A Conceptual Model for Cooperate Strategy and Supply Chain Performance by Structural Equation Modeling a Case Study in the Iranian Automotive Industry

Ali Mohaghar
Associate Professor, Management Department
University of Tehran, Tehran, Iran
E-mail: amohaghar@ut.ac.ir
Tel: +98-912-3848256

Rohollah Ghasemi
Corresponding Author, M.S. Candidate of Industrial Management
University of Tehran, Tehran, Iran
E-mail: ghasemir@ut.ac.ir
Tel: +98-935-8070906

Abstract
Nowadays, Companies to develop close relationships with suppliers and customers alike are encouraged. It seems that vendor-buyer strategy will be based upon the two sides’ perception of each other in the near future. Reviewing dimensions of Cooperative strategy (CS), makes better understanding of relationships and interactions between suppliers and the cause it can be used to achieve supply chain performance (SCP). The aim of this paper, is presenting a conceptual model for cooperate strategy (CS) and Supply Chain Performance (SCP) in supply chain (SC) of SAIPA Company.
In this study, after reviewing the related literature; firstly, the effective factors in the CS and SCP were identified. Secondly, questionnaires were distributed among SAIPA supply chain experts. Then, 201 filled questionnaires were collected. Next, Factor Analysis and Structural Equation Modeling (SEM) were used to discover the relation between CS and SCP; as a result, the proposed model was extracted. Our findings show that there is the significant and positive relationship between CS and SCP in supply chain of SAIPA Company.

Keywords: Supply chain relationship quality (CS), Supply Chain Performance (SCP), structural equation modelling (SEM), Supply chain of SAIPA Company.

1. Introduction
Iranian automotive industry will become the most important industry in Iran through years. Jointing to World Trade Organization (WTO), from one hand will force companies to pay International Trade Tariffs and on the other hand multi-aspects competition is absorbing special consideration to this industry in Iran.
Importance of SC is convincing companies to tie their competitive existence to SCM (Zuckerman, 2002). Supply Chain Management (SCM) is set of approaches integrates suppliers, manufacturers, warehouses, and markets. This integration causes products manufactured in best cost, time, and place. This exactness will reduce total costs in SC and will satisfy customers' demand (Simchi and Kaminsky, 2000).
The more the members of the chain know each other, the better the planning process would be. Managing the network relationships is inevitable due to the dynamic environment and the change occurs between the members. Lacking the managing may result in the waste of facilities and financial resources invested in the purpose of improving the chain. A supply chain has many different branches and roots. The number of them which should be managed depends on participation and cooperation within the chain. Also it depends on the relationships allocated in the chain; that is some relationships in the supply chain do not need high level of coordination since the level of cooperation affects the amount of control and relationship management. It is essential that the importance and critical level of each member should be determined in reaching the objectives in order to define its level of relationships, participation and cooperation within the supply chain (Javanmard, 2004).

Sue et al., (2008) said that when both parties in supply chain interact, supply chain relationship occurs. The process of interaction includes short-term exchanges and long-term relationship behaviors. Long-term relationship behaviors are essential for maintaining long-term cooperation, and supply chain relationship tends to be considered as a long-term relationship.

“Inter-organizational cooperation” is a necessity for an efficient supply chain. The information and knowledge of work procedure are shared between the members. The competition between them should be replaced by the commitment towards improving the competitiveness of the total supply chain. Although the entities inside a supply chain are independent, they are economically attached to each other. It is obvious that a supply chain structure will be stable if a win-win situation is arranged for each member at least in long period. This has to be attained by the aid of mechanisms like price; otherwise the consequences should be taken into consideration (Stadtler and Kilger, 2005).

As firms increasingly emphasize cooperative relationships with critical suppliers, executives of buyer firms are using supplier evaluations to ensure that their performance objectives are met (Prahinski and Benton, 2004)

Empirical research in the area of supply chain (SC) relationships have predominantly focused on the nature of relationship processes rather than their effect on performance (Styles and Ambler, 2000). A review on literature obviously depict that not only are there some researches investigate interactions between different dimensions of CS (Gummeson ,1987; Kalwani and Narayandas, 1995; Young ,2000; and Su et al., 2008), but also researchers studied SCP (Dixon, 1992; Voss and Blackmon, 1994; Choi and Eboch, 1998; Fynes and Voss, 2001; Fynes et al., 2004; Fynes et al., 2008). However, there are a few ones focusing on CS's effect on SCP (Vickery et al., 2003; Prahinski and Benton, 2004; and Cao and Zhang, 2011).

