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Title: Literature review of Supplier Development Activities and Performance Activities with Hypothesis to Identify Relationship

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Abstract:

Purpose of this paper is to review the supplier development activities (SDAs) and its Performance outcomes (POs), categorization of these SDAs and POs and also setting the hypothesis to identify the relationship amongst them. Through an extensive literature review of 67 papers from various academic databases 28 SDAs and 33POs are identified for this study. These 28 SDAs are categorized into five different categories and 22 POs into three categories in consultation with the industry practitioners. The SDAs five categories are strategic efforts (SE), Knowledge and information sharing (KIS), Investment (INV), Working together with suppliers (WTS), Involvement of buyer in supplier activities (IBS) and POs are also categorized into three categories i.e. supplier performance improvement (SPI), buyer's competitive advantage improvement (BCAI) and buyer-supplier relationship improvement (BSRI). In total 13 hypothesis were set to identify the interrelationship amongst SDAs and POs. This study can be further extended to check this proposed hypothesis by using structural equation modeling or regression analysis.

Keywords – Supplier development, Vendor development, SD activities, SD practices

Paper type – Research paper

1. Introduction

Now a day, overwhelming market competition forcing buying organizations to operate with increasingly fluctuating supply chains, in which both buying organization and suppliers recognize the benefits of supplier development (SD) (Mohanty et al., 2014; Hales et al., 2011). The buying organizations also realized the importance of implementation of SDAs in establishing and maintaining their competitive advantage (Shao et al., 2014; Ou et al., 2010).

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This turned the purchasing research to focus on SD programs like improving their suppliers' knowledge, capabilities, and market insights and to explore how these SDAs impact on buyer-supplier performance (Schoenherr et al., 2012). Supplier development (SD) can be any effort from buying organization to improve the capacity, capability and performance of supplier so that the purchasing needs of buying organization can be fulfilled (Govindan et al., 2015; Mohanty et al., 2014).

However the attempts have been made to investigate the effect of SDAs i. e. the antecedents and the influential factors. Most of the literatures are case based and focused on implementation of SDAs in US, China and European countries (Li et al., 2007). Further, despite of growing consensus that SD plays an important role in improving supplier performance and contributes strategically to overall organizational performance, some researchers has empirically investigated the impact of SDAs on buyer-supplier performance (Li et al., 2012; Modi and Mabert, 2007). This paper attempts to review the various categories of SDAs and POs with setting hypothesis to identify the interrelationship amongst them in Indian manufacturing organizations.

The paper is divided into a number of sections. In second section, related SD literature about SDAs and POs. Third section deals with the hypothesis setting in consultation with the industry practitioners to identify the interrelationship amongst them. In fourth section, based on this study, conclusions are made, which outlines important SDAs with POs and their interrelationship.

2. Literature review

SD can be defined as set of practices or activities of a buying organization for its supplier to improve the performance of the supplier to meet buyer's expectation (Inemek and Matthyssens, 2013). Numerous SDAs can be applied for improving supplier performance (Gurel et al. 2015). The various literatures indicates SDAs as regular evaluating supplier performance (Li et al. 2012), recognizing supplier progress in the form of awards (Alireza et al., 2010), involvement of buyer to improve supplier's performance and capabilities by increasing supplier performance goals (Prahinski and Benton, 2004), providing training to supplier (Khan and Nicholson; 2014), providing equipment, technological support, investments in supplier activities Mohanty et al. (2014), and exchanging personnel between the buyer and supplier (Wagner, 2006).

Table 1 Identified SDAs and References

Sr.No.	Supplier Development Activity (SDA)	References																																
		2	3	1	1	1	2	2	2	2	3	3	3	3	3	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	7		
1	Top management support and commitment	√	√					√				√	√		√																			
2	Long term relationship	√						√				√									√	√												
3	Commitment of buyer and supplier													√																		√		
4	Long term contracts with supplier								√					√																			√	
5	Continuous increase in volume of				√																													√

	outsource work							
6	Purchasing a large percentage of the suppliers' annual sales	√	√	√			√	√
7	Supplier recognition and awards of certificates and incentives					√	√	
8	Buyer supplier interdependence						√	
9	Relational norms development	√						
Knowledge and Information Sharing								
10	Sharing of operational knowledge					√		√
								√

11	Regular information sharing				√				
12	Providing training related to environmental performance	√	√	√	√		√	√	√
13	Providing technical support and technological assistance				√		√		
Investment									
14	Investment in training of supplier	√			√				
15	Investment in temporary transfer of persons						√		√
16	Transaction specific investment				√		√		√

	t					
17	Investment in facility development by providing equipment	√		√		√
18	Limited investment in number of suppliers			√	√	
Working together with suppliers						
19	Frequently visiting supplier site					√
20	Joint problem solving approach	√		√		
21	Improvement in suppliers present and future capabilities	√		√		√

