Supply Chain Management Practices and Technological Infrastructure -Impediments and Strengths

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Abstract: Intensive competition in the market place has forced companies to respond more quickly to customer needs through faster product development and shorter delivery time. In order words, fierce competition in today's global markets, the introduction of products with shorter life cycles, and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on, their supply chains. This, together with continuing advances in communications technologies has motivated the continuous evolution of the supply chain and of the techniques to manage it effectively.

In a typical supply chain, raw materials are procured and items are produced at one or more factories, shipped to warehouses for intermediate storage, and then shipped to retailers or customers. Consequently, to reduce cost and improve service levels, effective supply chain strategies must take into account the interactions at the various levels in the supply chain. Increasing customer awareness and preferences have led to an unprecedented explosion in adoption of supply chain technologies. Internal as well as external customers give credit only to companies that are able to deliver products and / or services with excellent quality as per their expectations. However, in order to be effective in matching demand with supply, manufacturers and retailers need to collaborate in the supply chain. This paper identifies and discusses various parameters and aspects of supply chain management. This paper is an attempt to summarize the associated bodies of knowledge and their connects using a systems approach. Systems levels of supply chain management are identified as the internal supply chain, the dyadic relationship, the external supply chain and the inter-business network.

The present paper is an outcome of the Major Research Project of University Grants Commission for studying the Collaborative Management Practices across Select Indian State of Northern region. The present research paper provides the various constructs along with their items that are of importance and being presently used across Northern Industrial Units. The parameters / constructs form the part of the structural questionnaire adopted from the Doctoral Unpublished Thesis of the Principal Investigator. The research paper makes use of CITC and EFA tools of statistics for concluding on the parameters that are presently being considered important in Indian industries by the associated managers. This paper also helps provide an outline to understand the concerns of the Top Management towards full implementation of SCM Practices.

***Index Terms* - Supply Chain Management, Knowledge Management, CKMP**

1. Introduction

Supply chain management refers to as an approach used to utilize efficiently and also to integrate suppliers, manufacturers, warehouses and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize systemwide costs while satisfying service level requirements. SCM takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centers to retailers and stores. In order words, as per supply chain analysis, it is necessary to account for suppliers' suppliers and the customers' customers because they have an impact on supply chain performance. The foremost objective of supply chain management is to be efficient and cost-effective across the entire system; total system-wide costs, viz, from transportation and distribution to inventories of raw materials, work in process, and finished goods, are to be minimized. Thus, in SCM emphasis is not merely on minimizing transportation cost or reducing inventories but, rather, on taking a systems approach to supply chain management. It should be taken into due consideration that since SCM revolves around efficient integration of suppliers, manufacturers, warehouses, and stores, it encompasses the firm's activities at many levels, from the strategic level through the tactical to the operational level.

2. Review of Literature

Baratt (2004) defines supply chain as a network of facilities and distribution options that performs the functions of procurement of materials, transformations of these materials into intermediate and finished products and distribution of these finished products to the customers. Balsmeier and Voisin (1996) states that supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry, and from firm to firm.

Swanson (1994) classified IS innovations into three types: Type I are technical task only innovations; Type II innovations support business administration; and Type III innovations are embedded in the core of the business. According to this typology, SCMP with trading partners should be considered as a Type III innovation, because SCMP innovate a firm's core business processes - leveraging two-way communication to improve product offering and customer service. Swanson (1994) further examined the adoption contexts of each innovation type, and contended that typical Type III innovations often requires antecedents such as facilitating technology portfolio, certain organizational attributes, perceived benefits, and external drivers that initiate the firm to adopt such innovation. This theoretical argument can be extended to Supply Chain Management domain: SCMP is being enabled by information and communication technology development, requires organizational enablers, motivated by the potential benefits, and entails environmental drivers of the supply chain context. Thus, upon theoretically examining adoption contexts, innovation types, and SCMP features, we believe that the three contexts in the organizational technology adoption model are well suited for studying SCM adoption and implementation.

