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Professor MURUGESAN SELVAM, M.Com, MBA, Ph.D
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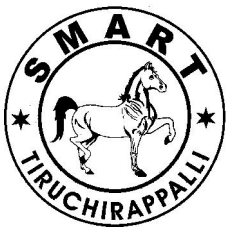

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A STRUCTURAL EQUATION MODELLING APPROACH FOR BUYER SUPPLIER RELATIONSHIP DEVELOPMENT STRATEGIES: INDIAN MANUFACTURING CONTEXT

Joshi Sarang P*
Research Scholar, National Institute of Industrial Engineering, Mumbai
Email ID: sarangnitie@gmail.com

Bhasin H V
Professor, National Institute of Industrial Engineering, Mumbai
Email ID: harsh.v.bhasin@gmail.com

and

Rakesh Verma
Associate Professor, National Institute of Industrial Engineering, Mumbai
Email ID: rakesh1709@gmail.com

Abstract

The relationship practices play a vital role in Buyer Supplier Relationship Improvement (BSRI). These improved relationships are characterized by a long term commitment, shared common goals, two-way information sharing and a high level of trust. For development of supplier, buyer should go for different Supplier Development Practices (SDP). SDP, with Buyer Supplier Relationship Practices (BSRP), leads to BSRI. Competitive Advantages (CA) to survive in the market can be achieved through BSRI and CA leads to profitability. Researcher made a survey of 512 respondents, from 114 manufacturing firms. Hypotheses were tested by structural equation modelling. For the analysis, AMOS and SPSS software were used.

Key Words: *Supplier Development Practices, Buyers, Supplier, Relationship Improvement, Practices,*

JEL Codes: *C38, L62, M11*

1. Introduction

Traditional approaches have been limited, within an enterprise, for being competitive in quality and cost due to increasing competition. Emerging ways of SDP, along with cooperation with suppliers, can make buyer more efficient and thus enable goods to be purchased at lower prices and also help buyer to look for his core competency to remain competitive (**Li et al., 2007; Lau, 2011; Pradhan and Routroy,**

*** Corresponding Author**

2014). More focus on these efforts for supplier development is towards supplier performance, BSRI and competitive advantage (CA) (**Li et al., 2007**). Now a days, not only SDP but also BSRP are deemed critical success factors for supply chain performance (**Aslan et al., 2011; Lee et al., 2013**).For being competitive in market, supplier base of buyer should be self-efficient and this can be achieved through implementing supplier development practices. To improve the relationship between buyer and supplier is the emerging way to build long term relationship and to achieve competitive advantages. SDP, together with relationship practices, can lead to competitive advantages which lead to profitability of the supply chain.

2. Literature Review

SDP is emerging as the feasible solution to a buyer as it is not possible for him to search for a new supplier every time or to manufacture product in house. SDP improves suppliers' product and delivery performance for the short term and supplier capabilities for the long term (**Aslan et al., 2011**). It is necessary to make supply chain, both responsive and efficient, which can be achieved through supplier development (**Routroy and Pradhan 2013; Rosell et al., 2014**). First seven factors deal with SDP and last three factors deal with BSRP.

2.1. Factors Identification

2.1.1. Supplier Evaluation (SE)

The first step in the supplier development is evaluation of supplier because after this buyer can identify areas of supplier where improvement is needed. This step helps to point out exact cause of the problem (**Krause et al., 2007; Cormican and Cunningham, 2007**). Continuous evaluation sharpens supplier performance to raise his quality to remain competitive (**Sundtoft Hald and Ellegaard, 2011**).

2.1.2. Training and Education (TE)

Evaluation of supplier leads to necessary training and education for supplier who lacks in the relevant area and right type of training could then lead to increase in performance for the supplier (**Modi and Mabert, 2007**). Right type of training to supplier leads to improvement in technical capabilities of supplier which makes the buyer more competitive (**Kadir et al., 2011**)

2.1.3. Reward (RE)

Recognition and awards for outstanding suppliers, can serve as an incentive for improved supplier performance (**Krause et al., 2007**). Appropriate incentives for improvement should be developed to ensure that the improvement effort is not limited to a single process. Supplier development may be achieved by promises of increased present and future business if supplier performance improves (**Handfield et al., 2000; Krause et al., 2007**).

