Knowledge Creation Within the Automobile Industry

Regular Paper

Anoop C. Nair[1]*, S. Ramalingam[2] and Ashvini Ravi[3]

1 Dr MGR Educational & Research Institute University, Chennai, India / Manager, Hyundai Motor India Ltd, India
2 Centre for International Collaboration, Dr MGR Educational & Research Institute University, Chennai, India
3 Anantah Knowledge Biz, Chennai, India
*Corresponding author(s) E-mail: anoopcnair83@gmail.com

Abstract

Research has identified the enabling factors and inhibitors for successfully implementing knowledge creation and accomplishing its strategic objectives. It is important to understand how these factors interact with each other to improve or inhibit performance. This empirical research presents a framework for finding the fundamental relations between these factors. It proposes strategies for implementing knowledge creation initiatives. The framework mainly focuses on the "what factor" with respect to people and identifies the vital characteristics for the knowledge creation process. It mainly illustrates the parameters of knowledge transfer, which supports knowledge creation, thereby improving organizational performance.

Keywords Knowledge Creation, Automobile Industries, India

1. Introduction

Within any industry, knowledge management is vital for better performance, sustenance and growth of a company (Marco et al., 2013 [1]; Liao et al., 2008 [2]; Zárraga and Bonache, 2005 [3]; Collins and Smith, 2006 [4]). To achieve this, a company needs to have a sufficient strategy in place for improving the knowledge transfer within team members and having a better knowledge pool (Kang et al., 2007 [5]; Ove et al., 2013 [6]). Knowledge transfer also helps superior knowledge creation within a team. In turn, this leads to a higher level of satisfaction and innovation among team members (Jantunen, 2005 [7]; Jung et al., 2003 [8]). This study was arranged in knowledge intensive and engineering-oriented automobile industries. It focuses on how to determine the aspects that control the implementation of knowledge transfer. Furthermore, it suggests which aspects have a higher importance with respect to the Indian automobile industry. Such aspects help to develop knowledge creation within a team, thereby improving a team's efficiency.

In terms of financial and non-financial performance, an organization's growth is an accurate reflection of its accumulated knowledge. In short, knowledge is practically related to prosperity during one's lifetime (Labedz et al., 2011 [9]; Rose et al., 2009 [10]; Panayides, 2007 [11]; Goh and Ryan, 2002 [12]; Bontis et al., 2002 [13]). For this reason, this research recognizes knowledge as a vital resource, mainly with respect to finance. In particular, knowledge transfer and ensuring development of this new knowledge have a critical effect on an organization's success. Thus, knowledge can be regarded as a vital source for maintaining substantial improvements.

This empirical research mainly focuses on the "what factor" with respect to people. It finalizes the factors that are involved in successfully implementing knowledge creation in the automobile industry. This research is structured as a flow of activities, as illustrated in Figure One.

Figure 1. Research Approach

Figure One indicates the research approach that was used in this study. The process starts with a review of literature, followed by expert feedback for developing the framework. Finally, the framework verifies the validity of the individual construct and total model fit.

2. Literature Review: Holistic Approach

Knowledge can be defined as acceptable faith that enhances effective action within a unit's capacity (Huber, 1991 [14]; Nonaka, 1994 [15]). As per *CEN*, 2004 [16] and Heisig, 2009 [17], for knowledge management, frameworks are commonly used to portray mechanisms and their reliability. Based on literature from *CEN*, 2004 [16], frameworks for knowledge management are formed to achieve a regular domain. Similarly, Alavi and Leidner (2001) [18] discuss how to compose frameworks for preparing, approaching and finding research gaps. As mentioned by Holden (2002) [19], although most frameworks do not cover global facets, their typical feature is that they give foremost interest to intra-institutional knowledge management projects. Knowledge sharing is necessary for availing of models of various entities. For instance, within institutional procedures and partnerships, information development, actions of dispersed groups, added obstructions and innovative tool types. As an initial move, the model that is required for studying is the basis of the framework, which is built in accordance with the universal requirements. A framework is considered as an example to demonstrate the construction and practice of frameworks.

Surprisingly, the below framework illustrates knowledge management in a holistic way. It is highly necessary for any organization to develop knowledge creation. Considering the above, in this study, we intended to name the KT enablers using literature reviews and use these enablers to develop a framework for the successful implementation of knowledge creation initiatives. This framework permits us to tackle the complexities that are linked to knowledge creation initiatives by identifying the enablers of knowledge transfer, which are unique to any firm.