Compared with other IS innovation, SCM implementation is unique in that it cannot be adopted and used unilaterally. Firms that are motivated to adopt SCM must either find similarly motivated partners, or persuade their existing market partners into adopting the practice. Moreover, even after SCM has been adopted, firms must continue making sure the above-discussed antecedents still hold to maintain collaborative relationship with partners in KM to gain sustainable benefits. Perceived benefits refer to the level of recognition of the relative advantage that SCM can provide to the organization. Many practitioners and researchers have attempted to identify the potential advantages that knowledge management system has to offer. Pfeiffer (1992) and Iacovou et al. (1995) argued that these perceived benefits can be understood from two perspectives. The first perspective looks at the direct benefits from SCM. These are mostly operational improvements in organizational knowledge management capabilities that the firm believes SCM can bring. The purpose of knowledge management system is to improve the knowledge management process (Alavi and Leidner, 2001). Therefore one's understanding to firm's perceived knowledge management capability improvement is based on the five activities of the generic knowledge management process identified by Cormican and O'Sullivan (2003), that is, firm's capabilities on supply chain knowledge generation, storage, access, dissemination and application are all expected to be facilitated by SCM practices. With the improve knowledge management process, SCM adopters expect to achieve superior knowledge outcome. Thus, it is necessary to add another dimension besides the above five knowledge activities to look at the overall supply chain knowledge quality improvements.

The second perspective of perceived SCM benefits observes the indirect benefits or opportunities from implementing SCM. It explores to the impact of SCM on the overall organizational and supply chain performance dimensions. These are mostly tactical and competitive advantages the firm gains indirectly from implementing SCM. Although the ultimate benefits of implementing SCM can include large financial savings, better product/service offering, improve customer service etc, these benefits are too remote and too general to be analyzed. Thus, much of one's attention has focused on its impact on business operations. In a conceptual paper, Smith (2001) summarized six possible dimensions of SCM benefits to organizational operations: (1) Adapt to a rapidly changing environment; (2) Optimize business transactions; (3) Enhanced Supply Chain Integration; (4) Exception handling; (5) Be able to innovate (6) Fully capitalize and develop it's people. The impact of SCM implementation refers to the real benefits adopters believe they have received from utilizing SCM related CKMP (Iacovou et al, 1995). Herein it is assumed that these impacts are closely associated with the perceived SCM benefits. All of the expected benefits should be reflected as an outcome from SCM, providing the implementation is successful. Thus there are two general dimensions of impacts: the first is the improve knowledge capabilities as represented by high supply chain knowledge quality, and the second dimension is the organizational performance advancement, as reflected by supply chain integration as well as supply chain performance.

3. Survey Response Rate

In order to collect precise data, a reliable measurement instrument is needed. To ensure brevity, understandability and content validity of the items, a rigorous validation procedure was adopted for preliminary test. A survey instrument in the form of a questionnaire was adopted from the unpublished Doctoral Thesis of the author. Respondents were asked to indicate, using a five-point Likert scale, on four varied themes.

The researcher received 364 non-deliverable/un-returned questionnaires in two months after the first phase of questionnaires were sent, excluding 48 replies declining participation to the study due to the following reasons: (1) no longer in the supply chain/procurement area (2) company policy forbidding disclosure of information. Therefore, during the two months period after sending out the questionnaires, a total of 788 responses were collected. Then the second phase of questionnaires were sent fifteen days later to those who had not yet responded for which a total of 233 responses were received. Furthermore, of this total 22 responses received were incomplete and thus were rejected while data entry was administered, thereby making a total of 211 responses. Therefore, the final number of complete and usable responses for the study stood at 999 (788 in first phase and 211 in the second phase). It yielded a response rate of 83.25%, indicating a reasonable and acceptable response rate for surveys (Dillman 2000).

The questionnaire was made available to the respondents using two modes of data collection, viz, personal contact and through online mode (google doc). Maximum of the questionnaire was made filled and collected with the help of the research fellow, who was supplied with the list of the respondents as well as questionnaires in a batch of 25 questionnaire.

4. Research Methodology

The data analyses of this study involved two procedures, viz, (1) Measurement Models Testing for instrument validation; and (2) Structural Model Testing for verifying the hypothesized relationship among constructs.