2.1.4. Effective Communication (EC)

Effective Communication between buyer and supplier, minimizes misunderstanding and brings 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 (Sanders et al., 2011). Effective communication is a significant parameter for supplier development and strengthens buyer supplier relationship (**Chidambaram et al., 2009; Routroy and Pradhan, 2013**).

2.1.5. Asset Specificity (AS)

Asset Specificity improves the market responsiveness of a buyer (**Li et al., 2007**) and also improves relationship effectiveness (**Corsten and Kumar, 2005**). 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 (**Rokkan et al., 2003**).

2.1.6. Joint Action (JA)

The concept of Joint Action, with early involvement of suppliers, gives additional advantage to supplier's innovativeness to buyer and reduces time for development of product (McIvor and Humphreys, 2004; Song and Benedetto, 2008). Early supplier involvement benefits in time and cost saving, with improved quality (**Eisto et al., 2010**).

2.1.7. Top Management Support (TMS)

TMS has been found to be a key enabler in initiating a SDP, based on the firm's competitive strategy (**Leenders and Blenkhorn, 1988**). Involvement and continuous follow up of SDP from top management, leads to the success of SDP (**Handfield et al., 2000; Kannan et al., 2010**).

2.1.8. Trust (TR)

Trust refers to the extent to which relationship partners perceive each other as credible and benevolent (**Gullett et al., 2009**). High level of trust is necessary in competitive environment to build relationship for result-oriented process (**Wagner et al., 2011; Akrout, 2015**). Trust is important for knowledge integration and it is perceived as key to product development success (**Rosell et al., 2014**).

2.1.9. Long Term Commitment (LTC)

LTC is a long-term cooperative effort between a buyer and its suppliers to upgrade the supplier's technical quality, delivery and cost capabilities (**Handfield et al., 2000**). LTC helps to improve supplier's capabilities and the knowledge transfer from the buyer to the supplier (**Kumar et al., 2014**)

2.1.10. Suppliers Perspective for Buyer Supplier Relationship (SPBSR)

Perspective of supplier mainly focuses on long term contract and profitable pricing and buyer should think of it in rising price conditions of raw material (**Roloff and Aßländer, 2010**). A supportive environment, with consideration of supplier's perspective, improves the performance of supplier (**Pradhan and Routroy, 2014**).

2.2. Buyer - Supplier Relationship Improvement (BSRI)

SDP initiatives by buyer and continuous follow up with supplier's perspective, leads to improvement in BSR. A more cooperative and long lasting relationship may be derived from SDP (**Lambert and Schwieterman, 2012; Lee et al., 2013**). Improved relationship with suppliers can play a critical role in the successful implementation of a firm's innovation-focussed supply chain strategy (**Shakeel et al., 2014; Abd Rahman and Bennett, 2009; LS Miguel et al., 2014; Jack and Powers, 2015**)

2.3. Competitive Advantages (CA)

Researcher considered competitive advantages under Technology Adoption, Operational Efficiency and Innovation.

2.3.1. Technology Adaption (TAD)

Relationship with supplier is an important parameter for new technology adoption and its implementation. Lack of support from supplier has been associated with impediments to technology acquisition and implementation (**Baldwin and Lin, 2002**). It is recommended that supplier should adopt new technologies to remain competitive (**Abd Rahman and Bennett, 2009**).

