Influence of KM on innovation within the Organisation (TPDDL)

Project Report
Submitted in Partial Fulfillment of the
Requirements For the
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Submitted by
Sanjeev Kumar
2K14/MBA/518

Guided by
Dr. Broto Bhardwaj

DELHI TECHNOLOGICAL UNIVERSITY
Bawana Road Shahbad Delhi

Certificate of Originality

This is to certify that the project report entitled " **Influence of KM on innovation within the organization (TPDDL)**" submitted to **Delhi Technological University** in partial fulfillment of the requirement for the award of the degree of Master of Business Administration is an original work carried out by me under the guidance of Dr. Broto Bhardwaj. The matter embodied in this project is a genuine work done by Sanjeev Kumar to the best of my knowledge and belief and has been submitted neither to this University nor to any other University for the fulfillment of the requirement of the course of study.

Signature of the student

DECLARATION

I Sanjeev Kumar student of EMBA 2014-2016 batch of Delhi School of Management, Delhi Technological University, Bawana road, Delhi-42 declare that term project **Influence of KM on innovation within the organization** submitted in partial fulfilment of Executive MBA programme is the original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge. This Report is not being submitted to any other University for award of any other Degree, Award and Fellowship.

Name of candidate with

Sign_____

Place: New Delhi

Date:

ACKNOWLEDGEMENT

"The successful completion of any task would be incomplete without accomplishing the people who made it all possible and whose constant guidance and encouragement secured us the success."
I am grateful to **Dr. Broto Bhardwaj** in Delhi School of Management, Delhi Technological University, Delhi, for her astute guidance, constant encouragement and sincere support for this project work. The knowledge and values inculcated have proved to be of immense help at the very start of our career.
I feel proud and privileged in expressing my deep sense of gratitude to all those who have helped me in presenting this project.

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1. Synopsis

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Abstract

Purpose – The purpose of this study is to analyze how Knowledge embedded in the organization in form of Human resources, organisational processes, and technological infrastructure influence a firm's innovation capability.

Design/methodology/approach – Based on a survey of 44 employees from various organizations in India, this study applies the structural equation modeling (SEM) to investigate the research model.

Findings – The results show that individual factors (self-motivated to collect and donate knowledge) and one of the organizational factors (top management support & Rewards) significantly influence knowledge collecting – knowledge donating processes in the organization and enable the firm's innovation capability.

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Practical implications – From a practical perspective, the relationships among knowledge-sharing enablers, processes, and firm innovation capability may provide a clue regarding how firms can promote knowledge-sharing culture to sustain their innovation performance.

Keywords: Knowledge collecting, Knowledge donating, Organizational innovation

Introduction

Knowledge donation creates opportunities to maximize organization ability to meet those needs and generates solutions and efficiencies that provide a business with a competitive advantage (Reid, 2003). Knowledge donation can define as a social interaction culture, involving the exchange of employee knowledge, experiences, and skills through the whole department or organization. Knowledge donation comprises a set of shared understandings related to providing employees access to relevant information and building and using knowledge networks within organizations (Hogel et al., 2003). Further, knowledge donation occurs at the individual and organizational levels. For individual employees, knowledge donation is about to educate the individual/group to do better work effectively and efficiently. Organization process for knowledge donation is to capturing, organizing, reusing, and transferring experience-based knowledge that resides within the organization and making that knowledge available to others in the business. A number of studies have demonstrated that knowledge sharing/ donation is essential because it enables organizations to enhance innovation performance and reduce redundant learning efforts (Calantone et al., 2002; Scarbrough, 2003).

A firm can successfully promote a knowledge sharing culture not only by directly incorporating knowledge in its business strategy, but also by changing employee attitudes and behaviors to promote willing and consistent knowledge sharing (Connelly and Kelloway, 2003; Lin and Lee, 2004). Moreover, various studies focused on the relationship between knowledge sharing enablers and processes (Van den Hooff and Van Weenen, 2004a; Van den Hooff and VanWeenen, 2004b; Bock et al., 2005; Yeh et al., 2006), while others have focused on the relationship between knowledge sharing enablers and innovation performance (Calantone et al., 2002; Syed-Ikhsan and Rowland, 2004). However, researchers and practitioners have not tried an integrative model that explores the effectiveness of knowledge donation from a holistic perspective, and little empirical research has examined the relationships among knowledge sharing enablers, processes, and firm innovation capability. Further study had been examined the influence of individual factors (enjoyment in helping others and knowledge self-efficacy) Hsiu-Fen Lin,(2007) on knowledge sharing leading to superior firm innovation capability.

The study is lacking on design of frame work how various factors are integrated for K-donation & K-collection in enhance firm innovation capacity & capability.

To fill this gap, this study develops a research model that links knowledge sharing enablers, processes, and firm innovation capability., organizational factors (top management support and organizational rewards) and technology factors (information and communication technology use) on knowledge sharing processes and whether leads to superior firm innovation capability. Based on a survey of 60 employees from various organizations in India, this study applies the structural equation modeling (SEM) to investigate the research model. Additionally, the current study contributes to knowledge sharing research by further clarifying which factors are essential for knowledge sharing effectively. At a minimum, the findings of this study provide a theoretical basis, and simultaneously can be used to analyze relationships among knowledge donation enablers, processes, and firm innovation capability.