As an example, based on *CEN*, 2004 [16], the European standardization community developed a knowledge management framework, which is currently being used. This framework offers a universal term for institutes that are involved in knowledge management. From the above framework, this research goes into detail about "create knowledge". In the following section, previous studies are assessed to identify the enablers of knowledge creation implementation. Using these factors, a framework is constructed, based on the automobile industry. The research methodology uses structural equation modelling (SEM) for establishing the relationships between the factors. Based on this, surveys are conducted among automobile industry professionals. From the results, we can conclude a successful strategy for knowledge management implementation.

3. Literature Review: Focus on Knowledge Creation

Within any industry, knowledge transfer plays a vital role in knowledge creation (KC). Enablers of knowledge transfer help to improve KC. In organizational culture, it is vital to generate knowledge creation, sharing, cooperation and leveraging. Meanwhile, technology assists an easy and effective knowledge transfer. In the work of Elliott and O'Dell (1999) [20], four key enablers of KM are identified. These include culture, technology, infrastructure and measurement. Each of the above enablers is important. Through teamwork, these enablers produce higher achievement in knowledge management. Leadership plays an essential role in ensuring the effectiveness and shared effort of the four enablers. Research has identified that leadership, along with technology, culture, and measurement, are considered to be KM enablers (Ward and Aurum, 2004 [21]). Brown, et al. (2006) [22] confirmed that there has been an improvement in procedural complexities and the ability of knowledge education to increase the inclination of users to rely on linkages (person to person knowledge transfer).

Smith et al. (2007) [23] claim that knowledge managers have initiated a system-driven approach to aid knowledge transfer. It is not sufficient to construct a record with codified knowledge and wait for it to be used. Similarly, a knowledge transfer plan also guarantees collaboration with organizations for knowledge creation, knowledge innovation (Kolfschoten, 2007 [24]) and to reduce knowledge sharing resistance (Thomas, 2006 [25]). As per Davenport et al., 1998 [26] and Bhatti et al., 2011 [27], factors that lead to KM success include improved construction of knowledge, culture induced for betterment, clarity in principle and numerous ways of transferring knowledge.

Knowledge management success can be possible through enabling aspects of knowledge management proposals and various features such as leadership, enhancing human capabilities through investments and promoting facilities in entities. These increase the chances of being successful (Chourides, Longbottom and Murphy, 2003 [28]; Jennex and Olfman, 2004 [29]). Hariharan (2005) [30] acknowledges that KM aids knowledge sharing. This helps to eradicate works that are already being discovered, thereby developing seven knowledge management enablers. These include focusing on a strategy, configuring a purpose, functioning knowledge management associations, having a method for

creating a KM model, culture, worker involvement and examination of satisfaction levels. Lee and Choi (2003) [31] found seven enablers namely, teamwork, belief, education, centralized view, formal work procedure, improved ability and the help of information technology. In addition to the above, belief is also a component. Belief is converted into actions for improved teamwork and information. It is an important aspect and, if it is eliminated, the sharing of knowledge cannot be carried out. Consequently, organizations abstain from contributing crucial communications within their organization (Robbins, 2005 [32]). Thus, belief has found its role as an inhibitor and enabler.

4. Enablers of KT: Through Literature Review Summary and Expert Opinion

Davenport, et al. (1998) [26] scrutinized 31 assignments in 24 entities. They found that only 18 assignments were doing well. They identified the E factors that were common in all of the 18 successful KM assignments. These include:

- Support of senior management

- Clear communication of KM function

- Connection towards financial stability

- Several ways to achieve KT

- Inspirational encouragement towards those who use KM

- Better organizational culture

- Strong scientific and managerial facilities

- Basic configuration of knowledge

With respect to the Indian automobile industry and knowledge management, the expert members were also consulted on the above parameters. From the summary of literature that has been reviewed so far and based on expert opinion, we consolidated the above factors into four key enablers of knowledge transfer. These include: information sharing, organization communication, feedback promotion and policy formulation. These are considered in the framework that we have developed for the automobile industry. The literature review helped us to create a list of aspects that previous studies have acknowledged for authorizing knowledge creation achievement through knowledge transfer enablers. The foundation for this approach is that, while previous studies have supported the classification of KT aspects, knowing how those aspects relate to each other remains the vital concern for creating plans to successfully implement knowledge creation.