22	Supplier Evaluation		√		√	√			√	
23	Effective feedback and communication system	√		√		√	√		√	√
Involvement of buyer and supplier										
24	Involvement of buyer in supplier activities		√		√				√	
25	Providing support to suppliers in materials improvement								√	
26	Early involvement of supplier or concurrent engineering.		√		√	√		√		√
27	Assisting in work or								√	

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	document ation	
28	Support in market entry for	√

Based on the literature review and opinion of industry experts, SDAs were identified, which are generally applied to improve the supplier performance and capabilities (See table 1)

Similarly the various POs mentioned in several literatures and experts are as follows (See table 2).

3. Hypothesis Development

As per the objective of this paper hypothesis needs to be set to identify the interrelationship amongst SDAs and Pos.. Based on the opinion of experts from industry and academia, a framework is proposed showing relationship between identified categories of SDAs and POs (see Figure 1).

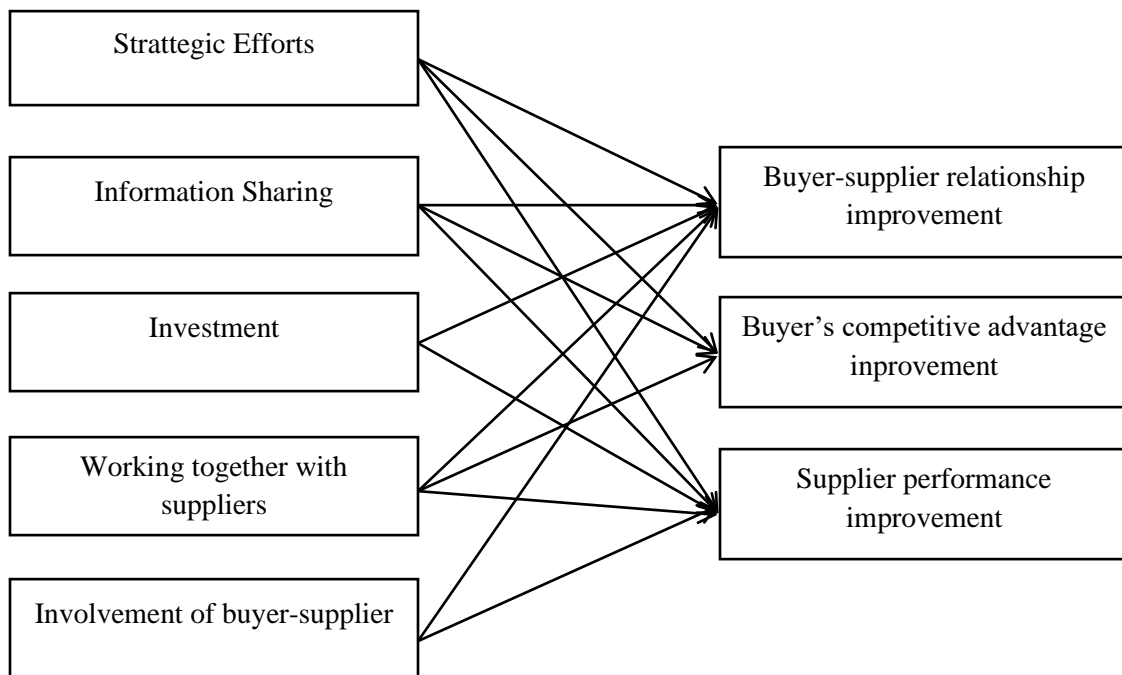


Figure 1. Proposed relationship between SDAs and POs

3.1 Strategic efforts (SE)

The top management support has been identified as the mandatory for initiating and implementation of SD programs (Govindan et al., 2010). The long-term contacts and long-term relationship between buyer and supplier determines the overall effectiveness of SD programs.

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The buying organization's commitment is essential to modify supplier's operation as per the requirement of buyer. The motivation in terms of incentives, appreciation and rewards is also a stimulating tool for improvement in supplier performance, which leads to the further performance (Wynstra et al., 2015; Humphreys and Chan, 2004). The activities namely continuous increase in volume of outsources work and purchasing a large percentage of the supplier's annual products will lead to the mutual trust and BSRI. For the success of any cooperative efforts between two or more organizations, the interdependency for the business plays a vital role (Alireza et al., 2010). This is the important category of SDA, which shows numerous activities namely top management support, long-term relationship, and continuous increase in volume of outsource work etc. in developing its suppliers (Dey et al., 2015).