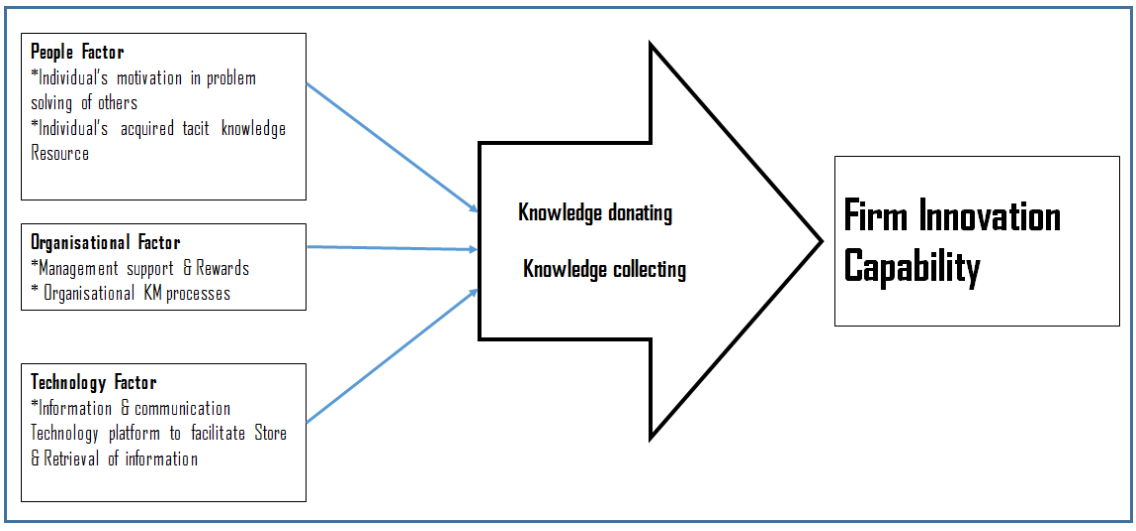
From a managerial perspective, the findings of this study can improve understanding and practice of organizational management of knowledge donation. Specifically, this study identified several factors essential to successful knowledge donation, and discussed the implications of these factors for developing organizational strategies that encourage and foster knowledge donation.

Analysis model

Figure 1 illustrates the general framework of strategic decision processes that are contrasted below. Following the approach proposed by Rajagopalan et al. (1993), the analytical framework of this study comprises three aspects: enablers, processes and outcomes. "Enablers" are the mechanism for fostering individual and organizational learning and also facilitate employee knowledge sharing within or across teams or work units. In related research, knowledge sharing enablers include the effects caused by employee motivators, organizational contexts, and information and communication

A general framework for studying Influence of KM within the organization.

Fig 1 Framework- Influence of KM on innovation within the organization



People factor as determinants of knowledge-sharing processes

Individual factors as determinants of knowledge-sharing processes
The research considered here has focused on individual factors that promote or inhibit organizational knowledge sharing activities. The two factors that may be proximal determinants of knowledge sharing are identified: Individual's motivation in problem solving of others and Individual's acquired tacit knowledge Resource

Individual's motivation in problem solving of others and Individual's acquired tacit knowledge resource factors to donate the knowledge and Influence others to donate and collect Knowledge. Organ (1988) defined altruism includes discretionary behaviors that help specific others with organizationally relevant tasks or problems. Knowledge workers may be motivated by relative altruism owning to their desire to help others (Constant et al., 1994; Davenport and Prusak, 1998). Previous research shows that employees are intrinsically motivated to contribute knowledge because engaging in intellectual pursuits and solving problems is challenging or pleasurable, and because they enjoy. Helping others (Wasko and Faraj, 2000; Wasko and Faraj, 2005). Knowledge workers who derive enjoyment from helping others may be more favorable oriented toward knowledge sharing and more inclined to share knowledge – in terms of both donation and collecting. The following hypothesis thus is proposed:

H1. Individual's motivation in problem solving of others positively influences employee willingness to both (a) donate and (b) collect knowledge.

Individual's acquired tacit knowledge resource is defined as the judgments of individuals regarding their capabilities to organize and execute courses of action required to achieve specific levels of performance (Bandura, 1986). It can help motivate employees to share knowledge with colleagues (Wasko and Faraj, 2005). Researchers have also found that employees with high confidence in their ability to provide valuable knowledge are more likely to accomplish specific tasks (Constant et al., 1994). Knowledge self-ability typically manifests in people believing that their knowledge can help to solve job-related problems and improve work efficacy (Luthans, 2003). Employees who believe that they can contribute organizational performance by sharing knowledge will develop greater positive willingness to both contribute and receive knowledge. Hence, the following hypothesis is proposed:

H2. Individual's acquired tacit knowledge resource positively influences employee willingness to both (a) Donate and (b) collect knowledge.

Organizational factors as determinants of knowledge-sharing processes
Top management support is considered one of the important potential influences on organizational knowledge (Connelly and Kelloway, 2003). Numerous studies have found top management support essential to creating a supportive climate and providing sufficient resources (Lin, 2006). MacNeil (2004) emphasized the importance of the visible top management's support to organizational knowledge sharing climate. Moreover, Lin and Lee (2004) proposed that the perception of top management encouragement of knowledge sharing intentions is necessary for creating and maintaining a positive knowledge sharing culture in an organization. Consequently, this study expects that top management support positively influences employee willingness to share knowledge with colleagues – both in terms of donating and collecting. The following hypothesis is therefore formulated:

H3. Top management support positively influences employee willingness to both
(a) Donate and (b) collect knowledge.