5. Framework for Knowledge Management

Considering the above literature review and thorough expert opinion, we prepared a framework that considers the automobile industry. All of the four key enablers of knowledge transfer, including information sharing, organization communication, feedback promotion and policy formulation, are considered in Figure Two below.
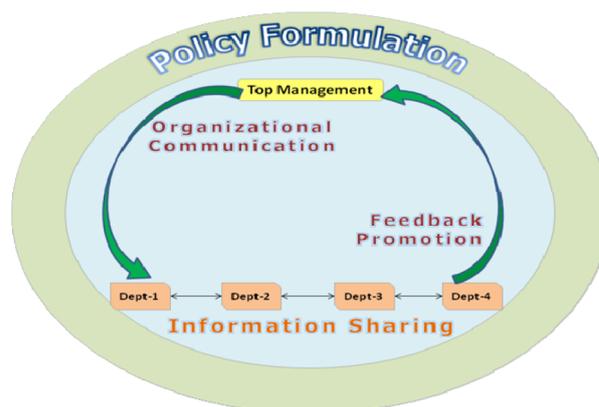

Figure 2. Framework for Enablers of Knowledge Transfer

a. Information Sharing: This pattern assesses the transparency of an organization and the degree of sharing information among its employees and managers. This helps to identify the information sharing within the same and different departments in the organization (Liao et al., 2008 [2]; Hansen, 1999 [33]).

b. Organizational communication: This pertains to the degree of communication from top management to various departments and among team members (Choe, 2004 [34]; Wheatley, 2001 [35]).

c. Feedback promotion pertains to an organization's approach to feedback and its application of organizational learning. This mainly confirms how feedback occurs between various departments and with the top management (Yang et al., 2004 [36]; Scharmer, 2009 [37]).

d. Finally, policy formulation mainly confirms the effectiveness of an organization's policies with respect to knowledge transfer (Power and Waddell, 2004 [38]; Redding, 1997 [39]).

6. Framework Confirmation: Systematic Approach

6.1 Research Methodology

In this study, data were collected from the employees of a top Indian automobile industry, as per the Society of Indian Automobile Manufacturers (SIAM) report. A systematic random sampling method was used to find the participant selection. Based on permission from the Human Resource Department (HRD), a list of employees from the above Indian automobile industries formed the basis of our systematic sampling method. Using computer generated random sampling, every third employee was chosen. Subsequently, a non-probability sampling method was adopted. With 95% confidence, the minimum sample size was calculated as 354 (z value 1.96). For convenience, this was rounded up to 400 samples, out of which 335 participants responded with a response rate of 84% [(335/400)*100].

The research variables of knowledge transfer and organizational performance stood for 30 manifest variables, which were collected under six latent variables. The six latent variables included: information sharing (six manifest variable), organizational communication (five manifest variable), feedback promotion (five manifest variable), policy formulation (five manifest variable), financial performance (four manifest variable) and non-financial performance (five manifest variable). These components were considered as dormant. Thus, a questionnaire method was organized for collecting records (please refer to the Appendix for the measurement item details). The questionnaire was detailed and proposed, based on previous studies and analyses. The questionnaire used a scale

Latent Variable	Manifest Variable	Cronbach's Alpha (if deleted)	No: of items	Cronbach's Alpha
Information Sharing	Constant communication among department available	0.778	6	0.801
	Organization is participative in nature	0.767		
	Information is shared openly (Supervisor and Manager)	0.759		
	Sharing of information related to the company with staff	0.768		
	Involvement of staff is excellent	0.765		
	Concerns are being treated equally without showing any boundary among teams	0.786		
Organizational Communication	Less intensity of conflicts among members in the organization	0.731	5	0.822
	Less intensity of conflicts between top management and team members	0.821		
	Proper communication between all employees in inter and intra department	0.754		
	Good communication between NPD department, production, marketing and administration	0.821		
	Good communication between organization and customer is vital	0.800		
Feedback Promotion	Organization allows feedback to facilitating organizational learning	0.750	5	0.805
	Organization provides information about how performance can be improved	0.779		
	A Learning plan is carried out wherein feedback from the most recent performance appraisal is taken into account	0.784		
	Organization allows question methods by which the facilitation of organizational learning happens	0.755		
	Feedback organizational learning process is promoted by the organization and any suggestions are noted	0.771		
Policy Formulation	Presence of clear objectives and guidelines	0.883	5	0.888
	Presence of policy suggestions to manage OL and risks that may arise	0.838		
	Presence of fluidity in the organization's structure	0.841		
	Enactive liaison actions among teams with similar functions through a cross function team	0.885		
	Creating model department, carrying out research and results being shared	0.861		
Financial Performance	Over the past year, the percentage of profit has increased significantly	0.854	4	0.909
	Over the past year, the percentage return of investment has increased	0.904		
	Overall financial performance relative to competitors has increased	0.900		
	Overall performance of the business unit has increased	0.871		
Non-financial Performance	More customer complaints , compared with previous period	0.699	5	0.808
	Increased customer churn rate, relative to our competitor	0.761		
	Consumer grievances are dealt with more slowly (in comparison with existing market condition)	0.796		
	We retain present customers and tried to find new customers	0.784		
	Better company image among clients	0.800		

Table 1. Reliability Statistics of the Manifest Variable Under Latent Variable

between one and five, where one was the lowest and five was the highest. The questionnaire also included participant characteristics such as age, work experience, qualification and job level.