As suggested by Gerbing and Anderson (1988), the researcher tested the measurement model so as to avoid possible interactions between the measurement and the structural models. Furthermore, the researcher followed Bagozzi (1980) and Bagozzi & Philips (1982) who suggested the instrument evaluation guideline for the measuring instrument properties for reliability and validity which include purification, factor structure (initial validity), unidimentionality, reliability and the validation of the second-order construct. The methods for each of these analysis were Corrected-Item-to-Total-Correlation (for purification), Cronbach's Alpha (for reliability) and Confirmatory Factor Analysis (for first and second order factor structure and unidimensionality).

The measurement items (76 in total) were first purified by using Corrected-Item-to-Total-Correlation (CITC) scores with respect to a specific dimension of the construct. The preent research work followed the guidelines constructed by Nunnally (1978), wherein an alpha score of higher than 0.70 for a construct is generally considered to be acceptable (Robinson et. al., 1991; Robinson and Shaver, 1973). The reliability analysis was executed on GNU PSPP 1.0.1 Version 3 to perform CITC computation of each of the construct.

After purifying the items based on CITC, an Exploratory Factor Analysis (EFA) of the items in each construct was conducted for assessing construct dimensionality. GNU PSPP 1.0.1 Version 3 was extensively used to explore potential latent sources of variance and covariance in the observed measurements. Principal Component Analysis (PCA) was used as factor extraction method and VARIMAX was selected as the factor rotation method. All the items for each construct were EFA tested regardless for its existence in a proposed sub-dimension. To ensure high quality of instrument development process in the current study, 0.5 was used as the cut-off for factor loadings as stated by (Hair, et. al., 1992). The Kaiser-Meer-Olkin (KMO) measure of sampling adequacy was calculated for all dimension-level and construct-level factor analysis in the research work under reference. This measure ensures that the effective sample size is adequate for the current factor analysis. The general prevalent notations as detailed were followed for the present research work: a KMO score in the 0.90's was considered outstanding, the score in 0.80's as very good, the score in 0.70's as average, the score as 0.60's as tolerable, the score as 0.50's as miserable and the score below 0.50 as unacceptable.

The next step performed after item purification was to examine the unidimentionality of the underlying latent constructs. Unidimentionality is the characteristic of a set of indicators that has only one underlying trait or concept in common (Hair et. al. 1998). Based on knowledge of the theory, empirical research or both, this research work postulates the relationships between the observed measures and the underlying factors, and thereafter tests this hypothesized structure statistically.

CFA has been used to determine the adequacy of the measurement model's goodness-of-fit to the sample data. Due to the robustness and flexibility of the Structural Equation Modelling (SEM) in establishing CFA, this research uses SEM to test both first-order as well as second-order CFA models. *First-order factors* are those in which the correlations among the observed variables can be described by a smaller number of latent variables, each of which may be one level (these factors are termed primary factors also). *Second-order* CFA models are to examine the correlations among the first-order factors and to verify whether these first order factors can be represented by a single second-order factor or at least a small set of factors. IBM® SPSS® AMOS™ 19.0 and Onyx 1.0-972 was used to perform SEM analysis. Model data fitting was evaluated based on multiple goodness-of-fit indexes. Goodness-of-fit measures the correspondence of the actual or observed input (covariance or correlation) matrix with that predicted from the proposed model.

Goodness-of-fit measures are of three types: (1) *Absolute Fit Measures* – assess only the overall model fit (both measurement and structural models collectively); (2) *Incremental Fit Measures* - compare the proposed model to another model specified by the researcher, most often referred to as the null model; and (3) *Parsimonious Fit Measures* - relate the goodness-of-fit of the model to the number of estimated coefficients required to this model fit. The purpose of the test is to determine the amount of fit achieved by each estimated coefficient.