Organizational rewards indicate what the organization values shape employee behaviors (Cabrera and Bonache, 1999). Organizational rewards can range from monetary incentives such as increased salary and bonuses to non-monetary awards such as promotions and job security (Davenport and Prusak, 1998; Hargadon, 1998). Several organizations have introduced reward systems to encourage employees to share their knowledge. For example, Buckman Laboratories recognizes its 100 top knowledge contributors through an annual conference at a resort. Moreover, Lotus Development, a division of IBM, bases 25 per cent of the total performance evaluation of its customer support workers on the extent of their knowledge sharing activities (Bartol and Srivastava, 2002). This study thus expects that if employees believe they can receive organizational rewards by offering their knowledge, they would develop greater positive willingness to both donate and receive knowledge. The following hypothesis is proposed:
H4. Organizational KM process influence employee willingness to both (a) donate and (b) collect knowledge.

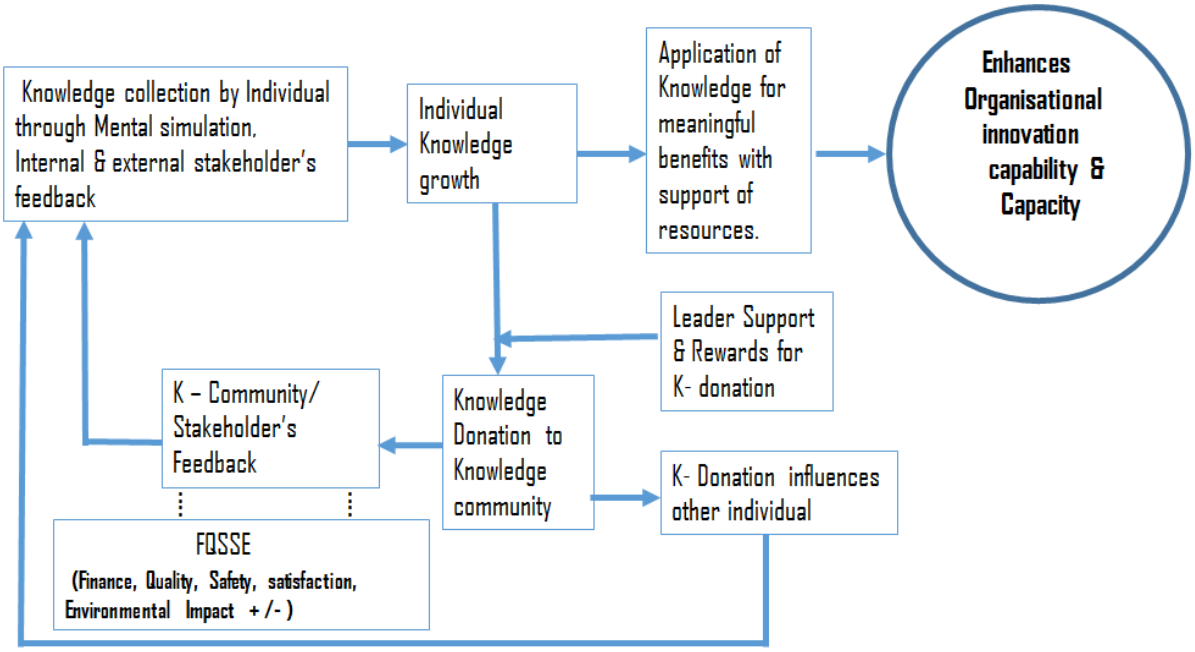
Technology factors as determinants of knowledge-sharing processes
Information and communication technology (ICT) use and knowledge sharing are closely linked, because ICT can enable rapid search, access and retrieval of information, and can support communication and collaboration among organizational employees (Huysman and Wulf, 2006). Within knowledge sharing, the use of ICT development facilitate new methods and applications (such as groupware, online databases, intranet, virtual communities, etc.), and allow firms to expand available social networks by overcoming geographical boundaries and thus achieving more effective

collaborative activities (Pan and Leidner, 2003). Moreover, Zack (1999) believes that ICT plays the following three different roles in knowledge management activities:
(1) Obtaining knowledge.
(2) Defining, storing, categorizing, indexing, and linking knowledge-related digital items.
(3) Seeking and identifying related content.
Moreover, according to Yeh et al. (2006), effective knowledge management requires employees sharing their knowledge through ICT facilities, because ICT can provide communication channels for obtaining knowledge, correcting flow processes, and identifying the location of knowledge carriers and requesters. Hence, the following hypothesis is proposed:

H5. ICT support positively influences employee willingness to both (a) donate and (b) collect knowledge.

Knowledge-sharing processes and firm innovation capability
It is obvious that a firm's ability to transform and exploit knowledge may determine its level of organizational innovation, such as faster problem-solving capability and enhanced rapid reaction to new information. Many scholars stress the importance of knowledge sharing to enhancing innovation capability (Liebowitz, 2002; Lin, 2006). The definition of Davenport and Prusak (1998) indicates that knowledge is personal.
Organizations can only begin to effectively manage knowledge resources when employees are willing to cooperate with colleagues to contribute knowledge to the firm. Knowledge donating aims to see individual knowledge become group and organizational knowledge over time, which in turn improves the stock of knowledge available to the firm. A firm that promotes employees to contribute knowledge within groups and organizations is likely to generate new ideas and develop new business opportunities, thus facilitating innovation activities (Darroch and McNaughton, 2002).
Knowledge collecting consists of processes and mechanisms for gathering information and knowledge from internal and external sources. The process of knowledge collecting in which organizational knowledge becomes group and individual knowledge, involves the internalization and socialization of knowledge.