6.2 Data Analysis

The demographic characteristics of the respondents (n=335) were as follows. The majority of the participants belonged to an age group of less than 30 years (62.7%), with a qualification of a bachelor's degree (49.9%). In addition, the majority of the respondents were from middle management (41.8%) and around 60% of the participants had between five and 10 years' experience in their current organization.

SEM, specifically confirmatory factor analysis (CFA), was used for analysing the data. This was mainly due to the latent behaviour of the variables, which could only be measured via certain indicators. Indicators could be variables that manifest in nature, as listed in the questionnaire assessment. The quantity requirement of the respondents had to be about five to 10 times that of the manifest variable, when the data had normal distribution. Otherwise, the quantity from the respondents had to consider a minimum of 20.

The analysis of data was conducted using AMOS and SPSS. The confirmation of the reliability of the manifest variables was carried out using Cronbach's alpha. The function of alpha was expressed by Zinbarg et al., 2005 [40] as the limit of hierarchical factor analysis. This allows for a basic factor, which is general for a complete measured item. The group factor, which is general for a few, cannot be a complete measured item. RMSEA, p-value and chi-square were the measurements of fit. As per Jöreskog and Sörbom (1989) [41], a chi-square can be defined as measuring fit as a whole, with respect to the model and data. Meanwhile, RMSEA can be defined as the inconsistency measurement in each degree of freedom (Browne and Cudeck, 1993) [42]. Another fit of measure is the P-value. Any score of more than 0.05 shows that the measurement is good. A measurement is said to be perfect when the p value is 1.00 (Hair et al., 2006) [43].

6.3 Analysis: Reliability, CFA and SEM

The survey was conducted by 400 automobile industry employees from seven automobile industries in the South India region. Out of that 400, 335 employees responded with all of the necessary data. AMOS and SPSS were used for confirming the respondents' information for the manifest variables. The same was analysed and the details are shown below.

6.3.1 Reliability: Using Cronbach's Alpha

The reliability study was conducted, based on the samples that were received from 335 members of various automo-

bile industries. The details of the reliability study are mentioned in Table One below. The Cronbach's alpha was higher than 0.7. Since the Cronbach's alpha could not be increased by deleting any of the factors, it is concluded that the 30 manifest variables that were taken were reliable under the six latent variables.

6.3.2 CFA: Knowledge Management and Organizational Performance

From the CFA, it is evident that the manifest variables had a perfect measure (among automobile industry employees) for KM (please refer to Table Two for details). The chi-square was less than 5.0, the P-value was more than 0.05 and the RMSEA was less than 0.08, referring to the fit of the data with the model. This implies that information sharing pattern, knowledge creating and obtaining, and knowledge sharing have a suitable measure in KM among automobile industry employees.

Latent Variable	No: of item	Chi-square Value	P-Value	RMSEA
Reference score		< 5.0	> 0.05	< 0.08
Information Sharing Pattern	6	1.382	0.501	0.000
Organizational Communication	5	3.695	0.296	0.026
Feedback Promotion	5	4.541	0.103	0.062
Policy Formulation	5	1.106	0.293	0.018
Financial Performance	4	3.715	0.054	0.064
Non-financial Performance	5	0.652	0.957	0.000

Table 2. Confirmatory Factor Analysis for Latent Variables

6.3.3 SEM: Knowledge Management and Organizational Performance

Structural equation modelling (SEM) includes a path analysis or causal modelling and assumes the fundamental associations amongst the variables (Figure Three). It checks this by a linear equation on the causal model.
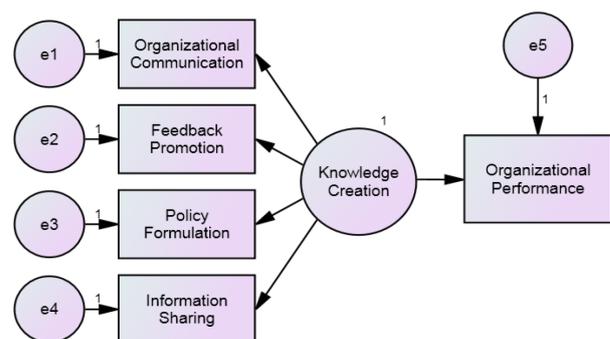

