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## Strategies for Buyer Supplier Relationship Improvement: Scale Development and Validation

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### Abstract

It is not possible for an Own Equipment Manufacturer to manufacture all components in house, due to which need of outsourcing of some components/process to supplier base occurs. For being competitive in market supplier base of buyer should be self-efficient and developed one. This development of supplier can be achieved by implementing different supplier development practices as per the requirement. Now days along with supplier development, relationship improvement between buyer and supplier plays a vital role for taking competitive advantages. In this article a frame work of achieving buyer supplier relationship improvement through development of a supplier is discussed and scale required for measuring all construct is being validated. To examine the impact of buyer supplier relationship improvement through supplier development practices and buyer supplier relationship practices, a survey was conducted for manufacturing companies mainly including Auto Ancillaries, Engine Manufactures, Generator Manufactures and Machine Tool Manufactures. Researcher approached 628 respondents, out of which 536 respondents showed interest to response, data from 512 respondents were used as 24 respondents filled information incompletely. Reliability Analysis, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are applied for reliability and validity of scale with use of SPSS and AMOS software. The multi-item scale shows strong evidence of reliability and validity.

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## 1. Introduction

The term “Supplier Development” describes efforts by manufacturers (Buyer) to increase the number of viable suppliers and improve supplier's performance. More specifically supplier development has been defined as any effort by an industrial buying firm to improve the performance or capabilities of its suppliers [1, 2]. Cooperation with suppliers can make buyer more efficient and thus enable goods to be purchased at lower prices and also makes buyer to look for his core competency to remain more competitive [3]. Supplier development is a kind of cooperation between a buyer and a supplier to seek continuous improvement in supplier performance to make buyer competitive [4-6]. Supplier development can further linked with relationship development, improvement in competitive advantage and these efforts will lead to profitability of buyer and supplier. More focus of these efforts for supplier development is towards supplier performance, buyer competitive advantage, and buyer-supplier relationship improvement [5]. Supplier development is an emerging and feasible solution for the buyer, as procuring a new supplier every time and manufacturing all products in-house is a feasible solution [2, 4]. Strong relationship between buyer and supplier positively affects supplier performance, which is positively related to organisational performance. There is an increased need for buyers and suppliers to strategically collaborate to build a stronger and long-term relationship [6, 7].

## 2. Literature Review

By critical review of literature following factors found to contribute primarily for supplier development practices (SDP) and relationship practices 1-7 factors are for SDP and 8-10 are for buyer supplier relationship practices (BSRP).

*Training and education:* Programs for supplier development that receive assistance from buyers can be regarded as buyer supported training. The right type of training could then lead to an increase in performance for the supplier which would in turn encourage an increase in buyer-supported training [8, 9]. Automotive companies have used training and education aspect in their supplier development programmes, where suppliers have the opportunity to directly experience new production methods [10].

*Evaluation:* First step of supplier development is supplier's evaluation because after this buyer can identify areas of supplier where improvement is needed. Supplier evaluation and feedback has been used to improve supplier's capabilities [11-14]

*Reward:* Recognition and awards for outstanding suppliers can serve as an incentive for improved supplier performance [15]. Appropriate incentives for improvement should be developed to ensure that the improvement effort is not limited to a single process [16-17].

*Effective communication:* Effective Communication between buyer and supplier leads to minimize misunderstanding and clarity in goal. Buyer-to-supplier information sharing, buyer-to-supplier performance feedback and buyer investment in inter-organizational information technology are key enablers of buyer-to-supplier communication openness [18, 19].

*Asset Specificity:* Dedicated investments offer tangible evidence that a partner can be believed, cares for the relationship, and is willing to make sacrifices through such investments which lead to improvement in trust and relationship [20, 21].

*Joint action:* Then the concept of joint action with early involvement of suppliers has come which also gives additional advantage of supplier's innovativeness to buyer [22]. To achieve better result of joint actions, supplier should be capable, committed and faithful. Early supplier involvement benefits in time and cost saving with improved quality [23, 24].

*Top management support:* Involvement and continuous follow of supplier development programme from top management leads to success of SD programme [1-5]. Top management has been found to be a key enabler in initiating a supplier development program based on the firm's competitive strategy [7-8].