Hansen (1999) suggested that knowledge collecting represents a key aspect of successful project completion, especially for organizations heavily involved in innovation projects. The generation of new ideas and the improvement of firm products, because of a better absorptive capacity, could improve innovation performance (Jantunen, 2005). Specifically, a firm with proficiency in gathering and integrating knowledge is more likely to be unique, rare, and difficult for rivals to replicate, and hence has the potential to sustain high levels of firm innovation capability. This study expects that employee willingness to both donate and collect knowledge with colleagues is likely to sustain innovativeness and thus better position the firm in terms of long-term competitive advantage. The following hypotheses thus are formulated:
H6. Employee willingness to donate knowledge positively influences firm innovation capability.
H7. Employee willingness to collect knowledge positively influences firm innovation capability.

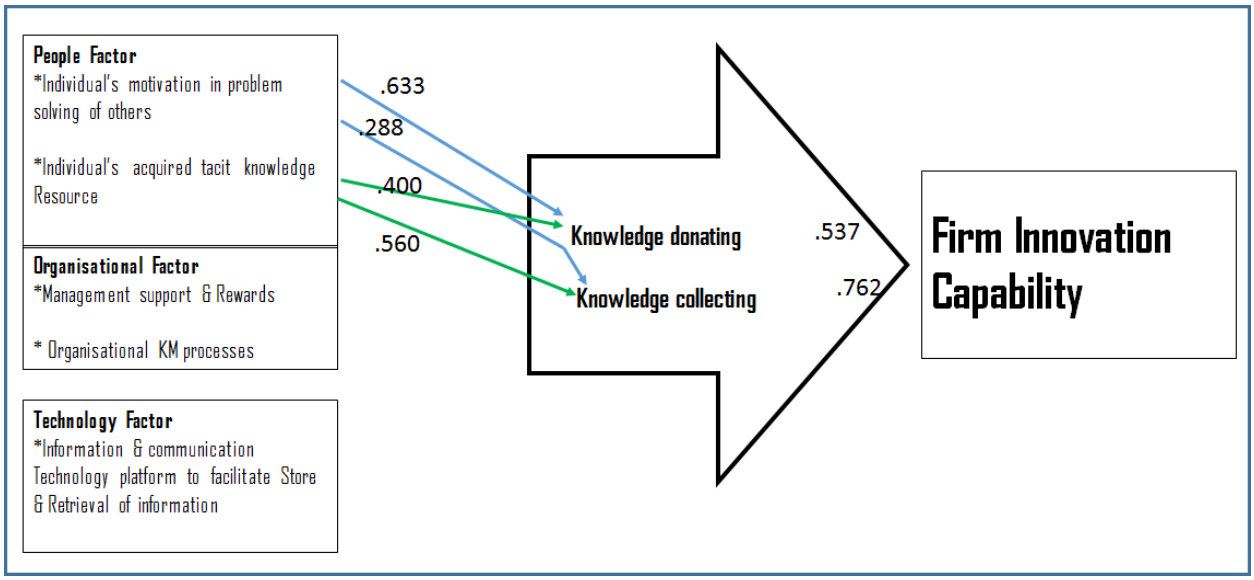


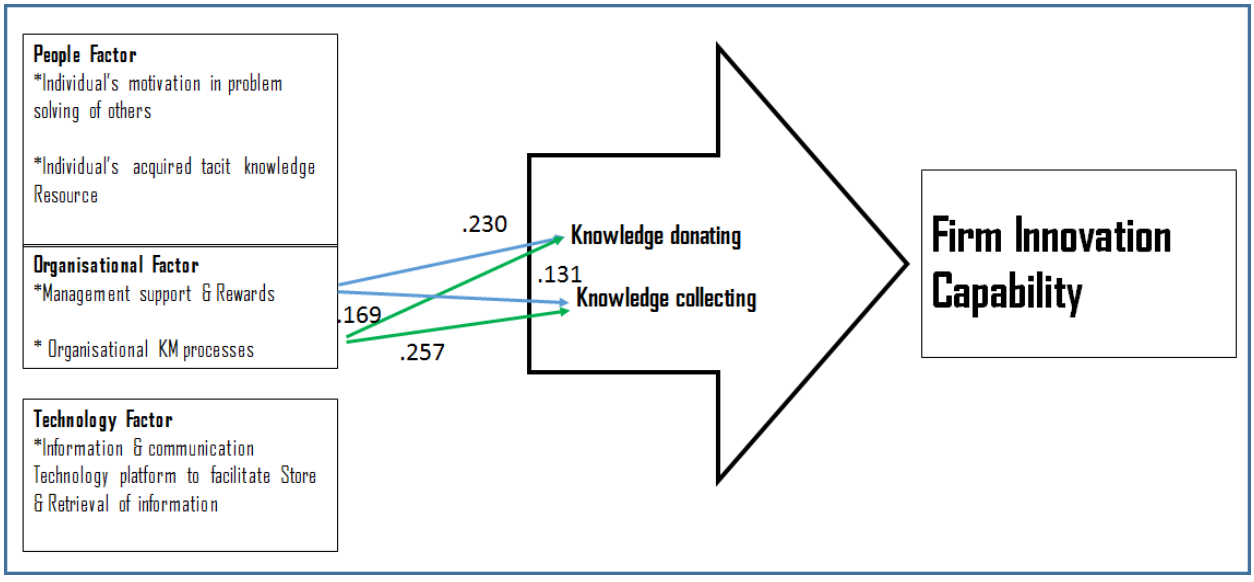
Methods Sample and data collection
A draft questionnaire was pilot tested by Dr Broto to ensure that the content and wording were free of problems.
Final questionnaire with 39 variables was put for survey to 60 participants 6 organizations.
Analysis of feedback:

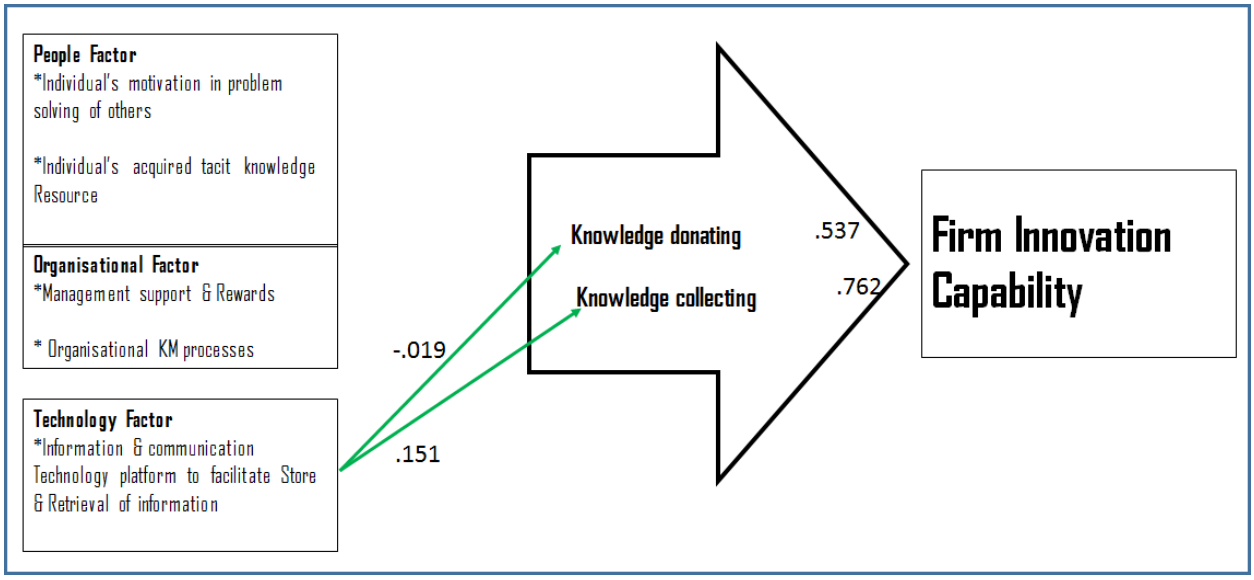
The Feedback is interpreted by using SPSS to analize the communalities in variables, data reduction, and Extraction method: Principal component Analysis (PCA) and Correlation among variables.

In communality: All 39 variables are accepted.
PCA: 11 variables out of 39 contribute to 76%
In component matrix, 3 factors have been identified as

1) People factor : a) Individual's motivation in problem solving, b) Individual's acquired tacit knowledge resource
2) Organisational factors: a) Top management support, 2) Organisational KM process
3) Technological factor: ICT Infrastructure support







Correlations

		VAR00024	VAR00026	VAR00031	VAR00033	VAR00025	VAR00035	VAR00032	VAR00015
VAR00024	Pearson Correlation	1	.633**	.398**	.288*	.631**	.338**	.482**	-.117
	Sig. (2-tailed)		.000	.002	.026	.000	.008	.000	.372
	N	60	60	60	60	60	60	60	60
VAR00026	Pearson Correlation	.633**	1	.400**	.479**	.637**	.537**	.480**	-.019
	Sig. (2-tailed)	.000		.002	.000	.000	.000	.000	.886
	N	60	60	60	60	60	60	60	60
VAR00031	Pearson Correlation	.398**	.400**	1	.560**	.298*	.547**	.546**	.005
	Sig. (2-tailed)	.002	.002		.000	.021	.000	.000	.968
	N	60	60	60	60	60	60	60	60
VAR00033	Pearson Correlation	.288*	.479**	.560**	1	.406**	.762**	.533**	.151
	Sig. (2-tailed)	.026	.000	.000		.001	.000	.000	.249
	N	60	60	60	60	60	60	60	60
VAR00025	Pearson Correlation	.631**	.637**	.298*	.406**	1	.490**	.506**	-.132
	Sig. (2-tailed)	.000	.000	.021	.001		.000	.000	.315
	N	60	60	60	60	60	60	60	60
VAR00035	Pearson Correlation	.338**	.537**	.547**	.762**	.490**	1	.413**	.168
	Sig. (2-tailed)	.008	.000	.000	.000	.000		.001	.199
	N	60	60	60	60	60	60	60	60
VAR00032	Pearson Correlation	.482**	.480**	.546**	.533**	.506**	.413**	1	-.257*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.001		.047
	N	60	60	60	60	60	60	60	60
VAR00015	Pearson Correlation	-.117	-.019	.005	.151	-.132	.168	-.257*	1
	Sig. (2-tailed)	.372	.886	.968	.249	.315	.199	.047	
	N	60	60	60	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