Chi-square Fit Index is perhaps the most common fit test. It measures the difference between the sample covariance and the fitted covariance. The chi-square value should not be significant if there is a good model fit. However, one problem with this test is that larger the sample size, the more likely the rejection of the model (Type II error). The chi-square fit index is also very sensitive to violations of the assumption of multi-variate-normality. Therefore, Joreskog and Sorbom (1989) suggested that the test must be interpreted with caution. For that reason, chi-square/degree of freedom (χ^2/df) is used with values less than 3 (<3) indicate good fit (Carmines and McIver, 1981), however various other studies suggests that a value of chi-square/degree of freedom (χ^2/df) less than 5 (<5) can also be a good idea for certain large samples, and hence this study accepts this argument and shall consider the χ^2/df value of 5 or less.

For this study the researcher has used reports of several measures of overall model fit from IBM® SPSS® AMOS™ 19.0 and Onyx 1.0-972, such as, Goodness-of-fit-index (GFI), Adjusted-goodness-of-fit-index (AGFI), Comparative-fit-index (CFI), Normed-fit-index (NFI), Root-mean-square-residual (RMR) and Root-mean-square-error-of-approximation (RMSEA).

GFI indicated the relative amount of variance and covariance jointly explained by the model. It can vary from 0 to 1, but theoretically may yield meaningless negative values. AGFI is similar to GFI but adjusts for the degree of freedom in the model. NFI is a relative comparison of proposed model to the null model. CFI compares the absolute fit of specified model to the absolute fit of the independence model. The greater the discrepancy between the overall fit of the two models the larger the values of CFI. CFI avoids the underestimation of fit but NFI often noted in models with small sample size. Many researchers interpret these index scores (GFI, AGFI, CFI, NFI) in the range of 0.80 - 0.89 as representing reasonable fit; scores of 0.90 or higher are considered as evidence of good fit (Hair et al., 1998; Joreskog and Sorbom, 1998; Bentler and Bonett, 1980). RMR indicates the average discrepancy between the elements in the sample covariance matrix and the model-generated covariance matrix. The value varies from 0 to 1, with smaller values indicating better model; and less than 0.05 indicates good fit (Byrne, 1998). RMSEA has only recently been recognized as one of the most informative criteria in covariance structure modeling. It takes into account the error of approximation in the population and is expressed per degree of freedom, thus making index sensitive to the number of estimated parameters in the model. Values below 0.05 signify good fit and the most acceptable value is 0.08 (Browne and Cudeck, 1993; Byrne, 1989).

Finally, the reliability of the entire set of items comprising the second order constructs was estimated using Cronbach's alpha. Following the guideline established by Nunnally (1978), an Alpha score of higher than 0.50 is generally considered to be acceptable.

5. Analysis and Discussion

The various constructs used as a part of the research work have been tabulated in the Table below. In presenting the results of the large-scale study, the acronyms used to number the questionnaire items in each sub-construct have not been renamed and their originality as per the already done research work by Principal Investigator (Author) during his Doctoral Research Work has been maintained.

S.No.	Category Code	Sub-Category Code	Item Code	Parameters
1.	TechInf	--	TechInf1	Our firm utilizes the technology, such as, JIT, APS, CRM, etc..
2.			TechInf2	Our firm utilizes the technology, such as, TPS, EDI, etc..
3.			TechInf3	Our firm utilizes the technology, such as, ERP / SAP, etc..
4.			TechInf4	Our firm utilizes the technology, such as, Email, Paging, Fax, etc..
5.			TechInf5	Our firm utilizes the technology, such as, Online Billing, e-commerce, e-transactions, etc..
6.	SCMP	SSP	SSP1	Our firm implements SCM because with it our firm wishes to collaborate on the benefits obtained from its usage.
7.			SSP2	Our firm implements SCM because with it our firm wishes to strengthen relationship with our trading partners.
8.			SSP3	Our firm implements SCM because with it our firm believes that our relationship with trading partner is profitable.
9.			SSP4	Our firm implements SCM because with it our firm and our trading partner can share risks that occur in SCM.
10.			SSP5	Our firm implements SCM because with it our firm can have harmonious relationship with our trading partner.
11.		BFA	BFA1	Our firm believes that with SCM implementation our firm can handle non-standard orders.
12.			BFA2	Our firm believes that with SCM implementation our firm can meet special customer requirements.
13.			BFA3	Our firm believes that with SCM implementation our firm can produce products with multiple features.
14.			BFA4	Our firm believes that with SCM implementation our firm can rapidly adjust to production capacity in response to the change in customer demand.
15.			BFA5	Our firm believes that with SCM implementation our firm can introduce new products quickly.
16.		SCKD	SCKD1	Our firm believes that with SCM implementation our firm can help exchange information with our suppliers.
17.			SCKD2	Our firm believes that with SCM implementation our firm can help maintain long-term partnerships.
18.			SCKD3	Our firm believes that with SCM implementation our firm can help provide stable procurement relationships.
19.			SCKD4	Our firm believes that with SCM implementation our firm can share market information among departments within the firm.
20.		SCPA	SCPA1	Our firm believes that with SCM applications help to have integrated inventory management system.
21.			SCPA2	Our firm believes that with SCM applications help to have integrated logistics support system.
22.			SCPA3	Our firm believes that with SCM applications help to have automated order refilling system.
23.			SCPA4	Our firm believes that with SCM applications help to have automated accounting system.
24.			SCPA5	Our firm believes that with SCM applications help to have integrated data sharing system.
25.			SCPA6	Our firm believes that with SCM applications help to have synchronized production schedules.