2.3.2. Innovation (INV)

Supplier Innovativeness always has positive impact on manufacturer performance, across multiple dimensions and it is always appreciated by the manufacturer. Technical capability of supplier affects greatly innovation and buyer feels that the best resources of this supplier work for him (**Schiele et al., 2011**). Exchange of knowledge, investment in specific assets and commitment lead to innovation (**Charterina and Landeta, 2010**). Improvement in buyer supplier relationship plays a vital role in innovation (**Inemek and Paul, 2014; Kim et al., 2015**).

2.3.3. Operational Excellence (OE)

Improved performance of supplier in operations focuses on improvement in quality, delivery, cost, inventory, lead time and the rate of new product introduction (**Collis, 1994**). SDP and relationship practices lead to increased competitive advantage, including improvement in operations and performance (**Thatte et al., 2013**).

2.3.4. Profitability (PR)

Higher profitability can be achieved through long-term relationships (**Kalwani and Narayandas, 1995**). Increase in profitability leads to openness between suppliers and buyer and thus greater knowledge and appreciation of each other's contribution to the relationship improvement. (**Corsten and Kumar, 2005; Mao et al., 2008**).

3. Statement of Problem

Supplier Development can be considered as an indicator of a cooperative buyer supplier relationship. Although buyer-supplier relationships have been researched, it has not been linked to supplier development specifically and effect of improved relationship on competitive advantages. Hence the aim is to understand the outcomes of a buyer-supplier relationship improvement, from both buyer's and supplier's perspective, under the conditions of supplier development, to achieve competitive advantages, leading to profitability.

4. Research Questions

- How can the supplier buyer relationship be improved, under the condition of supplier development and buyer supplier relationship practices?
- How will improved relationship lead to improved competitive advantages?
- Which are the success factors for buyer supplier relationship practices and supplier development practices?
- Which are the significant drivers for supplier development practices?

5. Research Objectives

Following are the research objectives for the study.

1) To find the significant drivers for SDP

2) To find the success factors for SDP and BSRP.

3) To link SDP and BSRP for CA, leading to Profitability.

4) To find the effect of BSRI on Profitability

6. Hypotheses Development

From the research frame work, following hypotheses were developed. All hypotheses are alternate hypotheses.

- Alternate Hypothesis: H1: There is a positive relationship between Productive Measure and Supplier Development Practices
- Alternate Hypothesis: H2: There is a positive relationship between Competitive Pressure and Supplier Development Practices
- Alternate Hypothesis: H3: There is a positive relationship between Customer Uncertainty and Supplier Development Practices

- Alternate Hypothesis: H4: There is a positive relationship between Supplier Development Practices and Buyer-Supplier Relationship Improvement
- Alternate Hypothesis: H5: There is a positive relationship between Buyer-Supplier Relationship Practices and Buyer-Supplier Relationship Improvement
- Alternate Hypothesis: H6: There is a positive relationship between Buyer-Supplier Relationship Improvement and Competitive Advantages.
- Alternate Hypothesis: H7: There is a positive relationship between Competitive Advantages and Profitability

7. Need of Study

The objective of buyer is to satisfy the end user, with improved quality and diversified range. As it is not possible to manufacture all components in house, supplier base of buyer should be self-efficient and developed one. The study proposes to examine the different SDP for improving the performance of supplier and the BSRP to strengthen the relationship between buyer and supplier. SDP and BSRP together, would provide competitive advantages which will attract the end user to purchase the product, leading to profitability of supply chain.

8. Research Frame Work

This section summarizes the theoretical framework (**Figure 1**) and the hypotheses. Work has been classified into six parts as: 1) 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). 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 SDP and BSRP together. Three drivers are mentioned for driving the implementation of SDP as Productive Measure (PM), Competitive Pressure (CP) and Customer Uncertainty (CU).

9. Methodology of the Study

Research methodology is a crucial part of the research activity, considering that it facilitates researchers in achieving their objectives. This study consists of three phases: 1) Item generation 2) Pilot study and 3) Large-scale data analysis. Items and constructs were taken from literature review and pilot study of 87 respondents was done to validate questionnaire and then this questionnaire was used for large scale data collection.

