Sustainable supplier selection by way of managing knowledge: a case of the automotive industry

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Abstract: Knowledge management (KM) is globally known as an enabler for supply chain management (SCM). By developing the literature of ‘sustainability’ in SCMs, sustainable supplier selections (SSS) have widely been recognised as an important issue. The current research aims at investigating the relationship between knowledge management process capability (KMPC) and SSS in one of the Iranian automobile manufacturer, so called ‘SAIPA’. After reviewing the related literature, the research’s model was extracted. Meanwhile, well-designed questionnaires were distributed among the 191 SAIPA Corp’s experts who have had the adequate understanding of KM. Besides, in this study an applied research has been used as a research method, and a canonical correlation coefficient for collecting the data. Furthermore, cross-sectional study has been utilised. Based on the results, in regards to the SAIPA’s SCM, there is a meaningful, as well as positive linkage between KMPC and SSS criteria.

Keywords: supply chain management; SCM; supply chain sustainability; sustainable suppliers selection; SSS; knowledge management process capabilities; KMPC; knowledge acquisition; knowledge application; financial capability; canonical correlation analysis; manufacturing processes; customers value; socio-economic values.

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1 Introduction

Knowledge is considered as one of the most important sources to create competitive advantage in organisations (Argote and Ingram, 2000; Meihami and Meihami, 2014). Supply chains also, as the coordinated and integrated set of organisations, take account of knowledge as one of their competitive advantage drivers (Li et al., 2006). Thus, knowledge management could have been known as a valuable factor for organisations empowerment to create competitive advantage (Momeni et al., 2011).

Moreover, some issues like complex world of business, economic development, (Bazargan et al., 2017) intensity of competition, modern technologies and the pace of change in customers’ needs have obliged today’s organisations to take advantage of the rapid flow of information, group decision-making, the business partners’ best possible
Sustainable supplier selection by way of managing knowledge

coordination, and manipulating comprehensive approaches. These developments have made a manifest in supply chain management (Chopra and Meindl, 2007). In this regard, knowledge management may be function as a supply chain management enabler, and may be considered as a vital component in compact data works and multicultural corporations (Samuel et al., 2011).

Various evidences show that some knowledge management processes capability provide a better understanding of connections and also interactions between suppliers, and they would lead to establish better connections for suppliers (Jafarnejad et al., 2014).

During past two decades, the issue of sustainability has been taken out of the ‘fringes’ of supply chain management studies and has become the mainstream of this field (Pagell and Shevchenko, 2014). Having sustainable supplier is one of the main today’s supply chain management concerns, as a result the importance of environmental and social issues of supply chains are considered as key issues (Govindan et al., 2013). Therefore, the issue of sustainability has attracted a lot of interests from business’ researchers and managers. This growing interest extremely is due to galloping consumption of natural resources, concerns related to global warming, as well as corporate some social responsibility (Dao et al., 2011).

On the other hand, ‘supplier selection’ is one of the most essential tasks of supply chain management in regard to increasing the integration of a supply chain (Stadtler et al, 2015, p.12). For this reason, a sustainable supply chain requires a sustainable supplier selection (SSS) approach. While it is not clear whether knowledge management process capability could be taken into the account as an enabler for the process of SSS?

1.1 Literature review

1.1.1 Knowledge management process capabilities (KMPC)

Knowledge is an indispensable theoretical construct for understanding organisations and the relationship between a firm’s knowledge capital (Samuel et al., 2011) which provides a framework for evaluating and incorporating some new experiences and information (Davenport and Prusak, 2000). Most scholars differentiate between explicit and tacit knowledge. Tacit knowledge is usually under the domain of subjective, cognitive, and experiential learning (Gupta et al., 2000). It is deeply embedded in the workers’ skills, work routines and shared understandings which, in combination, comprise an organisation’s distinctive capabilities (Scott and Davis, 2015). However, explicit knowledge deals with more objective, rational, and technical knowledge (data, policies, procedures, software, documents, etc.) (Gupta et al., 2000). Actually, it would only enable temporary competitive advantage phenomenon (Johannessen and Olsen, 2003).