Table-1: Parameters along with Coding used during Data Analysis

Source: Original & Unpublished Doctoral Research Thesis (2012) of Principal Investigator

5.1 Technological Infrastructure

Technological Infrastructure (TechInf) is a single dimension construct measured by 5 items representing the five important technological tools for increasing efficiency and productivity in Industries.

CITC scores indicates that the 1st item (TechInf1) is at 0.174 which is far below 0.5, though the resulted Cronbach's Alpha was acceptable at 0.772; thus TechInf1 was removed from further analysis. The second itinerary of reliability analysis after deleting TechInf1 (item-1) all the left over 4 items showed Cronbach's Alpha values above 0.5; also the overall Cronbach's Alpha value for the 4 items improved to 0.834 which was acceptable for our study along with all individual CITC values for this construct. The CITC for each item with its corresponding code name are as shown in Table below.

Technological Infrastructure (TechInf)				
Item Code	**CITC Initial**	**Cronbach's Alpha - Initial**	**CITC Final**	**Cronbach's Alpha - Final**
TechInf1	0.174	**0.772**	*Item Dropped*	**0.834**
TechInf2	0.632		0.648	
TechInf3	0.696		0.740	
TechInf4	0.605		0.598	
TechInf5	0.648		0.686	

Table-2: CITC Item Purification results for Technological Infrastructure

An Exploratory Factor Analysis (EFA) was then conducted using principal components as means of extraction. The Kaiser-Meyer-Olkin (KMO) score of 0.805 indicated an acceptable sampling adequacy. The total variance explained by the single factor for TechInf stood at 66.979%. Furthermore, all the items were loaded on their respective factors and there were no items with cross-loading greater than 0.50, which was acceptable for our study.

The EFA results are as shown in Table below.

Kaiser-Meyer-Olkin (KMO) : Measure of Sampling Adequacy Score = 0.805		
Item Code	**Technological Infrastructure (TechInf)**	**Cronbach's Alpha**
TechInf2	0.804	**0.834**
TechInf3	0.868	
TechInf4	0.766	
TechInf5	0.832	
Eigen Value	***2.679***	
%age of Variance	***66.979***	

Table-3: EFA results for Technological Infrastructure

The next step is to test the 4 items of in Complementary Factor Analysis (CFA) for measurement model fit. The CFA model for Technological Infrastructure (TechInf) was then tested using IBM® SPSS® AMOS™ 19.0 and Onyx 1.0-972. The results indicated an acceptable and perfect model fit indices: χ^2/df= 1.322; RMSEA= 0.018 ; RMR= 0.007 ; GFI= 0.999; AGFI= 0.994; NFI= 0.998 and CFI= 1.000 ; thus there was no need for any modifications in the model constructs. The model for Technological Infrastructure (TechInf) is as shown in Figure-5.1. Furthermore, all the factor loadings (λ) were above 0.50 and significantly important. The model fit indices for TechInf is shown in Table-4

