents adequate fit.	RMSEA is equal to 0.12 represents moderate fit.
GFI	Scaled between 0 and 1, with higher value indicates better model fit.	GFI is equal to 0.75 represents good fit.
AGFI	Adjusts the GFI based on the number of parameters in the model. Value ≥ 0.90 represents good fit.	AGFI is equal to 0.69 represents moderate fit.
RMR	Good model have small RMR.	RMR is equal to 0.14 represents good fit.
SRMR	Standardized version of RMR. SRMR ≤ 0.08 is good fit.	SRMS is equal to 0.058.
(2) Incremental fit indices		
NFI	Assessing fit relative to a baseline model which assumes no covariance between the observed variable Value ≥ 0.95 indicates strong fit.	NFI is equal to 0.94 indicates strong fit.
NNFI	Non-normed, values can fall outside the 0-1 range. Favours parsimony. Value ≥ 0.95 indicates strong fit.	NNFI is equal to 0.95 indicates strong fit.
CFI	Normed, 0-1 range. Value ≥ 0.95 indicates strong fit.	CFI is equal to 0.95 indicates strong fit.
(3) Fit index combination		
NNFI and SRMR	NNFI of 0.96 or higher and an SRMR of 0.09 or lower.	NNFI is 0.95 and SRMR is 0.058 indicates excellent combination fit index.
CFI and SRMR	CFI of 0.96 or higher and a SRMR of 0.09 or lower.	CFI is 0.95 and SRMR is 0.058 indicates excellent combination fit index.

After determining the face validity through the subject matter experts and further to ensure convergent and discriminant validity, the confirmatory factor analysis was performed and respective factors are taken for item analysis to measure the reliability of the scale. Given these results, we have evidence that the measures are unidimensional, with each item reflecting one and only underlying construct. The coefficient alpha estimates, ranging from 0.8411 to 0.9527, are at an accepted level (see Table 1). The average variance was extracted with the variance shared between the construct and other constructs in the model. This analysis compares the average variance extracted with the variance shared between the construct and other constructs in the model and it was found that the average variance extracted estimates were greater than the squared correlations between all constructs. Thus, we found the evidence of discriminant validity. The factor loading and the respective items' cronbach alpha scores have gained high loadings, which indicate a good convergent validity (more than 0.66) and reliability (more than 0.65), respectively (see Table 1). Moreover, the chi-square statistic was significant ($\chi^2=1,222.49/186$, $df=186$; $p < 0.01$. χ^2 probability > 0.10 ; comparative fit index (CFI), goodness of fit index (GFI), normed fit index (NFI), non-normed fit index (NNFI) > 0.9 , RMSR < 0.05). The model fit indices were RMSEA=0.125, NFI=0.94, NNFI=0.95, CFI=0.95, RMR=0.14 and RMSR=0.058 barring RMSEA (0.12) and RMR (0.14), whose values were above the recommended maximum of 0.10 (see Table 2). In addition, all the corresponding t -values (see Table 2) were statistically significant at the 95% significance level. Thus, it signifies that an adequate fit of the data is achieved for the measurement portion of the model. The factor scores of the three latent variables are used for further analysis.

3.3 Investigation of relationship and discussion of results

As our objective is to find the cause and effect relationship, regression analysis was used to explore the impact of supply effort management and supplier selection on the firm performance. A six-stage approach was followed in the analysis of data. Accordingly, firm performance was first regressed against supplier selection (see Table 3) and then the firm performance was regressed against supply effort management (see Table 4). Later, the firm performance was regressed against supplier selection and supplier effort management as well (see Table 5). As the factors of supplier selection and supply effort management were assumed to influence each other in determining the firm performance, two more causal models were developed using hierarchical regression that follows a stepwise method. In the first model, the causal effect was tested with the assumption that supplier selection as basic predictor (forced entry) and supply effort management as exploratory predictor with an aim that the factor supply effort management should not predict firm performance if firm performance is indeed distinct from supply effort management (see Table 6). In the next model, the causal effect was tested with the assumption that supply effort management is a basic predictor (forced entry) and supplier selection is an exploratory predictor with a aim that the factor supplier selection should not predict firm performance if firm performance is indeed distinct from supplier selection (see Table 7). In addition to clarifying the presence of excessive correlation among the predictor variables (supplier selection, supply effort management), multicollinearity effect (see Table 6 and Table 7) and interaction effect (see Table 8) were also considered for analysis.

Table 3 Regression results firm performance against supplier selection

Variables	<i>b</i>	SE <i>b</i>	β
Constant	-2.543	0.24	
Supplier selection	0.893	0.24	0.893*

Notes: $R^2 = 0.798$, $p \leq 0.05^*$, $n=358$.