Figure 3. SEM on Organizational Learning in Automobile Industries

Variables			Un-standardized co-efficient	S.E	Standardized co-efficient	t value.	P value
Information Sharing	←	Knowledge Creation	0.596	0.039	0.833	15.206	<0.001**
Policy Formulation	←	Knowledge Creation	0.444	0.040	0.616	10.982	<0.001**
Feedback Promotion	←	Knowledge Creation	0.358	0.036	0.570	10.002	<0.001**
Organizational Communication	←	Knowledge Creation	0.471	0.036	0.725	13.246	<0.001**
Organizational Performance	←	Knowledge Creation	0.186	0.061	0.312	3.068	0.002**

Note: ** Denotes significant at a 1% level

Table 3. Variables in the Structural Equation Model Analysis

In Table Three, the estimated positive sign implies that such an effect is positive and that knowledge creation would improve by 0.596 for each unit in information sharing, as well as a 0.444 increase for every unit in policy formulation, a 0.358 increase for every unit in feedback promotion, a 0.471 increase for every unit in organizational communication and a 0.186 increase for every unit in organizational performance. This coefficient value is significant at level of 1%.

From Table Four, it is evident that the calculated P value is 0.804, which is greater than 0.05. This indicates a perfect fit (Hair et al., 2006) [43]. Here, the goodness of fit index (GFI) value (Hair et al., 2006) [43] and adjusted goodness of fit index (AGFI) value (Daire et al., 2008) [44] are more than 0.9, which signifies a good fit. The calculated CFI (Comparative Fit Index) value is 1.000, which means that it is a perfect fit (Hu and Bentler, 1999) [45]. Additionally, it is found that the root mean square residuals (RMR) and root mean square error of approximation (RMSEA) value is 0.001 and <0.001, which is less than 0.08. This indicates that it is a perfect fit (Hair et al., 2006) [43].

Variable	Value	Suggested value
Chi-square	0.061	
p-value	0.804	>0.05
GFI	1.000	>0.90
AGFI	0.999	> 0.90
CFI	1.000	>0.90
RMR	0.001	< 0.08
RMSEA	< 0.001	< 0.08

Table 4. Variables in the Structural Equation Model Analysis

7. Results and Conclusion

As per Bose, 2004 [46], through judgement and measurement, the results provide a vital conclusion for knowledge practices. The present study applied conceptual frameworks for knowledge creation through enablers of KT and the adjustments for other manufacturing units.

Based on the analysis, various results have been identified. The confirmatory factor analysis used factors such as, information sharing, policy formulation, feedback promotion and organizational communication. It concluded that the hypothesized representations have a good fit. This implies that the enablers of knowledge transfer, which include information sharing, policy formulation, feedback promotion and organizational communication, have a positive impact on knowledge creation. It is significant at a level of 1%, as per the SEM analysis. The results are in-line with some of the previous studies. For example, the importance of information sharing towards the performance of a team has been analysed by Jessica and Leslie (2009) [47]. Similarly, with respect to hospital performance, significant improvement has been noticed through better policies (Mukesh and Ramesh, 1996 [48]). This supports the positive consequence of policy formulation on performance. In the case of feedback promotion, John and Jeffrey (1997) [49] explained the use of a 360-degree feedback for attaining better performance. Furthermore, James (2011) [50] carried out a study about the impact of organizational communication on employee satisfaction, which, in turn, improves performance.

Furthermore, knowledge creation is significant at a 1% level towards organizational performance, which consists of financial and non-financial performance. The importance of knowledge creation in an organization's innovation performance has also been explored by Sarra and Mehrez (2014) [51]. Although similar studies have been carried out in developed countries with respect to the relationship between knowledge creation and organizational performance (Marra and Edwards, 2012 [52]; Gourlay, 2006 [53]; Zirpoli and Becker, 2003 [54]; Choi and Lee, 2002) [55]), few studies have focused on developing countries like India. This empirical research builds on the knowledge for practitioners and production managers who are working in a similar demography and work environment.

This study also highlights the importance of the four enablers of KT and is highly required in the automobile industry. During a peer review, it was observed that only two out of 10 successful automobile industries start (from plant start-up) with all four of the enablers (samples only considered in India). Others mostly focus on policy formulation and organizational communication (top -->

bottom communication) during their start-up. Eight out of 10 automobile industries started using feedback promotion (bottom --> top communication) and information sharing (one department --> another department) within seven years after start-up because of its requirement over the course of time. However, as a whole, all of the four enablers have a positive impact on knowledge creation, thereby organizational performance. Thus, further studies are required for highlighting the importance of top --> bottom, bottom --> top and department --> department communication for the success of every organization.