9.1. Sample Selection

The present study adopted the purposive sampling technique. This method was considered to be appropriate to collect sufficient information from the respondents for arriving at a statistically significant inference. Data were collected from industrial area of Maharashtra and Gujarat due to availability of adequate manufacturing industries. Out of 687 respondents, data from 512 respondents were used for the analysis.

9.2. Source of Data

Respondents were from Auto and Machine/Components Manufacturing Sector. Respondents were mainly managers from quality, manufacturing and sourcing departments, with an average experience of more than five years.

9.3. Time of Study

Seven months were required to collect the data and the period of study was from July 2014 to February 2015.

9.4. Tools Used for the Study

Tools used for data collection were structured questionnaire and personal interviews.

Data were collected by visiting personally and via e-mails. Data collected, were analysed by software SPSS and AMOS.

10. Data Analysis

This section deals with reliability and validity of respective construct, building of Structural Equation Model and testing of hypotheses.

10.1. Reliability and Validity Analysis

It is recommended that before the analysis of data, instrument should be tested for reliability and validity. For reliability and validity of respective construct, indicators were used. Composite Reliability (CR) should be greater than 0.7, Average Variance Extracted should be greater than 0.5 and MSV<AVE (Hair et al., 2010). Range of CR was from 0.714 to 0.947, which was more than 0.7 and Range of AVE was from 0.503 to 0.626, which was more than 0.5. For all constructs MSV<AVE. Analysis shows that all values were above the cut off. Hence the instrument used is reliable and valid (**Table 1**)

10.2.Structural Equation Modelling (SEM)

After establishing the proposed measurement model, hypotheses were tested by using the SEM technique (Hair et al., 2009), using the maximum likelihood method. **Figure-2** shows the SEM, with the analysis of hypothesis testing. The SEM results indicate that all the parameter estimates were significant at five percent level and all the model fit indices were above/below the acceptance level. In order to improve the model fit and get a feasible solution, the model was refashioned. Based on modification indices and the standardized residual covariance matrix, the model was specified to improve the model fit. In a step-by-step manner, first the correlation path was specified between SPBSR2 and SPBSR5, SPBSR1 and SPBSR4, SPBSR1 and SPBSR2, P3 and P4, C3 and C4, TAD2 and TAD4, SPBSR1 and SPBSR6 and then the indicator EC2 was deleted due to high standardized residual covariance in the initially hypothesized structural model. The results for the final structural model, as shown in **Figure 2,** indicate that all the parameter estimates were significant at the five per cent level and all the model fit indices were above/below the acceptance level (GFI=0.887, CFI=0.989, RMR=0.068, RMSEA=0.014).

10.3. Model Fit Indices

After developing SEM model, fit values will decide the predictability of model. All fit values, Goodness of Fit Index and Comparative Fit Index (GFI, CFI) should be more than 0.9 and all error values, Root Mean Square Residual and Root Mean Square Error of Approximation (RME, RMSEA) should be less than 0.1 for a good model fit (Hair et al., 2009). **Table 2** shows all values to be above the above cut off values and thus it was a good fit. (GFI=0.887, CFI=0.989, RMR=0.068, RMSEA=0.014).

10.4. Hypothesis Testing

All hypotheses were tested after construction of SEM. The path coefficients, testing the relationship between latent constructs for all respondents, are summarized in **Table-3.** Only hypothesis H3 was rejected while the other six hypotheses were accepted. P values are mentioned in **Table - 3** (Confidence level is of 95%). P value, more than 0.05, was treated as base value for rejecting the hypothesis and less than or equal to 0.05, for not rejecting. Based on p values, all hypotheses were accepted except H3.