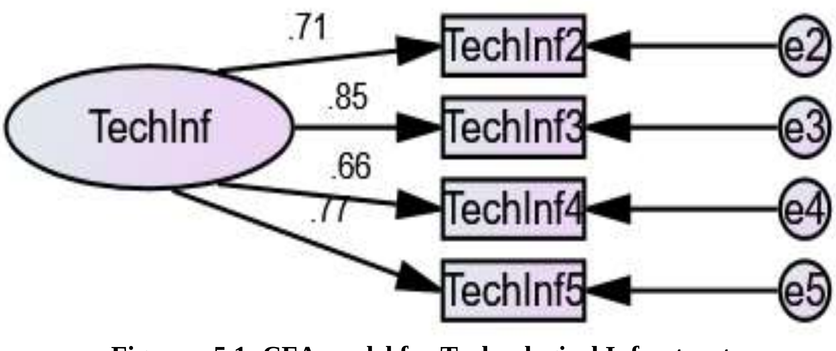

Figure – 5.1: CFA model for Technological Infrastructure

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	2.644	2	1.322	0.018	0.007	0.999	0.994	0.998	1.000

Table-4: CFA model fit results for Technological Infrastructure

5.2 Supply Chain Management Practices

Supply Chain Management Practices (SCMP) or Collaborative Knowledge Management Practices had 20 items in 4 sub-dimensions: Supply Chain Performance (SSP) five items, Barrier Free Access (BFA) five items, Supply Chain Knowledge Dissemination (SCKD) four items and Supply Chain Practices Application (SCPA) six items.

The CITC analysis revealed that it had a good Cronbach's α value of (0.832). The results are presented in Table-5. Furthermore, separate CITC analysis revealed that no item in each of the sub-constructs were below the CITC cut-off of 0.5.

Supply Chain Management Practices (SCMP)				
Item Code	**CITC Initial**	**Cronbach's Alpha - Initial**	**CITC Final**	**Cronbach's Alpha - Final**
SSP1	0.792	**0.909**	--	**0.909**
SSP2	0.837		--	
SSP3	0.825		--	
SSP4	0.745		--	
SSP5	0.669		--	
BFA1	0.805	**0.910**	--	**0.910**
BFA2	0.843		--	
BFA3	0.824		--	
BFA4	0.740		--	
BFA5	0.664		--	
SCKD1	0.648	**0.834**	--	**0.834**
SCKD2	0.740		--	
SCKD3	0.598		--	
SCKD4	0.686		--	
SCPA1	0.567	**0.880**	--	**0.880**
SCPA2	0.669		--	
SCPA3	0.764		--	
SCPA4	0.678		--	
SCPA5	0.733		--	
SCPA6	0.720		--	

Table-5: CITC Item Purification results for Supply Chain Management Practices

In the next step EFA was performed using principal component as means of extraction and VARIMAX as method of rotation. The KMO score of 0.728 indicated a good sampling adequacy, however SSP4 showed a cross loading (0.544, 0.680), hence this item was removed from further analysis. Thereafter, all items load on their respective factors and the result showed no cross-loadings. The EFA results have been tabulated in Table-6.

Kaiser-Meyer-Olkin (KMO) : Measure of Sampling Adequacy Score = 0.755					
Item Code	**SSP**	**BFA**	**SCKD**	**SCPA**	**Cronbach's Alpha**
SSP1	0.944				**0.895**
SSP2	0.860				
SSP3	0.897				
SSP5	0.845				
BFA1		0.952			**0.910**
BFA2		0.863			
BFA3		0.908			
BFA4		0.645			
BFA5		0.847			
SCKD1			0.804		**0.834**
SCKD2			0.863		
SCKD3			0.769		
SCKD4			0.820		
SCPA1				0.686	**0.880**
SCPA2				0.774	
SCPA3				0.849	
SCPA4				0.783	
SCPA5				0.827	
SCPA6				0.811	
Eigen Value	***5.774***	***3.763***	***2.731***	***1.893***	
%age of Variance	***30.390***	***19.804***	***14.373***	***9.965***	
Cumulative %age of Variance	***30.390***	***50.195***	***64.568***	***74.532***	