The present study was solely conducted in the context of the Indian automobile industry. In future, this needs to be widened - studying more locations, if possible, from different nations in various expansion processes. This literature only focused on the "what factor" with respect to people. This can be used as a yardstick for industries for further improvement and involvement of employees. Currently, some of the manufacturers follow the above, within APQP (Advanced Product Quality Planning) during the start of their projects. This is mainly because companies consider knowledge to be an important parameter for any project's success. Although the results highlight most of its advantages, there are certain areas that we need to further analyse and improve. The "how factor" with respect to people needs to be looked into, as well as the usage of technology for implementing or ensuring all of the four enablers. Additionally, only "one M" has been considered. It needs to be analysed on a "4M" basis (man, machine, method and material). This would help to improve companies in a holistic way. How the variables behave from a global perspective (other than India) and with other industries (other than the automobile industry) also needs to be analysed.

There is a need to enhance SME commitment to knowledge creation practices. The results from this study show that knowledge creation leads to better organizational performance. For better confirmation of the data, studies have to be performed with respect to one business unit. This study helps us to gain an in-depth familiarity with respect to the correlation of planned constructs for the present model. It supports future studies in terms of application and usage. Large firm management is fundamentally different from SME management. Thus, the conclusions that have been drawn from many studies of knowledge creation in large enterprises cannot be benchmarked for SMEs with no practical verification. Thus, more research on SMEs should be performed.

8. References

[1] Marco, G., Michele, G., and Musadaq, H. (2013) "How to Select Knowledge Management Systems: A Framework to Support Managers", International Journal of Engineering Business Management, Vol. 5, 5

[2] Liao, S., Wu-Chen, F. and Chih-Tang, L. (2008) "Relationships between Knowledge Inertia, Organizational Learning and Organization Innovation", Technovation, 28, pp. 183–195.

[3] Zárraga, C. and Bonache, J. (2005) "The Impact of Team Atmosphere on Knowledge Outcomes in Self-managed Teams", Organization Studies, 26, pp. 661-681.

[4] Collins, C. J. and Smith, K. G. (2006) 'Knowledge Exchange and Combination: The Role of Human Resource Practices in the Performance of High-Technology Firms', Academy of Management Journal, 49, pp. 544-560.

[5] Kang, S., Morris, S. S. and Snell, S. A. (2007) Relational Archetypes, Organizational Learning, and Value Creation: Extending the Human Resource Architecture", Academy of Management Review, Vol. 32 No. 1, pp. 236-56.

[6] Ove, B., Staffan, B. and Per-Olof, B. (2013) "The Strategic Importance of Supplier Relationships in the Automotive Industry", International Journal of Engineering Business Management, Vol. 5, 17

[7] Jantunen, A. (2005) "Knowledge-processing Capabilities and Innovative Performance: An Empirical Study", European Journal of Innovation Management, 8 (3), pp. 336-49.

[8] Jung, D. I., Chow, C. and Wu, A. (2003) "The Role of Transformational Leadership in Enhancing Organizational Innovation: Hypotheses and Some Preliminary Findings", The Leadership Quarterly, 14, pp. 525-544.

[9] Labedz, C. S., Cavaleri, S. A. and Berry, G.R. (2011), "Interactive Knowledge Management: Putting Pragmatic Policy Planning in Place", Journal of Knowledge Management, Vol. 15 No. 4, pp. 551 – 567.

[10] Rose, R. C., Kumar, N. and Pak, O. G. (2009), "The Effect of Organizational Learning on Organizational Commitment, Job Satisfaction and Work Performance", Journal of Applied Business Research, Vol. 25 No. 6, pp. 55–66.

[11] Panayides, M. (2007), "Affirmative Obligations and Market Making with Inventory", Journal of Financial Economics, Vol. 86, pp. 513–542.

[12] Goh, S. C. and Ryan, P. J. (2002), "The Organizational Performance of Learning Companies.", Paper presented at the Third European Conference on Organizational Knowledge, Learning and Capabilities, Athens, Greece, pp. 5–6.

[13] Bontis, N., Crossan, M. and Hulland, J. (2002), "Managing an Organizational Learning System by Aligning Stocks and Flows", Journal of Management Studies, Vol. 39 No. 4, pp. 437–469.

[14] Huber, G. (1991) "Organizational Learning: The Contributing Processes and the Literatures", Organization Science (2:1), pp. 88-115.

[15] Nonaka, I. (1994) "A Dynamic Theory of Organizational Knowledge Creation", Organization Science (5:1), pp. 14-37.

[16] CEN (2004) CEN CWA 14924 European Guide to Good Practice in Knowledge Management - Part 1 to 5, Brussels.

[17] Heisig, P. (2009) "Harmonisation of Knowledge Management – Comparing 160 KM Frameworks Around the Globe", Journal of Knowledge Management, Vol. 13, No. 4, pp. 4 – 31.