11. Findings and Suggestions

Findings suggest that a buyer should select the SDP, based on the performance of

supplier. Buyer should not only depend on SDP but also work on improving the relationship with supplier to achieve the competitive advantages. It is recommended that buyer should also consider the perspective of supplier, which will make him a preferred buyer from the perspective of supplier. Findings suggest that this model is for the stable product where incremental innovation is preferred. Lastly, with reference to problem statement, model reveals that linking of SDP and BSRP together leads to CA and CA leads to profitability of supply chain

12. Conclusion

By linking SDP with BSRI, a significant growth generates competitive advantages which make a buyer more competitive by taking into account the perspective of supplier for his growth, through maintaining long-term relationship. These efforts will lead to the profitability of business for survival in the market. It has been found that two drivers *viz.*, productive measures and competitive pressure of rivals were significant drivers for SDP. Another driver, customer uncertainty, was found to be insignificant for SDP.

13. Limitations & Scope for Further Study

This study was carried out in a scenario where the product was stable and established. Buyer and suppliers selected were well-established and manufacturing the respective product for a considerable time. End user was supposed to select the product from an easily available range. Innovation considered was incremental innovation and not sudden/drastic 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 the 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 in other sectors to see the applicability of model.

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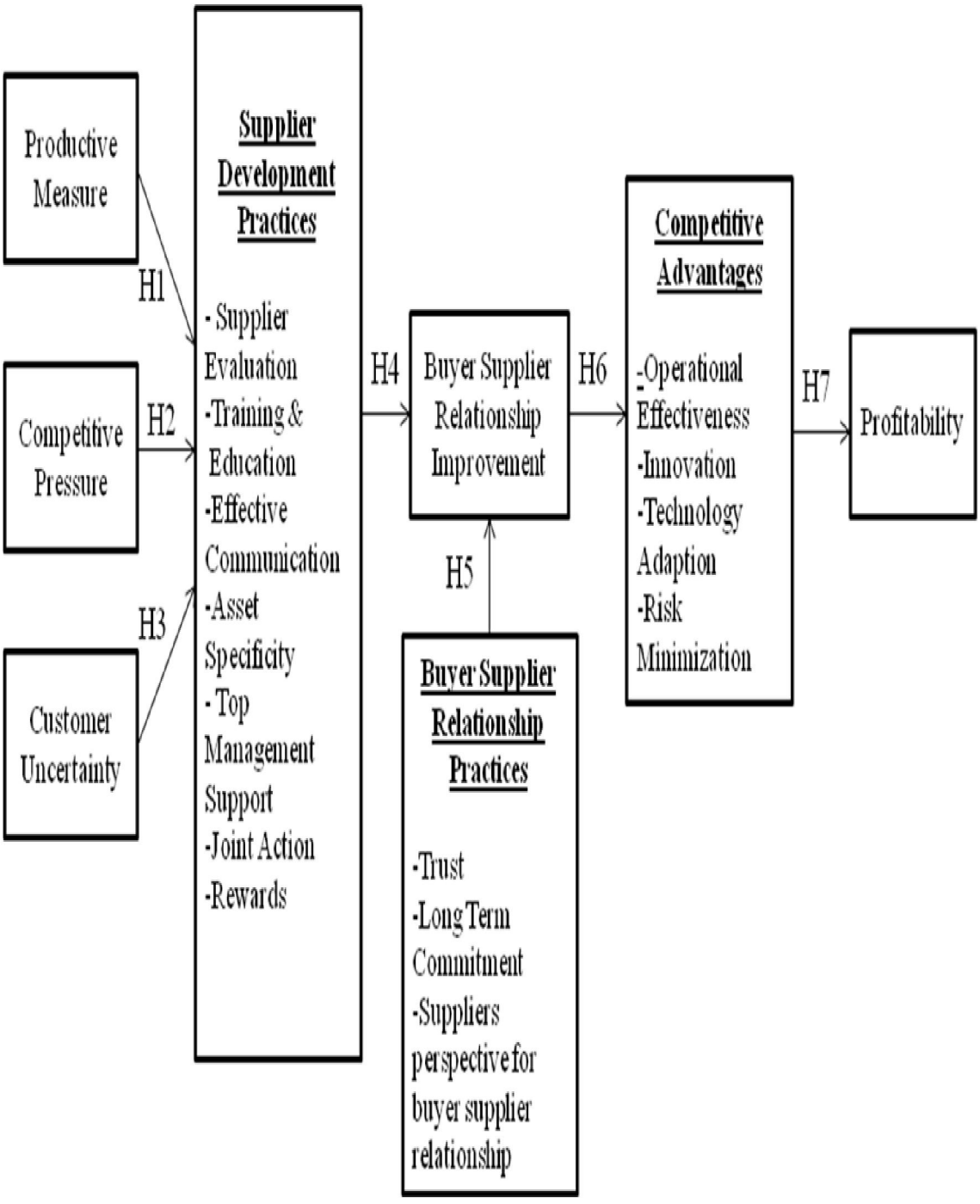
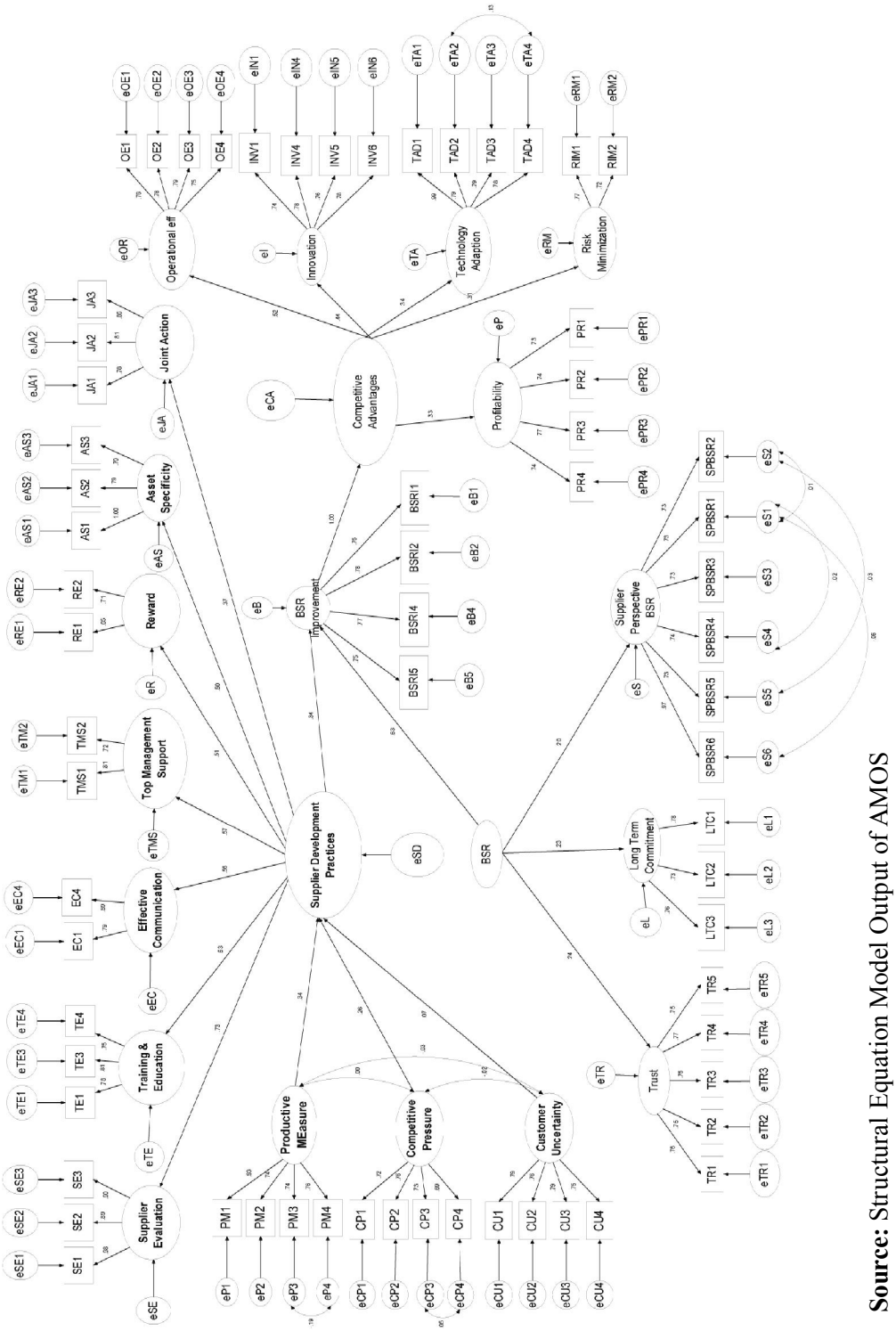
Figure - 1
Research Framework