Table-6: EFA results for Supply Chain Management Practices

The first order CFA model for EC was then tested using IBM® SPSS® AMOS™ 19.0 and Onyx 1.0-972 with the statistics as presented in Table-7. The results indicated that although factor loading coefficients for the initial model were greater than 0.50, however, the model fit was having poor indices: χ^2/df= 67.619; RMSEA= 0.258 ; RMR= 0.096 ; GFI= 0.680; AGFI= 0.584; NFI= 0.566 and CFI= 0.569 ; henceforth modification indices were utilized for modifications in the model which indicated a chance for model improvement as a result from possibility of error correlation (as shown in Table-7); after removing the correlated affects the final first-order CFA model thus obtained is as shown in Fig-2. Thereafter, modification indices indicated that there was no need for any modifications in the model constructs. The first-order CFA model for Supply Chain Management Practices (SCMP) is as shown in Fig.2.

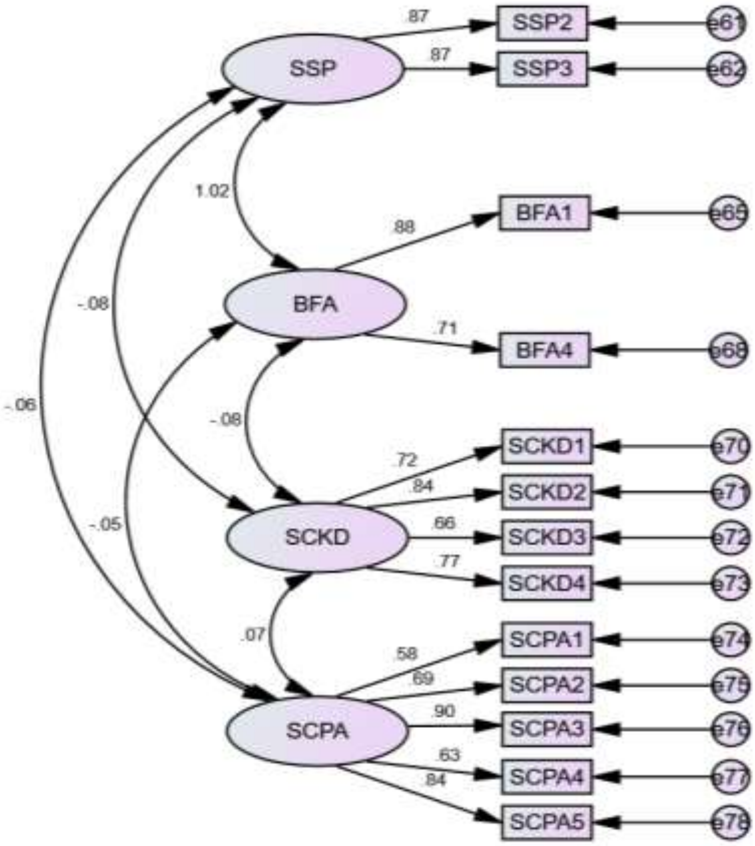

Figure-2: First Order CFA model for Supply Chain Management Practices

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	9872.328	146	67.619	0.258	0.096	0.680	0.584	0.566	0.569
After Removing BFA5	6629.990	129	51.395	0.225	0.072	0.738	0.653	0.652	0.656
After Removing BFA5, BFA2	3384.186	113	29.943	0.170	0.075	0.782	0.705	0.767	0.772
After Removing BFA5, BFA2, SSP5	2964.209	98	30.247	0.171	0.061	0.816	0.745	0.784	0.790
After Removing BFA5, BFA2, SSP5, BFA3	807.917	84	9.618	0.093	0.060	0.903	0.862	0.922	0.929
After Removing BFA5, BFA2, SSP5, BFA3, SCPA6	512.568	71	7.219	0.079	0.055	0.931	0.898	0.946	0.953
After Removing BFA5, BFA2, SSP5, BFA3, SCPA6, SSP1	255.889	59	4.337	0.058	0.044	0.961	0.941	0.962	0.970

Table-7: First Order CFA model fit results for Supply Chain Management Practices

In the next step, the second order model was tested to see if these four sub-constructs (SSP, BFA, SCKD & SCPA) underlie a single high order construct of SCMP. It was observed that no items of SCMP showed high-order correlated effect. The resulting second-order CFA model for Environmental Characteristics is as shown in Figure-3; thereafter no further modification in the model was desired. The resultant goodness-of-fit indices for the second-order construct are as illustrated in Table-8.