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Correlations

		VAR00026	VAR00033	VAR00035	VAR00011	VAR00003
VAR00026	Pearson Correlation	1	.479**	.537**	.169	.230
	Sig. (2-tailed)		.000	.000	.197	.077
	N	60	60	60	60	60
VAR00033	Pearson Correlation	.479**	1	.762**	.257*	.131
	Sig. (2-tailed)	.000		.000	.048	.317
	N	60	60	60	60	60
VAR00035	Pearson Correlation	.537**	.762**	1	.037	.031
	Sig. (2-tailed)	.000	.000		.779	.813
	N	60	60	60	60	60
VAR00011	Pearson Correlation	.169	.257*	.037	1	.533**
	Sig. (2-tailed)	.197	.048	.779		.000
	N	60	60	60	60	60
VAR00003	Pearson Correlation	.230	.131	.031	.533**	1
	Sig. (2-tailed)	.077	.317	.813	.000	
	N	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Hypothesis	Hypothesized path	Path coefficient	Results
H1a	Individual's motivation in problem solving of others: Knowledge donating	0.633	Supported
H1b	Individual's motivation in problem solving of others: Knowledge collecting	0.288	Supported
H2a	Individual's acquired tacit knowledge Resource: knowledge donating	0.400	Supported
H2b	Individual's acquired tacit knowledge Resource: knowledge collecting	0.560	Supported
H3a	Top management support: knowledge donating	0.230	Supported
H3b	Top management support: knowledge collecting	0.131	Supported
H4a	Organisational KM processes: knowledge donating	0.169	Supported
H4b	Organisational KM processes: knowledge collecting	0.257	Supported
H5a	ICT use: knowledge donating	-0.019	Not Supported
H5b	ICT use: knowledge collecting	0.151	Supported
H6	Knowledge donating: Firm innovation capability	0.537	Supported
H7	Knowledge collecting: Firm innovation capability	0.762	Supported

a. All requested variables entered.

b. Dependent Variable: VAR00035

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811[a]	.657	.618	.64842

a. Predictors: (Constant), VAR00033, VAR00003, VAR00024, VAR00011, VAR00031, VAR00026

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.716	6	7.119	16.933	.000[a]
	Residual	22.284	53	.420		
	Total	65.000	59			

a. Predictors: (Constant), VAR00033, VAR00003, VAR00024, VAR00011, VAR00031, VAR00026

b. Dependent Variable: VAR00035

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.329	.473		.696	.490
	VAR00024	.015	.100	.016	.150	.881
	VAR00031	.108	.109	.103	.987	.328
	VAR00011	-.146	.098	-.153	-1.501	.139
	VAR00003	-.031	.099	-.031	-.314	.755
	VAR00026	.246	.135	.211	1.826	.074
	VAR00033	.675	.115	.641	5.863	.000

a. Dependent Variable: VAR00035

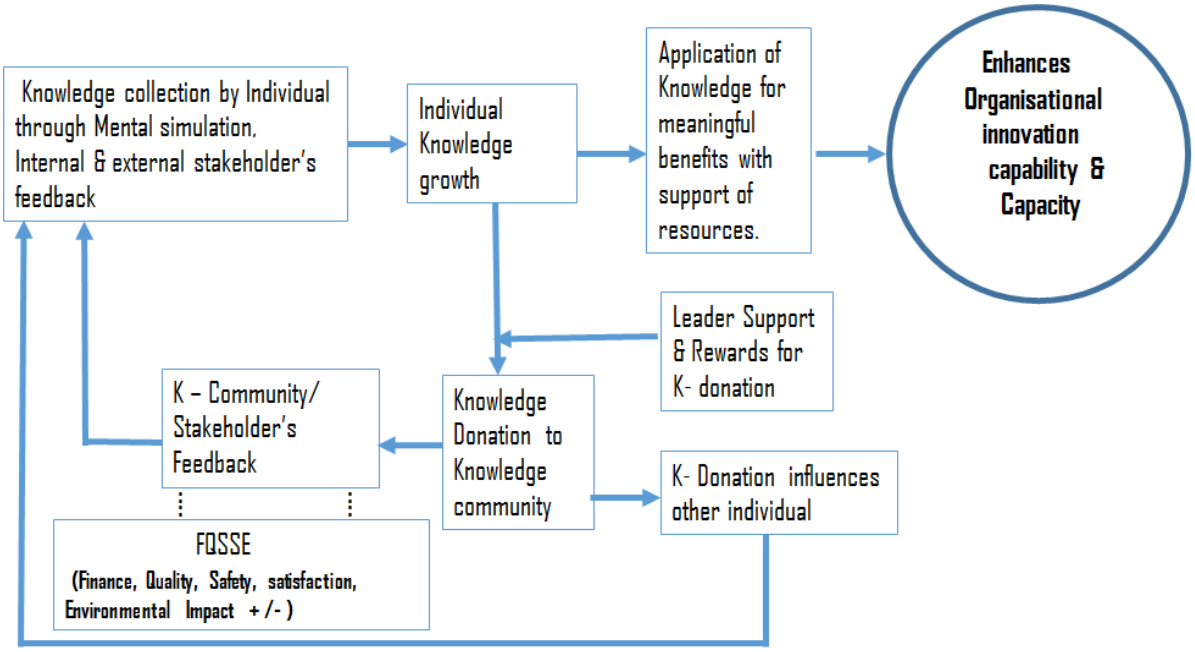
As R square value is greater than 0.5. Hence model is accepted.

The model is dominated by knowledge donation and collection by an individual. First, the findings of this study indicate that both Individual's motivation in problem solving of others and Individual's acquired tacit knowledge Resource were strongly associated with employee willingness to share knowledge. This result implies that employees who feel pleasure in sharing knowledge and thus helping others tend to be more motivated to donate and collect knowledge with colleagues.
Related to organizational factors, top management support & rewards was effective for employee willingness to both donate and collect knowledge with colleagues,
. To promote knowledge sharing activities, top management facilitation of social interaction culture is more important than extrinsically motivated employees the results show a positive significant relationship between ICT use and knowledge collecting, but no significant relationship with knowledge donating.
Although analytical results show that most respondents agreed that the use of various ICT tools help employees in receiving knowledge, the results reveal no significant relationship between ICT use and knowledge donating.