KMPC is defined as a degree in which a firm creates, shares, and utilises some knowledge resources across functional boundaries (Momeni et al., 2011). Reviewing all the definitions, we picked up four basic dimensions, including acquisition, conversion, application, and protection of knowledge, as Gold et al. (2001) utilised them for KMPC.

- Knowledge acquisition (KAC): it refers to how knowledge is acquired from variegated external and internal sources (Lee and Lan, 2011). Nonaka et al. (2006) expound knowledge creation as ‘a continuous process of learning by acquiring a new context, view of the world and knowledge in overcoming the individual boundaries and constraints imposed by existing information parameters’. In order to learn and
attain some new knowledge, individuals need to interact and share implicit and explicit knowledge with each other (Kamasak and Bulutlar, 2010).

- **Knowledge conversion (KCO)**: KCO can compensate the lack of training programs and support the employees to identify the ‘culture’ part of the infrastructure capability. It actually reconfirms that suitable and essential training programs are significant to ensure the employees (both new and existing) understanding and applying the pathways to receive organisational knowledge (Lee and Lan, 2011). KCO is a truly social process where individuals by different knowledge interact and thereby create new knowledge which grows the quality and quantity of both tacit and explicit knowledge (Tseng, 2010).

- **Knowledge application (KAP)**: Organisation knowledge becomes the most crucial intangible and precious asset only after it has been applied to the business operations and decision making appropriately (Lee and Lan, 2011). The main goal of this dimension is to implement the both tacit and explicit knowledge inside and outside of organisations’ boundaries in order to achieve the corporates’ objectives more effectively (Monavvarian and Kasaei, 2007).

- **Knowledge protection (KPR)**: The KPR process refers to the corporation ability for protecting its knowledge from illegal or inappropriate use or theft through clear but detailed policies to guarantee that the knowledge asset is in its safe state all time (Lee and Lan, 2011). This process vital if the knowledge is used to generate or preserve a competitive advantage (Gold et al., 2001). From a legal perspective, firms can protect their knowledge by intellectual property rights such as copyrights, trademarks, and patents (Lin, 2007). Tacit codification and explicit knowledge helps for making the knowledge understandable and using it later on (Monavvarian and Kasaei, 2007).

### 1.1.2 Sustainable supplier selection

Sustainable supplier chain management is described as a material flow management as well as coordination between organisations along the supply chain in regard to the three goals sustainable development, i.e. economic, social and environmental improvement (Seuring and Müller, 2008).

The production processes corporations are often wasted worldwide. Suppliers, centralised factories and customers are linked by information, material and capital flow. Considerable environmental and social pressures during different stages have been affected the production of major corporations. Under these conditions, centralised factories in supply chain are also responsible for environmental and social performance of their supplier. In this case, centralised factories are those that:

1. rule over the whole supply chain
2. are in direct contact with customers
3. in which the product and service provided are designed (Seuring and Müller, 2008).

As it was mentioned in the introduction part, supplier selection in supply chain management is one of the key decisions which are made by sale managers in order to
assist in maintaining the organisations’ competitive position (Chen et al., 2006). Globalisation and outsourcing are also broadened these competitive pressures to an extent that supplier selection has become a more essential issue. Establishing connections by a supplier merely based on price and product cannot be interested by these peripheral pressures in supplier selection, so there is also an emphasis on supplier social and environmental performance (Bai and Sarkis, 2010). Concerning the strategic aspect of decisions on sourcing, some organisations require to consider the tangible and intangible criteria for any analysis which is related to supplier selection and identification the usable advanced techniques (Sarkis and Talluri, 2002). SSS needs some factors which are not taken into the account of operational decisions. By increased emphasis on environmental and social matters and expanding concept of corporate social responsibility, the need for attention to supplier relationships in dimensions of sustainability and strategy has become more obvious (Ciliberti et al., 2008).