Model Fit	χ^2	df	χ^2/df	RMSEA	RMR	GFI	AGFI	NFI	CFI
Initial	259.209	61	4.249	0.057	0.050	0.961	0.941	0.961	0.970

Table-8: Second Order CFA model fit results for Supply Chain Management Practices

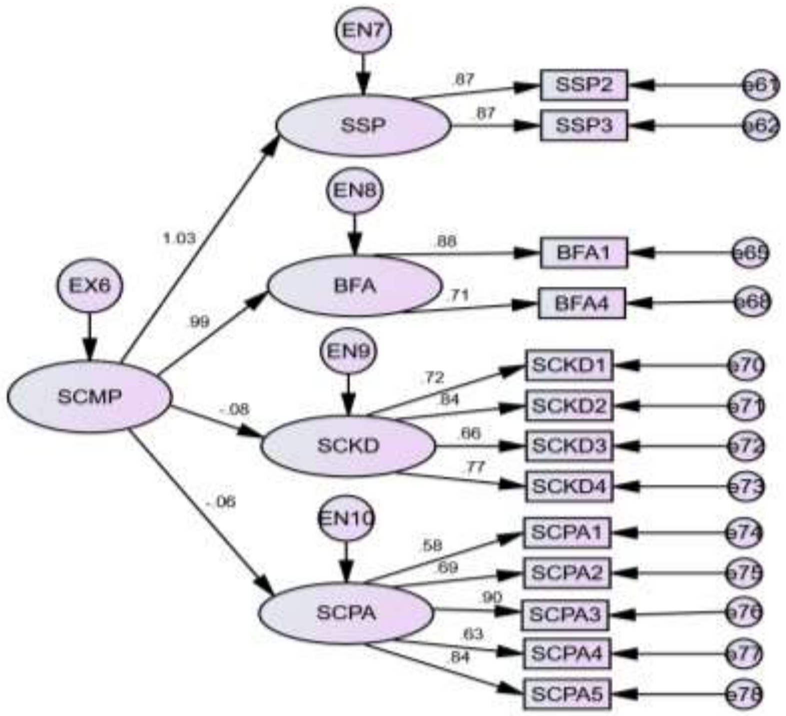

Figure-3: Second Order CFA model for Supply Chain Management Practices

6. Conclusion

The statistical analysis revealed that the following points needs due consideration and attention so as to effectively manage the Supply Chain Management Practices across Industrial Units:

The units should understand the relevance of technology, such as, JIT, APS, CRM, etc., and its very relevance for competitive advantage; The analysis revealed that top management had been less aware and coordination among Supply Chain Management Practices and the implementation of SCM utilities Also, the managers were of the opinion that their firm's organizational culture did not supported decentralized structure as well as the firm's organizational culture did not evaluate the employees on team-basis most of the time.

The measures further revealed that the managers were of the opinion that their firm did not face unpredictable quality of supplied products; neither did their firms faces fluctuating customer orders; nor does many other firms in our industry have implemented SCM practices. Furthermore, their firm and their trading partner had limited or no understanding of each other's requirements; nor their trading partners were willing to provide assistance to their firm whenever required. The analysis also revealed that their firm's did not implement SCM because with it their firm's did not wish to collaborate on the benefits obtained from its usage. Also it was highlighted that the firm's did not implement SCM because with it their firm and their trading partner did not wanted to share risks that occur in SCM. Also the managers responded that their firm's did not implement SCM because with it they were of the opinion that their firm will not have harmonious relationship with their trading partners.

7. References

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