Vickery et al., (2003) studied the performance implications of an integrated supply chain strategy, with customer service performance followed by financial performance as performance constructs. They found that The relationship of supply chain integration to financial performance was indirect, through customer service; i.e., customer service was found to fully (as opposed to partially) mediate the relationship between supply chain integration and firm performance for first tier suppliers in the automotive industry. Also Prahinski and Benton (2004) said that communication strategies will improve supplier performance. They used structural equation modeling (SEM) and data collected from 139 first-tier North American automotive suppliers. The results of their research have shown that, when a buying firm utilizes collaborative communication, the supplier perceives a positive influence on the buyer–supplier relationship. Also Cao and Zhang (2011) have investigated the impact of collaborative advantage on firm performance. The results indicate that supply chain collaboration improves collaborative advantage and indeed has a bottom-line influence on firm performance.

Any way this lack of study motivated us to consider relationship between CS and SCP in SC of SAIPA Company in automotive industry. The aim of this paper is investigating interactions between indicators cooperate strategy (CS) and SCP in supply chain SC of SAIPA Company. This study was using second source data and case study. First we studied literature of CS, SCP, and searches about CS's impact on different aspects of a company. After reviewing the literature and identification of indicators, a questionnaire between experts was distributed and 201 questionnaires were completed.
the end we utilized structural equation modeling (SEM) by Lisrel 8.5 software and analysis output was published. By performing this research, we hope that some light is shed on the relationship between CS and SCP in automotive industry.

2. Previous Research
2.1. Cooperative Strategy (CS)

Cooperative strategy means the strategies both parties took in the further development of business relationships, i.e., terminating relationship, maintaining relationship or extending relationship, and these strategies determine the further development of business relationships (Sue et al., 2008). The significant advantages of Inter-organizational cooperation in supply chain are as follows:

- Pertaining to valuable contacts along the supply chain,
- Profoundly understanding the usual activities of the organization and identifying the opportunities for doing projects with other members of the chain,
- Discussing and solving common problems by having regular meetings between the members, And facilitating the future strategies of the supply chain (Bayat, 2008).

In supply chains, cooperative strategy has three features. First, because of different degree and means engaging cooperation or transaction, cooperation or transaction may be one-off or long-term, which reflects the will of sustaining long-term cooperation. Second, the cooperation or transaction may be limited in a fixed field or multi-field, which reflects the expectation of developing business relationship deeply or in multi-field. Third, both parties in a relationship may cooperate or transact one-time, occasionally, or recurrently in a fixed period of time, which reflects the times that both parties cooperate or transact in a fixed period of time. These three features of cooperative strategy are associated with the development and change of business relationships. The attention on these three features will bring a better comprehension of the development of business relationship (Su et al., 2008).

2.2. CS's Dimensions

Su et al. (2008) utilized Relationship persistence, Relationship frequency and Relationship diversity to evaluate CS. The questionnaire we use for gleaning data in this paper is what they implemented for their research. We define different dimensions in CS operationally.

2.2.1. Relationship Persistence

Su et al. (2008) defined it as the perception of the firms that both parties expect the relationship to continue into the future, involves anticipated duration into the future rather than the historical duration to date. Also Gummesson, E. (1987) and Kalwani and Narayandas (1995) described persistence as a key aspect of shifts toward closer purchasing relationships.

2.2.2. Relationship Diversity

Young (2000) defines it as the perception of the extent and scope of future interaction, describes the complexity, extent and scope of the collaborative activities.

2.2.3. Relationship Frequency

Su et al. (2008) defined it as the times that both parties in a relationship cooperate/interact in a fixed period of time.