Source: Research Framework, Author formulated, 2015

Figure - 2
Final Structural Equation Model



Source: Structural Equation Model Output of AMOS

CMIN	DF	p-value	GFI	CFI	RMR	RMSEA
2316.822	2049	0	0.884	0.983	0.059	0.016

Table 1 : Reliability and Validity Analysis

	CR	AVE	MSV	ASV	Reliability	Convergent Validity	Divergent Validity
PM	0.868	0.626	0.0009	0.0005			
CP	0.818	0.53	0.0004	0.00025			
CU	0.855	0.597	0.0009	0.00065			
TE	0.825	0.611	0.2116	0.11537			
RE	0.734	0.61	0.0665	0.04580			
EC	0.704	0.443	0.1260	0.08035			
SE	0.947	0.856	0.2116	0.13167			
AS	0.898	0.748	0.1608	0.08206			
TMS	0.737	0.584	0.1705	0.09557			
JA	0.856	0.666	0.0882	0.04887	CR>0.7	AVE>0.5	(MSV<AVE)
TR	0.87	0.573	0.0009	0.0009			(ASV<AVE)
LTC	0.801	0.574	0.01	0.00545			
SPBSR	0.9	0.603	0.01	0.0058			
BSRI	0.87	0.573	0	0.0001			
OE	0.853	0.592	0.0384	0.02650			
INV	0.796	0.503	0.0384	0.02863			
TAD	0.908	0.713	0.0364	0.02110			
PR	0.714	0.556	0	0.0001			
RIM	0.835	0.558	0.0278	0.01324			

Source: Output of AMOS/SPSS,

Note: **CR:** Composite Reliability, **AVE:** Average Variance Extracted, **MSV:** Maximum Shared Variance, ASV**:** Average Shared Variance.

Table 2 : Model fit Indices

CMIN	DF	p-value	GFI	CFI	RMR	RMSEA
2491.7	**2187**	**0**	**0.88**	**0.982**	**0.062**	**0.017**

Source: Output of AMOS/SPSS

Note: GFI: Goodness of Fit Index **CFI:** Comparative Fit Index **RMR:** Root Mean Square Residual **RMSEA:** Root Mean Square Error of Approximation

Table 3 : Path Coefficients Testing the Relationship between Latent Constructs

			Estimate	S.E.	CR	P	Hypothesis No.	Remark
SDP	<---	PM	0.277	0.045	6.202	***	H1	Can't Reject H1
SDP	<---	CP	0.233	0.051	4.543	***	H2	Can't Reject H2
SDP	<---	CU	0.06	0.043	1.394	0.163	H3	Reject H3
BSRI	<---	SDP	0.429	0.072	5.96	***	H4	Can't Reject H4
BSRI	<---	BSR	0.576	0.188	3.057	0.002	H5	Can't Reject H5
CA	<---	BSRI	0.503	0.053	9.529	***	H6	Can't Reject H6
PR	<---	CA	0.619	0.115	5.387	***	H7	Can't Reject H7

Source: Output of AMOS ***** Significant at 0.001**