Discussion and implications

This study is interesting from both theoretical and practical perspectives. Theoretically, this study proposed a research model for empirical studies to link knowledge sharing enablers and processes with firm innovation capability. The results from a structural equation modelling approach provide quite a strong support for the hypothesized relations. The results show that people factors (Individual's motivation in problem solving of others and Individual's acquired tacit knowledge Resource) significantly influence knowledge donation and collection processes. The results also indicate that employee willingness to both donate and collect knowledge enable the firm to improve innovation capability. From a practical perspective, the relationships among knowledge sharing enablers, processes, and firm innovation capability is integrated and hence proposed model is developed for effectively use of Human Resource capital

Framework- **Influence of knowledge donation and collection by an Individual**



1.0 INNOVATION MANAGEMENT

1.1 Introduction

In the fast changing business world of today, innovation has become the mainstay of every organization. The nature of global economic growth has been changed by the speed of innovation, which has been made possible by rapidly evolving technology, shorter product lifecycles and a higher rate of new product development. Organizations have to ensure that their business strategies are innovative to build and

sustain competitive advantage. Innovation has, however, become increasingly complex due to changing customer needs, extensive competitive pressure and rapid technological change (Cavusgil *et al.*, 2003). The complexity of innovation has also been increased by growth in the amount of knowledge available to organizations as basis for innovation. Innovation is extremely dependent on the availability of knowledge and therefore the complexity created by the explosion of richness and reach of knowledge has to be identified and managed to ensure successful innovation (Adams and Lamont, 2003; Cardinal *et al.*, 2001; Darroch and McNaughton, 2002; Pyka, 2002; Shani *et al.*, 2003).

Definitions:
Herkema (2003) defines innovation as a knowledge process aimed at creating new knowledge geared towards the development of commercial and viable solutions. Innovation is a process wherein knowledge is acquired, shared and assimilated with the aim to create new knowledge, which embodies products and services. Herkema (2003) also states that innovation is the adoption of an idea or behavior that is new to the organization. The innovation can be a new product, a new service or a new technology. Innovation is related to change, which can be radical or incremental.

Innovation can broadly be described as the implementation of discoveries and interventions and the process by which new outcomes, whether products, systems or processes, come into being (Gloet and Terziovski, 2004). Marina du Plessis distinguished radical and incremental innovation from one another. Incremental innovations present themselves as line extensions or modifications of existing products. They are usually classified as market-pull innovations. Incremental innovation does not require significant departure from existing business practices and are therefore likely to enhance existing internal competencies by providing the opportunity to build on existing know-how. Radical innovations are likely to be competence-destroying, often making existing skills and knowledge redundant and necessitating different management practices. Radical innovations often put the business at risk because they are more difficult to commercialize. Radical innovations are considered crucial to long-term success as they involve development and application of new technology, some of which may change existing market structures. Companies that facilitate both radical and incremental innovation are more successful than organizations that focus on one or the other.

Darroch and McNaughton (2002) indicate that knowledge management is a management function that creates or locates knowledge, manages the flow of knowledge and ensures that knowledge is used effectively and efficiently for the long-term benefit of the organization. In the authors' opinion an organization that demonstrates competence in knowledge management has a knowledge orientation and that knowledge management therefore becomes a guiding business philosophy that influences strategies undertaken by an organization's managers. Parlby and Taylor (2000) is of the opinion that knowledge management is about supporting innovation, the generation of new ideas and the exploitation of the organization's thinking power. Knowledge management also includes capturing insight and experience to make them available and useable when, where and by whom it is required. Knowledge management allows easy access to expertise and know-how, whether it is formally recorded or in someone's mind. Knowledge management further allows collaboration, knowledge sharing, continual learning and improvement. It

underpins better quality decision-making and ensures that the value and contribution of intellectual assets, as well as their effectiveness and their exploitation, is well understood.
In the author's opinion, knowledge management is as a planned, structured approach to manage the creation, sharing, harvesting and leveraging of knowledge as an organizational asset, to enhance a company's ability, speed and effectiveness in delivering products or services for the benefit of clients, in line with its business strategy. Knowledge management takes place on three levels, namely the individual level, team level and organizational level. It is a holistic solution incorporating a variety of perspectives, namely people, process, culture and technology perspectives, all of which carry equal weighting in managing knowledge (Du Plessis and Boon, 2004). Knowledge management is not solely focused on innovation, but it creates an environment conducive for innovation to take place.

1.2 Objective:

To identify the determinants of Knowledge Management for enhancing firm Human capital skill & improve processes through Intelligence Generation, Intelligence Dissemination and Responsiveness. Propose a model for enhancing innovation capability through PPTCR model of KM

2.1 Industry Background:

Power is a significant input to the economy and plays a critical role for a sustained economic growth. In order to support a rate of growth of GDP of around 5 percent per annum, the rate of growth of power supply needs to be around 8-10 percent annually.

Today, India has an installed generating capacity of around 223 GW, the world's fifth largest. Capacitive power plants generate an additional 34 GW. Non-renewable power plants constitute 87.5% of the installed capacity and 12.5% of renewable capacity.