The above literature leads to following hypothesis

Hypothesis-1: *Strategic efforts have a direct significant impact on BCAI.*

Hypothesis-2: *Strategic efforts have a direct significant impact BSRI.*

Hypothesis-3: *Strategic efforts have a direct significant impact on SPI.*

3.2 Knowledge and information sharing (KIS)

Four factors were identified for this construct, which consists of supplier training related to experienced operational knowledge, environmental norms and requirement and also technical support if required. These activities develop a confidence level in supplier personnel, which improves the supplier performance. The operational and economic performance of both buyer and supplier is improved through the SDAs namely training of the supplier's personnel, technical assistance etc. (Wagner and Krause, 2009). Continuous information sharing about the future schedule improves the buyer-supplier relationship and ultimately the buyer's competitive advantage (Li et al., 2012).

3.2 The above literature leads to following hypotheses

3.2 Hypothesis-4: *Knowledge and information sharing is positively related with SPI.*

3.2 Hypothesis-5: *Knowledge and information sharing is positively related with BSRI.*

3.2 Hypothesis-6: *Knowledge and information sharing is positively related with BCAI.*

3.2 Investment (INV)

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Improvement in supplier's future capabilities is not possible without buyer's direct investment in related activities. This will improve and develop supplier's capacity and capabilities in terms of flexibility of supplier, which is a key for the successful implementation of SDAs (Zhang et al., 2015). It is a crucial component of SDAs from buying organization's point of view as it consists

Table 2 Identified POs and references

Reference No.	1	2	3	6	16	17	19	27	34	35	38	42	45	48	54	55	60	62	64	
Buyer-supplier relationship improvement (BSRI)																				
1	Strengthening buyer supplier relationship																			√
2	Increased trust between buyer and supplier																			√
3	Continuous improvement in buyer-supplier relationship																			√
4	Strategic partnership with improvement in supplier capability																			√
5	Improvement in information sharing																			√
6	Increased belief in renewal of contract																			√
7	Communication will be more effective with feedback																			√
8	Making contract with supplier for long term																			√
9	Supplier's strategic objectives will match with buyer's expectations																			√
Buyer's competitive advantage improvement (BCAI)																				
10	Reduction in total cost of product																			√
11	Improvement in flexibility of buyer																			√
12	Improvement in buyer capacity																			
13	Increased buyer's capability to																			√

	face uncertain demands of customer			
14	Continuous increase in buyer's product sale			√
15	Increased responsiveness of buyer	√		
16	Increased buyer's capability of manufacturing products		√	
17	Increased quality of product		√	√
18	Increased brand name of product of buyer		√	
19	Increased image of buying organization in society			√
21	Increased expansion and volume of buyer business	√		
21	Increased market share		√	
22	Increased enquires from new customers		√	
Supplier performance improvement (SPI)				
23	Increased capacity and capability of supplier		√	√
24	Decreased lead time of supplier for new product	√		
25	Increased innovativeness of supplier			√
26	Reduction in inventory cost of supplier		√	
27	Improvement in delivery performance of supplier	√		

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28	Improved order completing percentages with quality		√	√	
29	Improvement in material quality of supplier				√
30	Increased capacity of supplier		√		
31	Increased percentage of products meeting customer expectation	√			
32	Reduction in total cost of manufacturing		√		
33	Reduction in percentage rejection of products			√	

of buyer's direct investments in human or physical assets that are committed for particular supplier. This includes providing customized equipment, training cost etc. The buying organization's direct investment in supplier activities leads to BSRI and SPI. The investment in supplier activities is more beneficial, if the buying organization has a limited form of representation in a particular area or buying organization has not operated prior to the initiation of the SDAs etc. So, the investment is essential by buying organization in supplier activities for the expected outcomes (Gurel et al., 2015).

The above literature leads to following hypotheses

Hypotheses-7: *Investment of buyer in supplier activities is positively related with SPI.*

Hypotheses-8: *Investment of buyer in supplier activities is positively related with BSRI.*

3.4 Working together with suppliers (WTS)

Supplier evaluation is must to get the crucial information about weakness of suppliers, so that the suppliers can be selected for implementation of SDAs (Li et al., 2012). The effectiveness of communication and feedback system has been identified as important way to motivate the suppliers. The joint problem solving approach through frequent visits approach increases the understanding between buyer-supplier and also encourages conflict resolution between these two parties (Wu and Ragatz, 2010). The SDAs under this category namely improvement in supplier's technical capability, stability, reputation, delivery time performance, quality performance, and flexibility performance etc. plays vital role in BSRI, SPI and finally the BCAI (Shao et al., 2014). The improved capacity and capability of suppliers attracts the buying organization for implementation of more SDAs with supplier (Routroy and Pradhan, 2013).