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Table 4 Regression results firm performance against supply effort management

Variables	<i>b</i>	SE <i>b</i>	β
Constant	-2.801	0.34	
Supply effort management	0.769	0.34	0.769*

Note: $R^2 = 0.591$, $p \leq 0.05^*$, $n = 358$.

Table 5 Regression results of firm performance against supplier selection and supply effort management

Variables	<i>b</i>	SE <i>b</i>	β
Constant	-2.539	0.23	
Supplier selection	0.755	0.37	0.755*
Supply effort management	0.177	0.37	0.177*

Notes: $R^2 = 0.810$, $p \leq 0.05^*$, $n = 358$.

Table 6 Hierarchical regression results of firm performance against supplier selection and supply effort management

Variables	<i>b</i>	SE <i>b</i>	β	Tolerance	VIF
Step 1					
Constant	-2.539	0.024			
Supplier selection	0.893	0.024	0.893*	1.00	1.00
Step 2					
Constant	-2.54	0.023			
Supplier selection	0.755	0.037	0.755*	0.385	2.60
Supply effort management	0.177	0.037	0.177*	0.385	2.60

Notes: $R^2 = 0.789$ for Step 1, $\Delta R^2 = 0.012$ for Step 2, $p \leq 0.05^*$, $n = 358$. Durbin-Watson measure = 2.197 (independent error is tenable).

Table 7 Hierarchical regression results of firm performance against supply effort management and supplier selection

Variables	<i>b</i>	SE <i>b</i>	β	Tolerance	VIF
Step 1					
Constant	-2.801	0.034			
Supply effort management	0.769	0.24	0.893*	1.00	1.00
Step 2					
Constant	-2.539	0.23			
Supply effort management	0.177	0.37	0.755*	0.385	2.60
Supplier selection	0.755	0.37	0.177*	0.385	2.60

Notes: $R^2 = 0.591$ for Step 1, $\Delta R^2 = 0.21$ for Step 2, $p \leq 0.05^*$, $n = 358$. Durbin-Watson measure = 2.197 (independent error is tenable).

Table 8 Regression results firm performance against supplier selection, supply effort management and interaction effect

Variables	<i>b</i>	SE <i>b</i>	β
Constant	-0.001	0.032	
Supplier selection	0.755	0.044	0.755*
Supply effort management	0.177	0.038	0.177*
Interaction effect	0.001	0.028	0.002**

Notes: $R^2 = 0.810$, $p \leq 0.05^*$, ** indicates not significance, $n = 358$.

3.3.1 Supplier selection and firm performance

The results of regression analysis performed based on the entire method show that supplier selection has a significant and positive impact ($b = 0.896$; $p < 0.05$) on firm performance (see Table 3). The R^2 and the adjusted R^2 values indicate the model is fit at 79.8% and 79.7%, respectively. The ANOVA (based on the α value, which is ≤ 0.05) indicated that there is presence of a linear relationship. The factors related to quality, delivery, production

facilities and capacities, price, financial position of the firm, technical capacity, management and organization are taken into consideration for supplier selection. If the following issues were considered in supplier selection, the firm can gain in status and strategic importance. Moreover, a clear demonstrable relationship can be shown to exist between investments in developing supplier selection and firm performance.

3.3.2 Supply effort management and firm performance

The second regression analysis provided insights into the relationship between the constituent factor of supply effort management and firm performance (see Table 4). Specific supply effort managerial tasks were found to impact the firm performance. They are communication, long-term relationship, supplier involvement, leaning the supplier base and quality on supplier selection. The results suggest that the firm performance should be developed by the efficient practices of various tasks involved in supply chain management. The results of regression analysis shows that supply effort management has a significant and positive effect on firm performance ($b=0.769$; $p<0.05$). The R^2 and the adjusted R^2 value indicate the model is moderately fit at 59.1% and 59.0%, respectively. The ANOVA (based on the α value, which is ≤ 0.05) indicated that there is presence of linear relationship.

3.3.3 Supplier selection, supply effort management and firm performance

The results of regression analysis performed based on stepwise method show that supplier selection and supply effort management have a significant and positive impact ($b=0.755$ (supplier selection), $b = 0.177$ (supply effort management); $p<0.05$) on the firm performance (see Table 5). If the concerns related to supplier selection and supply effort management are considered, the firm performance can improve. The results suggest that supplier selection has more impact on firm performance than supply effort management. The R^2 and the adjusted R^2 values indicate the step 2 model is fit at 81.0 % and 80.9%, respectively. The ANOVA (based on the α value, which is ≤ 0.05) indicated that there is presence of linear relationship.