2.3. Supply Chain Performance (SCP)

There are a lot of empirical studies about SCR's effect on operational performance in a company. These studies have different definitions of SC, measurement and performance approaches.
For instance, Narasimhan and Jayaram (1998) had shown that relationship quality leads to better operational performance. They had found that integration of different activities of SC like resource allocation is leading to operational goals consists of reliability, cost flexibility, and quality. They examined the relationship between sourcing decisions, manufacturing goals, customer responsiveness and manufacturing performance using structural equation modeling (SEM). They found that integrating SC activities involves aligning sourcing decisions achieves manufacturing goals in terms of dependability, flexibility, cost and quality.

Uzzi (1997) had mentioned to a clear relationship between relationship quality and performance in clothing industry in New York.

Fynes et al. (2004) stated that the recurring theme in all of these studies is the role of SC management in improving SC performance. They said that Thus while SC dimensions such as trust, and adaptation have been widely tested in the marketing literature in terms of their impact on marketing performance, their impact on SC performance has received less attention in the operations and supply chain management literature.

Also Fynes et al. (2008) utilized quality performance, Delivery performance, cost performance, and flexibility performance to evaluate SCP. The questionnaire we use for gleaning data in this paper is what they implemented for their research.

2.4. Structural Equation Modeling (SEM)

SEM is a comprehensive statistical approach to testing hypotheses about relations among observed and latent variables. A major advantage of SEM is the ability to estimate a complete model incorporating both measurement and structural considerations.

We tested the measurement and research models by applying a structural equation modeling (SEM) approach, using the computer software program LISREL 8.5 with 201 samples. We used a variety of indices to evaluate model fit. The seven fit indices used and values indicating acceptable model fit include:

1. The ratio of the $\chi^2$ statistic to its degrees of freedom, with values of less than 3 indicating acceptable fit;
2. Root mean squared error of approximation (RMSEA), with values below 0.08 representing acceptable fit;
3. Goodness of fit index (GFI), with values exceeding 0.9 indicating good fit;
4. Adjusted GFI (AGFI), with values exceeding 0.8 indicating acceptable fit (Ngai et al., 2007).

3. Hypotheses and Proposed Model

This Proposed model is composed of two kinds of variables: cooperate strategy (CS) and Supply Chain Performance (SCP). The conceptual model incorporating the research hypotheses is shown in the following figure.

**Figure 1**: Research proposed model
According to the above-mentioned figure research main hypothesis is:

**H1:** CS will positively influence SCP meaningfully.

**And Research Sub hypothesizes are:**

**H2:** CS is defined as a higher-order construct which represents (a) Relationship persistence, (b) Relationship frequency, and (c) Relationship diversity.

**H3:** SCP is defined as a higher-order construct which represents (a) quality performance, (b) Delivery performance, (c) cost performance and (d) flexibility performance.

4. Research Methodology

4.1. Research Method

Research method is used for this article is descriptive-correlation. This study was using second source (library and other recorded observations) data and case study. First we studied literature of CS, SCP, SEM, and researches about CS's impact on different aspects of a company. Criteria were extracted and we distributed questionnaires between experts and professionals in SAIPA's SC and 201 filled questionnaires were gathered. At the end we utilize structural equation modeling (SEM) by Lisrel 8.5 software and analysis output was published.

4.2. Statistical Population and Sample Size

The formal survey was conducted based on the preliminary survey and the duration is approximately four months, from August 2010 to November 2010. Statistical population in this research is including Industrial Experts (CEO, Logistic experts, Operational marketing managers) in SAIPA supply chain and composed of three levels in SC. Up streams (First level suppliers), company itself and Down streams (First level customer: SAIPA YADAK Company). There were 398 Experts in 6 companies.

With regard to population, sample size was determined and it was about 196 persons. We used random classified sampling for this research. Table 2 is illustrating the ratio of this groups and sample sizes. After distribution of 285 questionnaires with an overall response rate of 70.5%; we could gather 201 filled questionnaires from experts. Participants were informed of the main objective of the study, and also were presented with a written definition of keywords to build shared concept. They were encouraged to sincerely respond to all the questions in the questionnaire and were assured of absolute anonymity.