Environmental considerations were regarded in many researches on supplier selection, but the social dimension is less considered (Hutchins and Sutherland, 2008).

There are experimental evidences of supply chain management improvement for knowledge management performance in many researches:

Wooliscroft et al. (2013) examined the concepts of a supply chain optimisation in motor vehicle through knowledge management in Slovakia. Samuel et al. (2011) shows a conceptual framework for supply chain knowledge management and the usage of Nonaka’s model in French corporations. Patil and Kant (2014) graded the knowledge management practice solutions in supply chain for overcoming the obstacles usage of fuzzy analytic hierarchy process (AHP)-topsis framework in India’s hydraulic milky production. With this framework, they introduced a support tool for more accurate, effective and systematic decisions on applying some knowledge to supply chain, which increases the success rate of organisations. Desai and Rai (2016) studied the knowledge management for subordinate supply chain management in public sector of Indian Oil Corporation. Their assessment showed that knowledge management is effective for the improvement of processes, decisions and the formulation of long-term and short-term business strategies of this corporation.

Based on the overview of theoretical and experimental records, none of the researches has examined the relationship between knowledge management process capability and SSS, and some of them merely have studied the knowledge management performance in supply chain management, and also sustainable supply chain has not been considered by any of them. The above gap in literature is covered by this research.

Despite the existing reports of numerous studies for the effect of knowledge management on supply chain, the relationship between ‘knowledge management process capability’ and ‘SSS’ has not been a concern for theoretical framework. Consequently, this article examines the reciprocal relationship between ‘knowledge management process capability’ and ‘SSS’ and this research is for figuring out the answers of the following questions:

1. Is there any positive correlation between the indexes?
   a. Among the indexes of the ‘knowledge management process capability’ set, which are the most effective ones to create a meaningful relationship between the two ‘knowledge management process capability’ and ‘SSS’ sets?
Among the indexes of the ‘SSS’ set, which are the most effective ones to create a meaningful relationship between the two ‘knowledge management process capability’ and ‘SSS’ sets?

There is no positive correlation between the indexes?

The remaining parts of the research are organised as follows: at first, the related literature is reviewed and based on that a conceptual model of the research is depicted. At second, in the research methodology part our research methodology is explained. Following the above-mentioned part, our statistical population, as well as, the size of samples are described in ‘questioner survey’. Also a part which called ‘result and analysis’ is defined for the aim of considering the research’s validity, reliability, and canonical correlation analysis. At last, our main results of conducting the research with our limitation and suggestion for future researches are explained in the shape of a ‘conclusions part’.

2 Proposed model and methodology

2.1 Proposed model

After a look at the theoretical framework and primary studies, the dimensions of ‘knowledge management process capability’ and ‘economic (EC)’, ‘social (SO)’ and ‘environmental (EN)’ indexes for SSS’ in automobile industry were identified by some experts’ conducted survey. Consequently, 17 items for SSS were identified (six items are related to the ‘economic’ dimension of SSS, four items are related to ‘social’ dimension of SSS, and seven items are related to ‘environmental’ dimension of SSS). Also, 21 items for ‘knowledge management process capability’ were found (five items for ‘knowledge creation’, five items for ‘knowledge transfer’, six items for ‘knowledge utilisation’ and five items for ‘knowledge retention’). Then, Saipa corporation were asked to answer the questions according to quintet Likert scale (from highly disagree to highly agree) by the supply chain experts.

Figure 1 The proposed model of the research

The proposed model is composed of two kinds of variables: KMPC and SSS. The conceptual model incorporating the research hypotheses is shown in the following figure.
2.2 Information gathering tools