*Trust:* High level of trust is necessary in competitive environment to build relationship for result oriented process [8-11]. Trust has been recognized in the literature as important in supply chain relationships [3-5]. Trust refers to the extent to which relationship partners perceive each other as credible and benevolent [10].

*Long term commitment:* A long-term cooperative effort between a buying firm and its suppliers to upgrade the supplier's technical, quality, delivery and cost capabilities and to foster ongoing. It develops quality attitudes in workers and management and continuously focuses on quality in design, production and performance [1-5, 8].

*Supplier's perspective for buyer supplier relationship:* Supplier needs to offer value to the customer but also needs to gain benefits from the customer at the same time. For keeping improvement in relationship and to achieve competitive advantage, buyer should also consider the perspective of supplier [9, 10].

### 2.1. Buyer-supplier relationship improvement

SDP initiatives by buyer and continuous follow up with suppliers perspective leads to improvement in BSR. So a more cooperative and long lasting relationship may be derived from supplier development Programs [25]. Improved BSR helps to implement new advanced technologies effectively [26].

### 2.2. Competitive advantages

Competitive advantages discussed here are, Technology Adaption, Innovation, Risk Minimization and Operational Excellence.

*Technology adaption:* It is recommended from supplier to adopt new technologies like CAD-CAM, manufacturing resources planning, robotics, group technology, flexible manufacturing systems, automated materials handling systems, computer numerically controlled (CNC) machine tools to remain competitive [21, 22].

*Innovation:* Supplier base of buyer should be innovative have capabilities of competencies in R&D, Product and Process. The supplier innovativeness has always positive impacts on manufacturer performance across multiple dimensions and is always appreciated by manufacturer [9, 10].

*Risk minimization:* Firms need to choose different management mechanisms for different suppliers based on the salient attributes of individual suppliers and their relationships with the buyers rather than relying on single supply chain practices [12-15].

*Operational excellence:* Improved performance of supplier in operations focuses on improvement in quality, delivery, cost, inventory, lead time and the rate of new product introduction [26]. Improvement in operations and performances leads to competitive advantage as quality improvement, cost reduction and faster product development. SDP and Supply chain practices leads to increased competitive advantage including improvement in operations [27].

### 2.3. Profitability

Increase in profitability leads to openness between suppliers and buyer and thus greater knowledge and appreciation of each other's contribution to the relationship. Profitable project especially from the supplier's perspective leads to satisfaction and future business growth [7-11].

## 3. Proposed Framework of Research

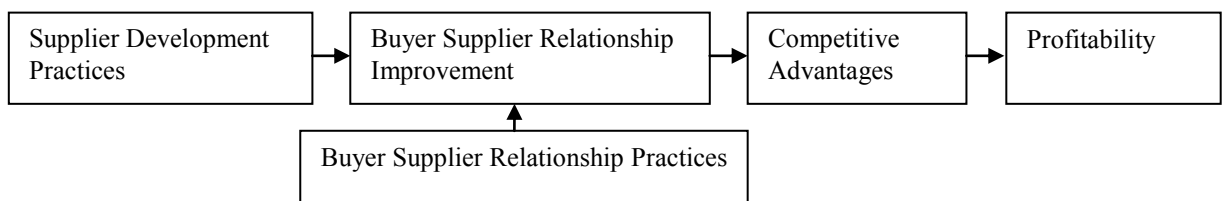


Fig. 1. Proposed framework for research

This section summarises the theoretical framework (Figure 1). The research work has been classified in 6 parts as 1) Drivers for Supplier Development Practices (Drivers for SDP) 2) Supplier Development Practices (SDP) 3) Buyer-supplier Relationship Practices (BSRP) 4) Buyer-supplier Relationship Improvement (BSRI) 5) Competitive Advantages (CA) and 6) Profitability (PR). Drivers for SDP include Productive Measure (PM), Competitive Pressure (CP) and Customer Uncertainty (CU). SDP includes Supplier Evaluation (SE), Training and Education

(TE), Effective Communication (EC), Asset Specificity (AS), Top Management Support (TMS), Joint Action (JA), and Rewards (RE). BSRP includes Trust (TR), Long-term Commitment (LTC) and Supplier Perspective for Buyer-supplier Relationship (SPBSR). CA includes Operational Effectiveness (OE), Innovation (INV), Technology Adaption (TAD) and Risk Minimisation (RIM). The framework ends with profitability, which can be achieved through competitive advantages under the condition of buyer-supplier relationship improvement. BSRI can be achieved by linking SDP and BSRP together.