<table>
<thead>
<tr>
<th>Company</th>
<th>SAIPA YADAK</th>
<th>SAIPA AZIN</th>
<th>SAIPA Press</th>
<th>MEGA Motor</th>
<th>SAZE GOSTAR</th>
<th>SAIPA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC position</td>
<td>Down stream</td>
<td>Up stream</td>
<td>Up stream</td>
<td>Up stream</td>
<td>Up stream</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population size</td>
<td>46</td>
<td>39</td>
<td>36</td>
<td>45</td>
<td>180</td>
<td>52</td>
<td>398</td>
</tr>
<tr>
<td>% in population</td>
<td>11.5%</td>
<td>9.8%</td>
<td>9.1%</td>
<td>11.3%</td>
<td>45.2%</td>
<td>13.1%</td>
<td>100%</td>
</tr>
<tr>
<td>Sample size</td>
<td>24</td>
<td>23</td>
<td>20</td>
<td>28</td>
<td>77</td>
<td>29</td>
<td>201</td>
</tr>
<tr>
<td>% in sample</td>
<td>11.9%</td>
<td>11.4%</td>
<td>9.9%</td>
<td>13.9%</td>
<td>38.4%</td>
<td>14.5%</td>
<td>100%</td>
</tr>
</tbody>
</table>

4.3. Information Gathering Tools

Implemented questionnaires are composed of two parts: 8 questions about CS's dimensions make the first part was about CS that contained 8 questions about Relationship persistence (with 2 questions), Relationship frequency (with 3 questions) and Relationship diversity (with 3 questions). Second part was about SCP that contained 8 questions about quality performance, Delivery performance, cost performance, and flexibility performance (with 2 questions each).
4.4. Reliability and Validity

4.4.1. Reliability
The summary statistics of formal survey are shown in Table 3. For reliability evaluation we utilized Cronbach's alpha. The Cronbach's alpha reliability of all the ten latent variables are more than 0.6 ($\alpha>0.6$), which indicates all scales demonstrate good reliability.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>$\alpha$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship persistence</td>
<td>2</td>
<td>3.0672</td>
<td>0.75777</td>
<td>0.626</td>
</tr>
<tr>
<td>Relationship frequency</td>
<td>3</td>
<td>3.0514</td>
<td>0.78394</td>
<td>0.790</td>
</tr>
<tr>
<td>Relationship diversity</td>
<td>3</td>
<td>3.6318</td>
<td>0.66031</td>
<td>0.781</td>
</tr>
<tr>
<td>CS</td>
<td>8</td>
<td>...</td>
<td>...</td>
<td>0.820</td>
</tr>
<tr>
<td>Quality performance</td>
<td>2</td>
<td>3.3657</td>
<td>0.78541</td>
<td>0.723</td>
</tr>
<tr>
<td>Delivery performance</td>
<td>2</td>
<td>3.6816</td>
<td>0.66001</td>
<td>0.753</td>
</tr>
<tr>
<td>Cost performance</td>
<td>2</td>
<td>2.7761</td>
<td>0.73629</td>
<td>0.777</td>
</tr>
<tr>
<td>Flexibility performance</td>
<td>2</td>
<td>3.1915</td>
<td>0.92162</td>
<td>0.796</td>
</tr>
<tr>
<td>SCP</td>
<td>8</td>
<td>...</td>
<td>...</td>
<td>0.819</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>34</td>
<td>...</td>
<td>...</td>
<td>0.904</td>
</tr>
</tbody>
</table>

$N = $ Number of questions (items), $SD =$ standard deviation; $\alpha =$ Cronbach's alpha coefficient.

4.4.2. Validity
For evaluating validity of questionnaires, we used content validity and construct validity.

4.4.2.1. Content Validity
Content validity deals with how representative and comprehensive the items were in creating the scale. It is assessed by examining the process by which scale items are generated (Moon and Kim, 2001). Content validity assured us that all aspects and parameters that impact on main content were evaluated. For testing content validity after devising a framework for questionnaire, we asked 16 experts to modify it if needed. These experts evaluated all implemented criteria in questionnaire and modified it.

4.4.2.2. Construct Validity
Construct validity determines the extent to which a scale measures a variable of interest (Moon and Kim, 2001). In this research we used factor analysis for considering the structure of research. Exploring factor analysis and criteria factor was used to investigate construction of questionnaire. Factor analysis depicted that all mentioned criteria are measured in these questionnaires.