The above literature leads to following hypotheses

Hypothesis-9: *Working together with supplier have a significant relation with BSRI.*

Hypothesis-10: *Working together with supplier have a significant relation with SPI.*

Hypothesis-11: *Working together with supplier have a significant relation with BCAI*

3.5 Involvement of buyer and supplier (IBS)

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The buyer and supplier's involvement in implementation of SDAs indicates the level of cooperation between buyer and supplier on certain activities that are important for improving the performance of buyer-supplier and relationship. Along with this strategic objectives of both buyer and supplier should match for the successful implementation of SDAs (Thomas, 2013). Involvement of buyer in supplier activities improves trust between buyer and supplier. The involvement of supplier in new product development is important as it minimizes the overhead cost of trial at their site. Providing assistance in material improvement will increase the supplier's quality, which will ultimately improve the buyer's quality.

The above literature leads to following hypotheses

Hypotheses-12: *Involvement of buyer and supplier is positively related with SPI.*

Hypotheses-13: *Involvement of buyer and supplier is positively related with BSRI.*

4. Conclusion and future scope

- Empirically tested and reliable instrument was developed to identify the importance level of SDAs and to recognize the relationship between SDAs with its effect on POs. The required parameters are namely Cronbach Alfa and validity were found within acceptable range. The aim of developing a instrument/questionnaire is to use an investigative tool to identify the effect of SDAs (independent variable) on POs (dependent variables).
- Thirteen hypotheses were set to check the relationship or significant effect of SDAs on POs, out of which five hypotheses were rejected and eight were accepted based on significant value.
- A model is developed showing relationship between SDAs (independent variable) and POs (dependent variables). After testing the hypothesis, the respecified model is developed showing significant relationship between SDAs (independent variable) and POs (dependent variable).

This study identified the possible significant relationship amongst SDAs on POs as follows

- The present study shows that, there is a significant correlation between each SDAs and POs except investment. These relationships are consistent with earlier researches, which indicated the SDAs have a significant impact on BSRI, BCAI and SPI (Li et al., 2012).

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- This shows a sound relationship between involvement of buyer in supplier activities and knowledge and information sharing with BSRI (Shi et al., 2013). Meanwhile, strong correlation was identified between working together with suppliers, knowledge and information sharing with BCAI, which is in line with the (Kannan et al., 2013; Govindan et al., 2010).
- The results also suggests that SPI depends upon all the constructs of SDAs except investment. Strong correlation found between the strategic efforts, knowledge and information sharing, working together with suppliers and involvement of buyer and supplier with SPI. This is the most essential objective of implementation of SDAs (Wu and Ragtaz, 2010).
- This study depicts a very important finding that investment by buyer in supplier activities does not have any significant impact on the performance outcome.

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5	Bentler and Peter (2010)	39	Mohanty et al. (2014)
6	Bhattacharyya and Guiffrida	40	O'Leary-Kelly and Vokurka
7	Campbell and Fiske (1959)	41	Ou et al. (2010)
8	Carr et al. (2008)	42	Park et al. (2010)
9	Chau (1997)	43	Peng et al. (2012)
10	Chin and Todd (1995)	44	Prahinski and Benton (2004)
11	Churchill Jr.(1979)	45	Qi et al. (2015)
12	Das et al. (2006)	46	Rezaei et al. (2015)
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19	Gunasekaran et al. (2008)	53	Sjoerdsma andWeele (2015)
20	Gurel et al. (2015)	54	Talluri et al (2010)
21	Hair Jr. et al. (2010)	55	Thomas (2013)
22	Hair et al. (1995)	56	Valtakoski (2015)
23	Hashemi et al. (2015)	57	Wagner and Benoit (2015)
24	Hohn (2010)	58	Wagner (2006)
25	Humphreys et al. (2004)	59	Wagner and Krause (2009)
26	Inemek and Matthyssens (2013)	60	Wagner (2011)
27	Kannan et al. (2013)	61	Walker and Brammer (2012)
28	Kelloway (1998)	62	Wu and Ragatz (2010)
29	Khan and Nicholson(2014)	63	Wynstra et al. (2015)
30	Kline (2011)	64	Yan and Dooley (2013)
31	Krause et al. (2000)	65	Yoo et al. (2015)
32	Lettice et al. (2010)	66	Zerbini and Borghini (2015)
33	Li et al. (2003)	67	Zhang et al. (2015)
34	Li et al. (2012)		