Implemented questionnaires were composed of two parts: The first part was about KMPC that contained 21 questions about \( KAC \), \( KCO \), \( KPR \), and \( KAP \). The measures are in Table 1.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Code</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge acquisition (KAC)</td>
<td>KAC1</td>
<td>Acquiring knowledge about our customers and suppliers.</td>
</tr>
<tr>
<td></td>
<td>KAC2</td>
<td>Generating new knowledge from existing knowledge.</td>
</tr>
<tr>
<td></td>
<td>KAC3</td>
<td>Exchanging knowledge with our business partners.</td>
</tr>
<tr>
<td></td>
<td>KAC4</td>
<td>Acquiring knowledge about competitors within our industry.</td>
</tr>
<tr>
<td></td>
<td>KAC5</td>
<td>Exchanging knowledge between individuals.</td>
</tr>
<tr>
<td>Knowledge conversation (KCO)</td>
<td>KCO1</td>
<td>Converting knowledge into the design of new products/services</td>
</tr>
<tr>
<td></td>
<td>KCO2</td>
<td>Transferring organisational knowledge to individual</td>
</tr>
<tr>
<td></td>
<td>KCO3</td>
<td>Absorbing knowledge from individuals into the organisation</td>
</tr>
<tr>
<td></td>
<td>KCO4</td>
<td>Integrating different sources and types of knowledge</td>
</tr>
<tr>
<td></td>
<td>KCO5</td>
<td>Replacing outdated knowledge.</td>
</tr>
<tr>
<td>Knowledge application (KAP)</td>
<td>KAP1</td>
<td>Has processes for applying knowledge learned from mistakes and experiments.</td>
</tr>
<tr>
<td></td>
<td>KAP2</td>
<td>Has processes for using knowledge in development of new products/services</td>
</tr>
<tr>
<td></td>
<td>KAP3</td>
<td>Matches sources of knowledge to problems and challenges</td>
</tr>
<tr>
<td></td>
<td>KAP4</td>
<td>Is able to locate and apply knowledge to changing competitive conditions</td>
</tr>
<tr>
<td></td>
<td>KAP5</td>
<td>Takes advantage of new knowledge.</td>
</tr>
<tr>
<td></td>
<td>KAP6</td>
<td>Quickly applies knowledge to critical competitive needs</td>
</tr>
<tr>
<td>Knowledge protection (KPR)</td>
<td>KPR1</td>
<td>Processes to protect knowledge from inappropriate use inside and outside</td>
</tr>
<tr>
<td></td>
<td>KPR2</td>
<td>Processes to protect knowledge from theft from inside and outside the organisation</td>
</tr>
<tr>
<td></td>
<td>KPR3</td>
<td>Incentives that encourage the protection of knowledge</td>
</tr>
<tr>
<td></td>
<td>KPR4</td>
<td>Technology that restricts access to some sources of knowledge</td>
</tr>
<tr>
<td></td>
<td>KPR5</td>
<td>Extensive polices and procedures for protecting trade secrets.</td>
</tr>
</tbody>
</table>

Source: Gold et al. (2001)

As shown in Table 2, the second part consisted of 17 questions about the 3 dimensions of SSS which are known as: SSS economical, social and environmental dimensions.
Table 2  The dimensions and measures of SSS