5. Data Analysis
Data analysis is accomplished by inferential statistics techniques particularly exploratory factor analysis and confirmatory factor analysis. In this section 8 variables related to CS and 8 variables related to SCP are factored through factor analysis method. Results shown in Tables 4 to 5.

The relationships between variables are identified using exploratory factor analysis and then the factoring is implemented. The result is applied in structural equation modeling (SEM) used in confirmatory factor analysis. The variables are properly factored during the exploratory factor analysis. Through confirmatory factor analysis in structural equation modeling (SEM) factoring is either accepted or rejected.

The software SPSS 18.0 is applied for first analysis and Lisrel 8.53 is applied for the second. In the following sections the results of exploratory factor analysis and after that the results of SEM are presented. The secondary hypothesis, that is H2 and H3, are studied. Finally the main hypothesis is explained after the confirmatory factor analysis of both sides of the model separately. In fact we have tested our proposed model in three steps:
1. CS: its latents and indicators;
2. SCP: its latents and indicators; and
3. The effect of CS on SCP.

5.1. The Results of Exploring Factor Analysis

5.1.1. Exploring Factor Analysis Result of CS's Questionnaire
We considered 8 questions by factor analysis and based on 201 gathered questionnaires; KMO was 0.741 showing that the sample size was enough. Also considering the fact that sig. in Bartlett test was lower than 0.05. The Total Variance Explained for the seven factors in the questionnaire was found to be 72.37%, which explains the variance of the concept of CS, in fact indicating a high level of reliability for the questionnaire. The result of Exploratory Factor Analysis for the CS model has been shown in Table 4.

<table>
<thead>
<tr>
<th>Questioners</th>
<th>Component</th>
<th>Relationship diversity</th>
<th>Relationship frequency</th>
<th>Relationship persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1</td>
<td>-.039</td>
<td>.364</td>
<td>.823</td>
<td></td>
</tr>
<tr>
<td>RP2</td>
<td>.391</td>
<td>.042</td>
<td>.796</td>
<td></td>
</tr>
<tr>
<td>RF1</td>
<td>.257</td>
<td>.765</td>
<td>.091</td>
<td></td>
</tr>
<tr>
<td>RF2</td>
<td>.107</td>
<td>.851</td>
<td>.164</td>
<td></td>
</tr>
<tr>
<td>RF3</td>
<td>.236</td>
<td>.776</td>
<td>.192</td>
<td></td>
</tr>
<tr>
<td>RD1</td>
<td>.782</td>
<td>.173</td>
<td>.072</td>
<td></td>
</tr>
<tr>
<td>RD2</td>
<td>.826</td>
<td>.148</td>
<td>.148</td>
<td></td>
</tr>
<tr>
<td>RD3</td>
<td>.789</td>
<td>.252</td>
<td>.120</td>
<td></td>
</tr>
</tbody>
</table>

5.1.2. Exploring Factor Analysis Result of SCP's Questionnaire
We considered 8 questions by factor analysis and based on 201 gathered questionnaires; KMO was 0.743 showing that the sample size was enough. Also considering the fact that sig. in Bartlett test was lower than 0.05. The Total Variance Explained for the four factors in the questionnaire was found to be 88.66%, which explains the variance of the concept of SCP, in fact indicating a high level of reliability for the questionnaire. The result of Exploratory Factor Analysis for the SCP model has been shown in Table 5.

<table>
<thead>
<tr>
<th>Questioners</th>
<th>Component</th>
<th>Flexibility performance</th>
<th>Quality performance</th>
<th>Delivery performance</th>
<th>Cost performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>QP1</td>
<td>.336</td>
<td>.755</td>
<td>.249</td>
<td>-.199</td>
<td></td>
</tr>
<tr>
<td>QP2</td>
<td>.024</td>
<td>.830</td>
<td>.140</td>
<td>.328</td>
<td></td>
</tr>
<tr>
<td>CP1</td>
<td>.390</td>
<td>.519</td>
<td>-.126</td>
<td>.569</td>
<td></td>
</tr>
<tr>
<td>CP2</td>
<td>.104</td>
<td>.046</td>
<td>.279</td>
<td>.871</td>
<td></td>
</tr>
<tr>
<td>FP1</td>
<td>.121</td>
<td>.182</td>
<td>.889</td>
<td>.202</td>
<td></td>
</tr>
<tr>
<td>FP2</td>
<td>.494</td>
<td>.114</td>
<td>.704</td>
<td>.068</td>
<td></td>
</tr>
<tr>
<td>DP1</td>
<td>.849</td>
<td>.064</td>
<td>.269</td>
<td>.095</td>
<td></td>
</tr>
<tr>
<td>DP2</td>
<td>.823</td>
<td>.278</td>
<td>.136</td>
<td>.163</td>
<td></td>
</tr>
</tbody>
</table>