[18] Alavi, M., and Leidner, D. E. (2001) "Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues", MISQ, Vol. 25, No. 1, pp. 107-136.

[19] Holden, N. (2002) "Cross-cultural Management – A Knowledge Management Perspective". Harlow: Prentice Hall.

[20] Elliott, S. and O'Dell, C. (1999). "Sharing Knowledge and Best Practices: The Hows and Whys of Tapping Your Organization's Hidden Reservoirs of Knowledge", Health Forum Journal, 42(3), 34–37.

[21] Ward, J. and Aurum, A. (2004). "Knowledge Management in Software Engineering – Describing the Process", ASWEC 2004. IEEE Computer Society.

[22] Brown, S. A., Dennis, A. R. and Gant, D. B. (2006). "Understanding the Factors Influencing the Value of Person to- Person Knowledge Sharing", 39th Hawaii International Conference on System Sciences, IEEE Computer Society.

[23] Smith, H. A., McKeen, J. D. and Singh, S. (2007). "Tacit Knowledge Transfer: Making It Happen", Journal of Information Science & Technology, 3(3), 50–72.

[24] Kolfschoten, G. L. (2007)." Theoretical Foundations for Collaboration Engineering", Dissertation, Delft University of Technology, 269.

[25] Thomas, B. D. (2006). "An Empirical Investigation of Factors Promoting Knowledge Management System Success", Doctoral Dissertation, Texas Tech University, Retrieved 17 April, 2009 from http://etd.lib.ttu.edu/theses/available/etd-07072006-105657/unrestricted/ Thomas_Bobby_Diss.pdf

[26] Davenport, T. H., DeLong, D. W. and Beers, M. C. (1998). "Successful Knowledge Management Projects", Sloan Management Review, 39(2), 43–57.

[27] Bhatti, W. A., Zaheer, A. and Rehman, K. U. (2011). "The Effect of Knowledge Management Practices on Organizational Performance: A Conceptual Study", African Journal of Business Management Vol. 5(7), pp. 2847-2853.

[28] Chourides, P., Longbottom, D. and Murphy, W. (2003). "Excellence in Knowledge Management: An Empirical Study to Identify Critical Factors and Performance Measures", Measuring Business Excellence, 7(2), 29–45. doi: 10.1108/13683040310477977

[29] Jennex, M. E. and Olfman, L. (2004)." Accessing Knowledge Management Success/Effectiveness Models", In Proceedings of the 37th Hawaii International Conference on System Sciences. HICSS37. IEEE Computer Society.

[30] Hariharan, A. (2005). "Implementing Seven KM Enablers at Bharti", Knowledge Management Review, 8(3), 8–9.

[31] Lee, H. and Choi, B. (2003). "Knowledge Management Enablers, Processes, and Organizational Performance: An Integrative View and Empirical Examination", Journal of Management Information Systems, 20(1), 179.

[32] Robbins, S. (2005). "We Need a New Vocabulary", Information Systems Management, 22(1), 89–90. doi:10.1201/1078/44912.22.1.20051201/85744.12

[33] Hansen, M. (1999), "The Search-transfer Problem: The Role of Weak Ties in Sharing Knowledge across Organization Subunits", Administrative Science Quarterly, Vol. 44, pp. 82–111.

[34] Choe, J. (2004), "The Relationships among Management Accounting Information, Organizational Learning and Production Performance", The Journal of Strategic Information Systems, Vol. 13 No. 1, pp. 61–85.

[35] Wheatley, M. (2001), Leadership and the New Science: Discovering Order in a Chaotic World, New York: Berrett-Koehler Publishers.

[36] Yang, B., Watkins, K. and Marsick, V. (2004), "The Construct of the Learning Organization: Dimensions, Measurement, and Validation", Human Resource Development Quarterly, Vol. 15 No. 1, pp. 31–55.

[37] Scharmer, C. O. (2009), Theory U: Leading from the Edge as It Emerges. The Social Technology of Presencing, San Francisco, CA: Berrett-Koehler

[38] Power, J. and Waddell, D. (2004), "The Link Between Self Managed Work Teams and LOs, Using Performance Indicators", The Learning Organization, Vol. 11 No. 3, pp. 244– 259.

[39] Redding, J. (1997), "Handwriting the Learning Organisation", Training and Development, pp. 61–67.

[40] Zinbarg, R. E., Revelle, W., Yovel, I. and Li, W. (2005), "Cronbach's Alpha, Revelle's Beta, and McDonals's Omega: Their Relations with Each Other and Two Alternative Conceptualizations of Reliability", Psychometrika, 70, pp. 123 - 133.