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Code</th>
<th>Measures</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic (EC)</td>
<td>EC1</td>
<td>Cost/price</td>
<td>Amindoust et al. (2012), Ghadimi and Heavey (2014)</td>
</tr>
<tr>
<td></td>
<td>EC2</td>
<td>Quality</td>
<td>Amindoust et al. (2012), Ghadimi and Heavey (2014)</td>
</tr>
<tr>
<td></td>
<td>EC3</td>
<td>Technology</td>
<td>Kannan et al. (2013), Kuo et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>EC4</td>
<td>Delivery</td>
<td>Kannan et al. (2013), Tseng and Chiu (2013)</td>
</tr>
<tr>
<td></td>
<td>EC5</td>
<td>Relationships</td>
<td>Tseng and Chiu (2013)</td>
</tr>
<tr>
<td></td>
<td>EC6</td>
<td>Financial capability</td>
<td>Keskin et al. (2010)</td>
</tr>
<tr>
<td>Social (SO)</td>
<td>SO1</td>
<td>The interests and rights of employee</td>
<td>Kuo et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>SO2</td>
<td>Information disclosure</td>
<td>Amindoust et al. (2012), Kuo et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>SO3</td>
<td>Customers satisfaction</td>
<td>Erol et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>SO4</td>
<td>Ethics</td>
<td>Mani et al. (2014)</td>
</tr>
<tr>
<td>Environmental (EN)</td>
<td>EN1</td>
<td>Environmental management system</td>
<td>Erol et al. (2011), Kuo et al. (2010), Tseng and Chiu (2013)</td>
</tr>
<tr>
<td></td>
<td>EN2</td>
<td>Pollution control</td>
<td>Amindoust et al. (2012), Ghadimi and Heavey (2014), Tseng and Chiu (2013)</td>
</tr>
<tr>
<td></td>
<td>EN3</td>
<td>Green and safe product</td>
<td>Awasthi et al. (2010), Mirhedayatian et al. (2014)</td>
</tr>
<tr>
<td></td>
<td>EN4</td>
<td>Resource consumption</td>
<td>Govindan et al. (2013), Tseng and Chiu (2013)</td>
</tr>
<tr>
<td></td>
<td>EN5</td>
<td>Energy consumption</td>
<td>Lozano and Huisingh (2011)</td>
</tr>
<tr>
<td></td>
<td>EN6</td>
<td>Recycling</td>
<td>Amindoust et al. (2012)</td>
</tr>
<tr>
<td></td>
<td>EN7</td>
<td>Use of reverse logistics</td>
<td>Handfield and Nichols (1999)</td>
</tr>
</tbody>
</table>

2.3  Research methodology

The research method that is used for this article is descriptive-correlation. This study was using the second source (library and other recorded observations) data and case study. First we studied KMPC, SSS literature and researches about KMPC’s impact on different aspects of a company. Criteria were extracted and we distributed questionnaires between experts and professionals in SAIPA’s SC and 191 filled questionnaires were gathered. At the end canonical correlation analysis (CCA) is utilised by SAS9 and STATISTICA7 software and analysis output were published.

CCA is a multi-variables statistical approach for measuring linear relationship between different groups of variables. This approach can play an important role in exploratory definition when multi attribute variables have some relations to an analytical category (Lima et al., 2004; Mohaghar et al., 2011). CCA obtain the linear composition of predicting variables that has the most correlation with the linear combination of criteria variables. These combinations are shown as follow (LeClere, 2006).
3 Questioner survey

3.1 Statistical population and sample size

Statistical population in this research has been including some 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 280 Experts in eight companies.

With regard to population, sample size was determined and it was about 190 persons. We used random classified sample for this research. After distribution of 235 questionnaires we could gather 191 filled questionnaires from experts. Furthermore, in our study 5 point Likert scale questionnaire was used.

4 Result and analysis

For entering data gathered by questionnaires in canonical correlation analysis, we define a new variable for every extracted factor and use the mean of scored answers. So we define seven variables (four for KMPC and three for SSS).

We utilise SAS9 and STATISTICA7 software for recognising the correlation between two variables sets and then CCA was used between KMPC and SSS. Also for the aim of achieving the research’s aims in the next parts the questionnaires validity and reliability have been investigated.

4.1 Reliability and validity

4.1.1 Reliability

The Cronbach’s alpha was utilised to evaluate the reliability for pre-test samples (30 questionnaires). Results shows that verifying evaluation is more than 70% and questionnaire is trustable.

<table>
<thead>
<tr>
<th>Cronbach’s alpha coefficient</th>
<th>Number of questions</th>
<th>Test scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.821</td>
<td>21</td>
<td>KMPC</td>
</tr>
<tr>
<td>0.901</td>
<td>17</td>
<td>SSS</td>
</tr>
</tbody>
</table>

4.1.2 Validity

For evaluating the validity of questionnaires, we used content. The content validity is assured us that all aspects and parameters which impact on the main content were evaluated. For testing content validity after devising a framework for questionnaire, we asked 11 experts to modify it in case of need. These experts evaluated all implemented criteria in questionnaire and modified it.
4.2 Canonical correlation analysis

Table 4 shows enveloped data variation by CCA. The extracted variance of KMPC and SSS shows that 96.99% of internal KMPC variations are covered by canonical roots and also 100% of internal SSS variations are covered by canonical roots. These statistics are very considerable and support CCA utilisation.