3.3.4 Multicollinearity and interaction effect between the dependent variables on firm performance

The correlation between supplier selection and supply effort management is 0.784, which refers to excessive value of correlation of the predictor variables. It is usual that, when correlation is excessive, standard error of the b and β coefficient become larger, making it difficult or impossible to assess the relative importance of the predictor variables. In such a situation, interaction effect and multicollinearity are a serious problem when the research purpose includes causal modeling like this research. The interaction effect of both the predictor variables were measured based on a simple slope test. This test is designed for the interpretation of the interaction effect of two continuous predictor variables. The interaction effect of supplier selection and supply effort management were measured based the recommendation of Aiken and West (1991). The results of regression analysis (see Table 8) show that supplier selection and supply effort management have a significant and positive impact ($b=0.755$ (supplier selection); $b=0.177$ (supply effort management); $p<0.05$) on firm performance, but the interaction effect of both the supplier selection and supply effort management have an insignificant effect ($b=0.002$; $p>0.05$). Thus, it shows that the both the predictor variable are independent in nature. The indicators for identifying the multicollinearity problem in the causal model are based on the value of tolerance and the value of variance-inflation factor (VIF). The results of hierarchical regression (see Table 6 and Table 7) show that the value of tolerance is $0.385 \geq 0.20$, which indicates that there is no problem with multicollinearity and further to substantiate, the value of TIF is 2.60, which is ≤ 4.0 , indicating no multicollinearity problem. Thus, it shows that both the predictor variables do not influence each other in determining the level of business performance.

4. Implication and conclusion

There are few interesting observations that need to be given attention based on this empirical investigation. Primarily, the variables that are related for developing the construct of supplier effort management, supplier selection, firm performance are consistent constructs, and have been found to be empirically important in the domain of SCM research. All the observed variables used for survey instrument were also found to have high level of reliability and validity. The estimate loadings of these variables that exhibited high values proves the variables selected for developing the construct holds good. So, the developed instrument is a valid and reliable measurement instrument. Academicians as well as practitioners can use this measurement tool to measure and weigh the firm's supply effort management, supplier selection and business performance. This research offers a few important advantages to the practicing managers. The knowledge of selecting good supplier is useful for managing various activities in the supply chain. For example, the criteria like quality, delivery and price have to be considered for supplier selection. The scientific way of selecting the supplier will enhance the function of the overall supply chain. Further, managers have to think on the various tasks involved in supply chain management. The tasks like building sustainable relationship and investing time and effort in communicating with supplier will also enhance the overall function in managing the supply chain. Moreover, the indicators related to financial performance, market performance and competitiveness of the firm will provide a guiding principle for measuring the performance of the firm. The six causal models that were tested confirm that the predictor variables—supplier selection criterion and supply effort management—are positively influencing the firm performance. Among the two predictor variables, supplier selection criterion has the most significant effect on firm performance than supply effort management. Later, it was found that there is no interaction effect and multicollinearity problem among the predictor variables. The results of various causal models were discussed with subject matter experts. The discussion reveals that the managers of manufacturing firm have to invest more effort in selecting and managing the supplier. It is recommended that the supplier selection function and supply effort management function have to be managed separately because of the nature of task. Though these two functions have to be managed separately, special integrating tasks should be identified and further appreciation of such tasks to be made to make proper coordination among them. Special attention has to be provided to supplier selection function than that of supply effort management function, because supply effort management function was considered to be performing a routine task carried out by the supply chain professional, whereas the supplier selection function is a special, priority and exceptional task and not a routine task. The decision on supplier selection is complex and challenging for the reason that the business and supplier environment is dynamic.

5. Research limitation and further direction

This research is not without limitation. The scale is validated based on convergent and discriminant validity. The scale can also be validated by taking further process of performing replicate confirmatory factor analysis and thereby nomological and predictive validity can be measured. In future, this process can be undertaken to strengthen the validity of the measurement tool. In terms of research construct, new dimensions of construct related to professional way of managing supply chain like supplier certification and supplier integration can be included in supply effort management criteria. The issues related to globalization, digitalization, social responsibility and green supplier management can be included in the construct of supplier selection. The concerns

related to strategic issues like system dynamics, business process, organizational culture and dynamics can also be incorporated in the construct of business performance. This research has concentrated on first-tier supplier and hence the future research can address the secondary level of suppliers and further the issues related to the interaction effects of both primary and secondary level of suppliers can also be addressed. This research measures the causal relation based on simple and multiple regression analyses only. The advanced statistical analytical tool like partial least square regression, ordinal least square regression and structural equation model can be used for understanding the causal relationship.

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