5.2. The Results of Confirmatory Factor Analysis

5.2.1. X model; Measurement Model of CS
In the initial step we applied confirmatory factor analysis in Lisrel 8.5 and eventually conducted path diagram of X model as per Figure 2. We have tested Relationship between CS latents and its indicators. Fitness's indices in Table 7 shows good fitness of our X model, proving selected indicator are good representative for each dimension of CS. Also CS is defined as a higher-order construct which
represents (a) Relationship persistence, (b) Relationship frequency, and (c) Relationship diversity. So our third hypothesis (H2) is supported.

Table 7: CS model fitness indices

<table>
<thead>
<tr>
<th>Fitness indices</th>
<th>Measure of Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square/df</td>
<td>2.5258</td>
</tr>
<tr>
<td>P-value</td>
<td>0.000</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>0.063</td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>0.95</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit Index (AGFI)</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Figure 2 shows the extent each variable describes CS. The ranking of the variables is as follows: 1) Relationship frequency, 2) Relationship persistence, 3) Relationship diversity.

Figure 3: Standardized Solutions Model for CS

1. The significant factors in Relationship frequency are RF2 and RF3 with the same correlation coefficient of 70%, which are “cooperating with supplier on technology frequently” and “cooperating with supplier on many other businesses frequently”.
2. The significant factors in Relationship persistence are RP1 and RP2 with the same correlation coefficient of 68%, which are “Cooperating with this supplier for a long time” and “Expectation for cooperating with this supplier unceasingly”.
3. The significant factor in Relationship diversity is RD2 with the correlation coefficient of 80%, which is “copelexity of cooperation with supplier”.

5.2.2. Y Model; Measurement Model of SCP
In next step we adopted confirmatory factor analysis for SCP and its indicators in Lisrel 8.5 and eventually conducted path diagram of Y model as per Figure 3. We have tested Relationship between SCP latent and its indicators. Fitness’s indices in Table 7 shows good fitness of our X model, proving selected indicator are good representative for each dimension of SCP. Also SCP is defined as a higher-order construct which represents (a) quality performance, (b) Delivery performance, (c) cost performance and (d) flexibility performance. So our third hypothesis (H3) is supported.
Also, the followings are the results of figure 3:
1. The significant factor in Flexibility performance is FP2 with the correlation coefficient of 85%, which is “Variety (product line) flexibility”. Also, FP1 with the correlation coefficient of 80% is of great importance, which is “Volume flexibility”.
2. The significant factor in Quality performance is QP1 with the correlation coefficient of 63%, which is “Frequency of customer complaints”.
3. The significant factor in Cost performance is CP1 with the correlation coefficient of 69%, which is “Unit cost of product relative to competitors”.
4. And the significant factor in Delivery performance is DP2 with the correlation coefficient of 62%, which is “Percentage of orders delivered on-time”.

5.2.3. Structural Model; the Effect of CS on SCP
For entering data gathered from questionnaires in SEM for investigating our main hypothesis, we define a new variable for every latent variable and use the mean of scored answers. So we define 10 variables (3 for CS and 4 for SCP). In other words, we performed our Structural model applying 3 dimensions of CS and 4 component of SCP.
Table 8: The Structural model fitness indices

<table>
<thead>
<tr>
<th>Fitness indices</th>
<th>Measure of Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square/df</td>
<td>2.8846</td>
</tr>
<tr>
<td>P-value</td>
<td>0.0000</td>
</tr>
<tr>
<td>Root Mean Square Error of Approximation (RMSEA)</td>
<td>0.075</td>
</tr>
<tr>
<td>Goodness of Fit Index (GFI)</td>
<td>0.93</td>
</tr>
<tr>
<td>Adjusted Goodness of Fit Index (AGFI)</td>
<td>0.90</td>
</tr>
</tbody>
</table>