Table 4

<table>
<thead>
<tr>
<th>$N = 191$</th>
<th>KMPC</th>
<th>SSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of variables</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Extracted variance</td>
<td>96.99%</td>
<td>100%</td>
</tr>
<tr>
<td>Total redundancy</td>
<td>44.73%</td>
<td>66.91%</td>
</tr>
</tbody>
</table>

Variables:
1. Knowledge acquisition
2. Knowledge conversation
3. Knowledge application
4. Knowledge protection

Table 5

<table>
<thead>
<tr>
<th>Canonical roots</th>
<th>Canonical $R$</th>
<th>Canonical $R^2$</th>
<th>Chi-sqr</th>
<th>$df$</th>
<th>$P$-value</th>
<th>$\lambda$ prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.8789</td>
<td>0.7724</td>
<td>592.09</td>
<td>12</td>
<td>0.0000</td>
<td>0.0414</td>
</tr>
<tr>
<td>1</td>
<td>0.8202</td>
<td>0.6727</td>
<td>316.71</td>
<td>6</td>
<td>0.0632</td>
<td>0.1821</td>
</tr>
<tr>
<td>2</td>
<td>0.6657</td>
<td>0.4432</td>
<td>108.93</td>
<td>2</td>
<td>0.1716</td>
<td>0.5567</td>
</tr>
</tbody>
</table>

Usual canonical correlation analysis meaningful level for interpretation is 0.05. As it’s shown in Table 5, $P$-value is used for this research, just at first, canonical variables are statistically meaningful. In addition, the other statistical tests like ‘Lambda Prime’ and $\chi^2$ proof our results.

For answering the research question, we should focus on Tables 4 and 5. Relationship importance between KMPC and SSS is determined by canonical correlation ($R_c$) and Eigen value ($R_c^2$).
Based on Figure 2 we considered the first canonical variable and ignored interpretation of second and third variables because of their weak canonical cross loading and redundancy index (refer Table 4).

Based on Table 5, first variable $R_c$ is 0.87 and $R_c^2$ is 0.77. Because $R_c$ cannot directly prepare the shared variation, we utilise redundancy index. Redundancy index for $R_c^2$ is in multiple regression analysis.

Table 4 shows that we can predict more than 66.91% of changes in KMPC by studying changes in SSS.

Also we can predict SSS behaviour based on studying KMPC more than 44.73%. These findings mention a meaningful relationship between KMPC criteria and SSS criteria, also SSS criteria has a positive effect on KMPC criteria.

For answering the sub questions, we used canonical cross loading for evaluating the importance of every criteria in meaningful canonical variable.

Based on the research’s findings our Null hypothesis is rejected, so our Alternative hypothesis that believes there is a significant relation between our variables is proven, in regard to the Alternative sub-hypothesis and according to Table 6, all variables in the both sets have a high canonical cross loading in creation of a canonical variable in their sets. So they are very effective in creation of a meaningful relationship between KMPC and SSS. In KMPC variables, knowledge conversation, and KAP have had the highest effect and KPR had the lowest effect in creation of this relationship. In the SSS criteria, economic and social relationship have the highest and environmental relationship has the lowest impact on creating a relationship.
Also, for CCA validity, we used sensitivity analysis on independent variables. For this validation, we eliminate one of KMPC variables all times and utilise CCA. Outputs depicted no impression change in construct coefficient of variables. So we assured that data were valid.