#### 4. Research Methodology

Research methodology is a crucial part in research which facilitates researchers in achieving the objectives. Rigorous statistical methods were used to assess and validate the constructs. The methods used were: Content validity (using structured interviews), Reliability (using Cronbach's  $\alpha$ ), exploratory factor analysis (for factor structure and initial validity) and confirmatory factor analysis.

To develop the scale for survey instrument, an extensive literature review was first conducted to identify scales used in previous studies that were found to have strong validity and reliability. The critical variables for, supplier development practices, buyer supplier relationship practices, buyer supplier relationship improvement and competitive advantage, were identified from the literature had content validity because an extensive review of the literature was conducted in selecting the items followed by discussion with the industry practitioners on applicability of these variables in Indian context. Content validity represents the sufficiency with which a specific domain of content (construct) was sampled [8-10]. Data from experts was also complied via mail and interviews were conducted through telephonic mode. The second stage consisted of using items from the first phase for the various constructs for convergence and discernment validity and reliability for the assessment of scale. To enable respondents to indicate their responses a five-point Likert interval scale was used [15].

##### 4.1. Sampling and data collection

The present study has adopted purposive sampling technique. This method was considered to be appropriate to collect sufficient information from the respondents for making statistical inference. Target respondents were plant managers, operations managers, quality managers; quality heads, and sourcing managers. Researcher approached 628 respondents, out of which 536 respondents showed interest to response and at last data from 512 respondents were used as 24 respondents filled information incompletely.

##### 4.2. Profile of respondents

The respondents were from various departments of organizations. Following table 1 shows details of respondents. Table. 1. Profile of respondents

Classification	Nos	% total
Industry Category		
Auto and Auto Ancillary	267	52.14
Sheet Metal	64	12.5
Oil Engine	59	11.52
Generator Manufacturing	51	9.96
Casting	48	9.38
Electrical Equipment	23	4.49
Education		
Graduate	436	85.15
Post Graduate	76	14.84
Experience (in Years)		
0-3	41	8
3-5	109	21.28

5-10	124	24.21
10-15	152	29.68
Above 15	86	17.8
Turn Over (in Cr)		
50-100	78	15.23
100-200	216	42.18
200-500	171	33.39
500-1000	47	9.17

### 4.3. Data analysis and result

#### Content validity:

In total, 61 items under 16 factors of supplier development practices, buyer supplier relationship practices, buyer supplier relationship improvement, competitive advantages and profitability were reviewed by 7 experts from academicians and 6 from industry to assess the content and face validity. A pilot study of 57 respondents was conducted to examine the questionnaire before large scale data collection and 5 items viz., TE2, EC3, TMS3, INV2, and INV3 were deleted due to their least importance in questionnaire and cross loading in Exploratory Factor Analysis. Finally questionnaire of 16 factors and 56 questions is used for further data collection for checking its reliability and validity.

#### Reliability analysis:

The first and the most important step of analysis is to refine the scale by computing coefficient alpha i.e. Cronbach's alpha (Churchill Jr 1979). The Cronbach's alpha measures the reliability of the instrument, and detects consistency of the measurement scale developed on the basis of responses. Value of Cronbach's alpha which is needed to be at least .60 and considered highly reliable beyond 0.70 (Nunnally 1978). The present study used the Internal Consistency technique in determining the instrument's reliability for all factors. Table 2 shows reliability analysis of respective construct.