[41] Jöreskog, K. G. and Sörbom, D. (1989), "LISREL 7– A. Guide to the Program and Application", SPSS Publication, Chicago.

[42] Browne, M. W. and Cudeck, R. (1993), "Alternative Way of Assessing Model Fit", in Bollen, K.A. and

Long, J.S. (Eds.): Testing Structural Equation Models, Newbury Park, Sage, CA.

[43] Hair J. F., Anderson R. E. and Tantham R. L. (2006). "Multivariate Data Analysis",10th edn., Prentice Hall: New Jersey. In: Malek AL- Majali, Nik Kamariah Nik Mat (2011). "Modeling the Antecedents of Internet Banking Service Adoption (IBSA) in Jordan: A Structural Equation Modeling (SEM) Approach". Journal of Internet Banking and Commerce. 16(1):8-13.

[44] Daire, H., Joseph, C. and Michael, R. M. (2008). "Structural Equation Modeling: Guidelines for Determining Model Fit", Electron. J. Bus. Res. Methods 6(1):53-60.

[45] Hu, L. T. and Bentler, P. M. (1999). "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives", Struct. Equ. Model. 6(1):1-55.

[46] Bose, R. (2004) "Knowledge Management Metrics", Industrial Management & Data Systems, Vol. 104, No.6, pp. 457-468.

[47] Jessica, R. and Leslie, A. (2009) " Information Sharing and Team Performance: A Meta-analysis", Journal of Applied Psychology, Vol. 94, No. 2, 535–546.

[48] Mukesh, C. and Ramesh, G. (1996), "Improving Hospital Performance Through Policies to Increase Hospital Autonomy: Implementation Guidelines", Data for Decision Making Project, Harvard University, Boston, MA.

[49] John, W. F. and Jeffrey, M. P. (1997), "Using 360-Degree Feedback in Organizations: An Annotated Bibliography", Centre for Creative Leadership, Greensboro, North Carolina

[50] James, B. A. (2011), "Appraising the Impact of Organizational Communication on Worker Satisfaction in Organizational Workplace", Problems of Management in the 21st Century, Volume 1.

[51] Sarra, B. and Mehrez, C. (2014) " Knowledge Creation Process and Firms' Innovation Performance: Mediating Effect of Organizational Learning", International Journal of Human Resource Studies, Vol. 4, No. 1.

[52] Marra, M., Ho, W. and Edwards, J. S. (2012) 'Supply Chain Knowledge Management: A Literature Review', Expert System with Applications, 39, 6103-6110

[53] Gourlay, S. (2006). Conceptualizing Knowledge Creation: A Critique of Nonaka's Theory. J. Management Stud. 43(7) 1415–1436.

[54] Zirpoli, F. and Becker, M. (2003) Organizing New Product Development: Knowledge Hollowing-out and Knowledge Integration - The FIAT Auto Case, International Journal of Operations & Production Management.

[55] Choi, B. and Lee, H. (2002). Knowledge Management Strategy and Its Link to Knowledge Creation Process. Expert Systems with Applications, 23, 173–187.

List of measurement items

Latent Variable	Manifest Variable
Information Sharing	Constant communication among department available
	Organization is Participative in nature
	Information being shared openly (Supervisor & Manager)
	Sharing of information related to company with staff
	Involvement of staff is excellent
	Concerns are being treated equally without showing any boundary among teams
Organizational Communication	Less Intensity of conflicts among members in the organization
	Less Intensity of conflicts between top management and team members
	Proper communication between all employees in inter and intra department
	Good communication between NPD department, production, marketing, administration
	Good communication between organization and customer is vital
Feedback Promotion	Organization allows feedback to facilitating organizational learning
	Information with regards to how performance can be improved is provided by organization
	A Learning plan is carried out wherein feedback from the most recent performance appraisal is taken into account
	Organization allows question methods by which the facilitation of organizational learning will happen
	Feedback organizational learning process is promoted by organization and any suggestions are noted
Policy Formulation	Presence of clear objectives and guidelines
	Presence of policy suggestion to manage OL and risks which may arise
	Presence of fluidity in structure of the organization
	Enactive liaison actions among teams having similar functions through cross function team
	Creating model department, carrying out research and result being shared
Financial Performance	Over the past year, the percentage of profit increased significantly
	Over the past year, the percentage return of investment is increased
	Overall financial performance relative to competitors increased
	Overall performance of the business unit increased
Non-Financial Performance	The customer complaints are more in comparison with previous period
	The customer churn rate relative to our competitor increased
	Consumer grievances are dealt in lower speeds (in comparison with existing market condition)
	We retain present customers and tried to find new customers
	Company Image among clients being bettered