Table 6  Canonical loading and canonical cross loading for meaningful canonical variables in SSS

<table>
<thead>
<tr>
<th></th>
<th>Canonical variable 1</th>
<th></th>
<th>Canonical variable 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loading</td>
<td>Cross loading</td>
<td>Loading</td>
<td>Cross loading</td>
</tr>
<tr>
<td>Economic</td>
<td>0.8874</td>
<td>0.8145</td>
<td>-0.1417</td>
<td>-0.1325</td>
</tr>
<tr>
<td>Social</td>
<td>0.7643</td>
<td>0.6766</td>
<td>0.0172</td>
<td>0.0046</td>
</tr>
<tr>
<td>Environmental</td>
<td>0.5731</td>
<td>0.5059</td>
<td>-0.0139</td>
<td>0.0054</td>
</tr>
<tr>
<td>Extracted variance (%)</td>
<td>77.03</td>
<td></td>
<td>9.82</td>
<td></td>
</tr>
<tr>
<td>KMPC set</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge acquisition</td>
<td>0.5874</td>
<td>0.4975</td>
<td>0.1558</td>
<td>0.1244</td>
</tr>
<tr>
<td>Knowledge conversation</td>
<td>0.8765</td>
<td>0.729</td>
<td>0.4551</td>
<td>0.3367</td>
</tr>
<tr>
<td>Knowledge application</td>
<td>0.7232</td>
<td>0.6673</td>
<td>0.3456</td>
<td>0.3267</td>
</tr>
<tr>
<td>Knowledge protection</td>
<td>0.4553</td>
<td>0.3621</td>
<td>-0.2087</td>
<td>-0.0831</td>
</tr>
<tr>
<td>Extracted variance (%)</td>
<td>13.02</td>
<td></td>
<td>70.77</td>
<td></td>
</tr>
</tbody>
</table>

5 Conclusions

The aim of this research is the assessment of the correlations between ‘knowledge management process capability’ and ‘SSS’ exclusively for the supply chain of Saipa Corporation. At first, we provided the identification of the dimensions of ‘knowledge management process capability’ and ‘SSS’ after an overview. It is determined based on the analyses of SAS9 and STATISTICA7 software that:

1 There is a positive and meaningful relationship between ‘knowledge management process capability’ and ‘SSS’ in the supply chain of this corporation.

2 Whereas the effectiveness rate of ‘knowledge management process capability’ on ‘SSS’ is estimated higher than the rate of ‘SSS’ on ‘knowledge management process capability’.

3 It also revealed that among the dimensions of ‘knowledge management process capability’, ‘knowledge transfer’ and ‘knowledge utilisation’ dimensions play respectively the major roles in establishing a meaningful relationship between the two sets; and among the dimensions of ‘SSS’, ‘economic’ and ‘social’ dimensions play respectively the major roles in establishing a meaningful relationship between the two sets.

The results of this research are coordinated with the other studies, because the most conducted studies consider the knowledge management as supply chain enabler (Desai and Rai, 2016; Patil and Kant, 2014; Samuel, et al., 2011). On the whole, these
results have expanded our knowledge about the correlations between ‘knowledge management process capability’ and ‘SSS’, and also showed the effectiveness rate of each dimension on the two sets. The following suggestions are based on ‘canonical correlation analysis’: In order to have sustainable suppliers, ‘knowledge transfer’ and ‘knowledge utilisation’ must be systematically applied to supply chain. Supplier selection based on economic, social and environmental indexes (and not merely one of them) also may simplify the knowledge management process in supply chain.

We manipulate some sorts of empirical relationship analysis by using of experts’ opinions from Iranian automotive industry which reduces the ability of generalising the researches’ findings. Therefore it is recommended for future researches that they should also cover the relationship between these two variables in the other industries of the country. In addition, it seems that there have been the other factors that can be considered in the future researches – for example, organisational culture – for the aim of shedding light on the other aspects of this issue.

Also some new technologies have been affecting SCMs’ agility through different ways, in this regard, it is highly recommended that the potential of such technologies on SCMs’ performance going to be investigated more closely, for instance the internet of things (IoT) which provides a capability of real-time monitoring for SCMs (Zarei et al., 2016, 2017).

References


Yamazaki, R. (2016) *Random Subspace Analysis on Canonical Correlation of High Dimensional Data* (Doctoral dissertation), Uppsala University, The USA.