Table 2. Reliability analysis

Construct	No. of items	Reliability Cronbach's alpha ( $\alpha$ )	Item to total Correlation (above 0.5)
TE	3	0.824	All
RE	2	0.637	All
EC	3	0.704	All
SE	3	0.946	All
AS	3	0.891	All
TMS	2	0.735	All
JA	3	0.855	All
TR	5	0.870	All
LTC	3	0.801	All
SPBSR	6	0.896	All
BSRI	5	0.87	All
OE	4	0.853	All
INV	4	0.85	All
TA	4	0.903	All
PR	4	0.834	All
RIM	2	0.712	All

#### 4.3.1. Construct validity

After conducting reliability analysis Exploratory Factor Analysis (EFA) was applied on respective constructs. The purpose of EFA was to explore the structure between the latent and observed variables. The Principal Component Analysis (PCA) using Varimax rotation was executed for extracting factors through SPSS 20.0 software. A minimum cut off criteria for the deletion of the items was: factor loadings (>0.50), cross loadings

(<0.40) or communalities (<0.30) [1-4]. The appropriateness of the data was determined by the examination of Kaiser-Meyer-Olkin (KMO) statistic of sampling adequacy and Bartlett's Test of Sphericity. For good factor analysis, the value of KMO must be at least 0.60 and above.

#### 4.4 Summary of EFA and CFA analysis

Table 3 shows summarized values of EFA and CFA Analysis

Table 3 Summary of EFA and CFA analysis

Group	Construct	EFA loading range	KMO Value	CFA	
				First-Order	Second-Order
Supplier Development Practices (SDP)	TE	0.795 to 0.814	0.81	0.75 to 0.81	0.59
	RE	0.763 to 0.751		0.47 to 1	0.42
	EC	0.737 to 0.807		0.63 to 0.68	0.43
	SE	0.883 to 0.902		0.89 to 0.98	0.690
	AS	0.853 to 0.910		0.79 to 1	0.52
	TMS	0.761 to 0.776		0.73 to 0.8	0.51
	JA	0.839 to 0.891		0.78 to 0.86	0.37
Buyer-Supplier Relationship Practices (BSRI)	TR	0.804 to 0.814	0.858	0.75 to 0.77	0.597
	LTC	0.837 to 0.853		0.73 to 0.79	0.498
	SPBSR	0.778 to 0.933		0.72 to 0.96	0.618
Buyer-Supplier Relationship Improvement (BSRI)	BSRI	0.804 to 0.818	0.878	0.75 to 0.77	-
Competitive Advantages (CA)	OE	0.811 to 0.835	0.811	0.76 to 0.79	0.44
	INV	0.791 to 0.812		0.74 to 0.78	0.38
	TAD	0.842 to 0.945		0.73 to 0.98	0.39
	RIM	0.869 to 0.873		0.73 to 0.76	0.21
Profitability (PR)	PR	0.812 to 0.831	0.814	0.74 to 0.77	-

## 5. Discussion and conclusion

The scale emerging from this study shows a good degree of reliability, validity and uni dimensionality in each of its dimensions. At start, Questionnaire was having 61 items out of which 5 items were deleted after conduction of EFA for pilot study, due to cross loading and their least importance in questionnaire for respective construct. Final questionnaire contains 16 factors with total 56 items. All constructs used have internal consistency by seeing Cronbach's alpha value. EFA analysis shows that there is no cross loading between items and satisfactory KMO values. All constructs shows clear pattern matrix with respective items. Based on factor loading value in pattern matrix it can be concluded that items lying in respective constructs explain those constructs effectively. Exploratory Factor Analysis shows that all fit indices values (GFI and CFI) and all residual indices values viz. (RMR and RMSEA) are satisfying cut off values. Finally, all values for reliability, EFA and CFA were also found to be satisfactory as per cut-off mentioned. Constructs were supposed to be reliable and valid as per the analysis.

## 6. Limitation and scope for further study

This study has been carried out in a scenario where the product is stable and established. Buyer and suppliers selected here are well-established and manufacturing the respective product for a considerable time. End user is

supposed to select the product from available range. Innovation considered is incremental innovation, not sudden/drastring innovation. Study can be carried to include the impact of demographic variables on the model. Also study can be done to find the impact of responses on model by differentiating the responses from Indian companies and foreign companies situated in India. Other than Auto sector and Machine/Components manufacturing sector, study can be carried out to see the applicability of model. A research can be carried out to analyze new factors where market of products is volatile and sudden innovation is required to attract the customer.

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