**Figure 4:** Structural model: the effect of CS on SCP

As shown in Figure 4, CS can determine 73.96 per cent (0.862) of SCP variances which is a significant role. Fitness's indices in Table 8 shows good fitness of the Structural model. So our main hypothesis (H1) is supported. Also “Relationship frequency” and “Relationship persistence” are fairly most important dimensions of CS and in the SCP, “Cost performance” and “Quality performance” are fairly most important dimensions of SCP.

**6. Summary and Concluding Remarks**

This research intended to investigate the relationship between CS and SCP by using SEM in supply chain of SAIPA Company. For this investigation, first we studied in hand literature and extracted impressive criteria on CS and SCP. Then we devised a questionnaire and distributed it to experts and professionals in SAIPA Company and its related suppliers. At the end, we analyzed output from questionnaires by utilizing SEM. We have tested our proposed model in three steps: 1. CS: its latents and indicators; 2. SCP: its latents and indicators; and 3. The effect of CS on SCP.

This study has some limitations. First, we measured CS as independent variable which may differ in different industry and make it fairly difficult to generalize it. Second, we study perceived CS and SCP rather than the reality.

In spite of the aforementioned limitations, there are important managerial implications obtained from the findings. According to research findings, CS is defined as a higher-order construct which represents (a) Relationship persistence, (b) Relationship frequency, and (c) Relationship diversity. Also SCP is defined as a higher-order construct which represents (a) quality performance, (b) Delivery performance, (c) cost performance and (d) flexibility performance. Finally, we found that CS will positively influence SCP meaningfully. Also “Relationship frequency” and “Relationship persistence” are fairly most important dimensions of CS and in the SCP, “Cost performance” and “Quality performance” are fairly most important dimensions of SCP.
Obtained results in this research is in a same direction in some aspects with other findings in different studies. For example, our results are supporting Prahinski and Benton (2004), shown that communication strategies will improve supplier performance. Also Cao and Zhang (2011) have indicate that supply chain collaboration has influence on firm performance.

Findings in this research are increasing our knowledge about relationship between CS and SCP in automotive industry. For future studies we suggest more empirical studies in different companies supply chain. Also we suggest that researchers consider relationships between CS and SCP in Automotive industry with investigating key elements in supply chain environment (like supply, demand, and technology uncertainty).

References
Appendix A.

Respondents are asked to rate the extent or degree of current practice of the following items on a five-point Likert scale with 1= “strongly disagree” to 5= “strongly agree”.

**Relationship persistence** (Young, 2000 and Su et al., 2008)
- RP1—we have cooperated with this supplier for a long time.
- RP2—we expect to cooperate with this supplier unceasingly.

**Relationship frequency** (Young, 2000 and Su et al., 2008)
- RF1—we cooperate with this supplier on product quality and price decision frequently.
- RF2—we cooperate with this supplier on technology frequently.
- RF3—we cooperate with this supplier on many other businesses frequently.

**Relationship diversity** (Young, 2000 and Su et al., 2008)
- RD1—we cooperate with this supplier in many fields.
- RD2—the cooperation with this supplier is complex for us.
- RD3—we expect to extend cooperative fields with this supplier.

**Quality performance (customer satisfaction)** (Voss and Blackmon, 1994 and Fynes et al., 2008)
- PQ1- Frequency of customer complaints.
- PQ2- Adequacy of customer complaint tracking/feedback systems.

**Delivery performance** (Choi and Eboch, 1998 and Fynes et al., 2008)
- DP1- Speed of delivery relative to competitors.
- DP2- Percentage of orders delivered on-time.

**Cost performance** (Fynes and Voss, 2001 and Fynes et al., 2008)
- CP1- Unit cost of product relative to competitors.
- CP2- Unit cost of product over life cycle.

**Flexibility performance** (Dixon, 1992 and Fynes et al., 2008)
- FP1- Volume flexibility.
- FP2- Variety (product line) flexibility.