The per capita average annual domestic electricity consumption in India in 2009 was 96 kWh in rural areas and 288 kWh in urban areas for those with access to electricity, in contrast to the worldwide per capita annual average of 2600 kWh and 6200 kWh in the European Union. India currently suffers from a major shortage of electricity generation capacity, even though it is the world's fourth largest energy consumer after US, China and Russia. The international Energy Agency estimates India needs and investment of at least $ 135 billion to provide universal access of electricity to its population.

The growth rate of demand for power in developing countries is generally higher than that of their GDP. In India, the ratio of demand growth to GDP growth was 3.06 in the first Plan and peaked at 5.11 during third plan and came down to 1.65 in the eighties. At present, a ratio of around 1.5 is projected. Therefore, in order to support a rate of growth of GDP of around 7 % per annum, the rate of growth of power supply needs to be over 10 % annually. This is evident from ever increasing power demand of the country's vibrant economy leading to a widening gap between the supply and demand. The Government of India had an ambitious mission of 'POWER FOR ALL BY 2012' as per which the installed generation capacity was to be at least 2, 00,000 MW by 2012 which is successfully achieved.

Power Sector, hitherto, had been funded mainly through budgetary support and external borrowings. But given the budgetary support limitation, due to growing demands from other sectors, particularly social sector and the severe borrowing constraints, a new financing strategy was required. Financial requirement for the 11th Plan for the distribution sector had been worked out as Rs.3,07,000 crore. The expenditure incurred during the first 4 years of 11th Plan period in the distribution sector is about Rs. 75,000 crore.

On the basis of the ongoing works under distribution schemes, a total expenditure of Rs. 1,00,000 crore is expected to be made at the end of 11th Plan. The target was estimated on a normative basis including spill-over of 10th Plan. However, low

investment in the distribution sector has been a matter of concern. The lack of adequate investment may lead to delays in capacity augmentation/ replacement of obsolete equipments which may adversely impact the performance of the distribution sector. The need of a new financing strategy was recognized by the Government as reflected in the new policy enunciated in 1991, allowing private enterprise a larger role in the power sector of India. Now, the central government owned public sector enterprises like Rural Electrification Corporation Limited and Power Finance Corporation Limited provide loans and guarantees for public and private electricity sector for enabling smooth implementation of various infrastructure projects in India.

2.2 Formation of TPDDL

North Delhi Power Limited (TPDDL), which distributes and supplies power in North North-West of Delhi, was set up in terms of the Delhi Electricity Reforms (Transfer Scheme) Rules 2001 whereby the erstwhile vertically integrated State Government owned Utility, viz. the Delhi Vidyut Board (DVB) was unbundled and corporatized into its functional entities like Generation, Transmission and Distribution. For an effective reorganization of the electricity sector, whereby the Sector became efficient and commercially viable by ensuring a reduction in losses through better management practices and infusion of capital investment, it was considered imperative to privatize the distribution sector in the total energy chain.

The Bid Evaluation Criteria (BEC) for allotment of Distribution Companies to the private investors was the % Aggregate Technical & Commercial (AT&C) Loss Reduction (i.e. (Units Input – Units Realized)/ Units Input) commitment over a period of five years (subsequently reduced to four years and nine months i.e. till end of FY 2007) (hereinafter referred to as the “Initial Control Period”). The privatization policy (Policy Directions) assured a 16% p.a. Return on Equity provided the annual AT&C Targets were achieved, with certain incentives for over-achievement of Loss Reduction Targets. The assured Returns were to be ensured through an innovative mechanism whereby the Privatized Distribution Companies (Discoms) were allowed to pay for Power Purchase from the Delhi Transco Limited (DTL) at their respective paying capacities, which were computed as the residual amounts available with the Discoms after covering for their expenses (other than for power purchase) and Returns. In the event of any under-achievement of Loss Reduction Targets, the entire

loss of Revenue on account of lower Loss Reduction (than committed) was to the account of Discom as the Power Purchase Cost payable to Transco would be determined ignoring any lower Revenue Realization due to lower Loss Reduction.

The sorry state of the entire electricity sector in general and the risks involved in turning around the distribution sector through the public-private route can be gauged from the fact that against thirteen potential bidders who submitted their 'Expression of Interest", six purchased the bidding documents, with only two finally bidding for the three distribution companies.

Based on the above mentioned BEC whereby the TATA Group committed to reduce the AT&C Losses to at least 31.1%, the management control together with a 51% Equity stake in TPDDL was transferred to the TATA Group for a consideration of Rs. 187.68 Crore with effect from 1 July, 2002. The balance 49% Equity is held by the Government of National Capital Territory of Delhi (GoNCTD) through the Government owned, Delhi Power Company Limited (the "Holding Company").

The Company changed its name from North Delhi Power Limited to Tata Power Delhi Distribution Ltd. in Nov 2011. The new name, while signifying TPDDL's direct relationship with the Tata Power Company Limited, allows the company to significantly leverage its TATA lineage for enhancing sustainability and growth of business.

TPDDL's utility business is governed by the provisions of license issued by the DERC for the distribution & retail supply of electricity in North & North West Delhi for a period of 25 years. The DERC regulates the working of entire power sector of the Delhi state, including determination of tariff chargeable to end consumers and establishing performance norms (mainly related to loss reduction, reliability of power supply and consumer service delivery).

The norms/targets are set by the DERC after taking into account the past performance, existing levels and current operating environment, i.e., the ground realities and prevailing norms for other power distribution utilities across the country. Further, keeping the stakeholders' interest paramount, it captures the future expectations of the general Public/Govt./Utilities etc. through a public hearing.

2.3 Electricity Distribution Model:

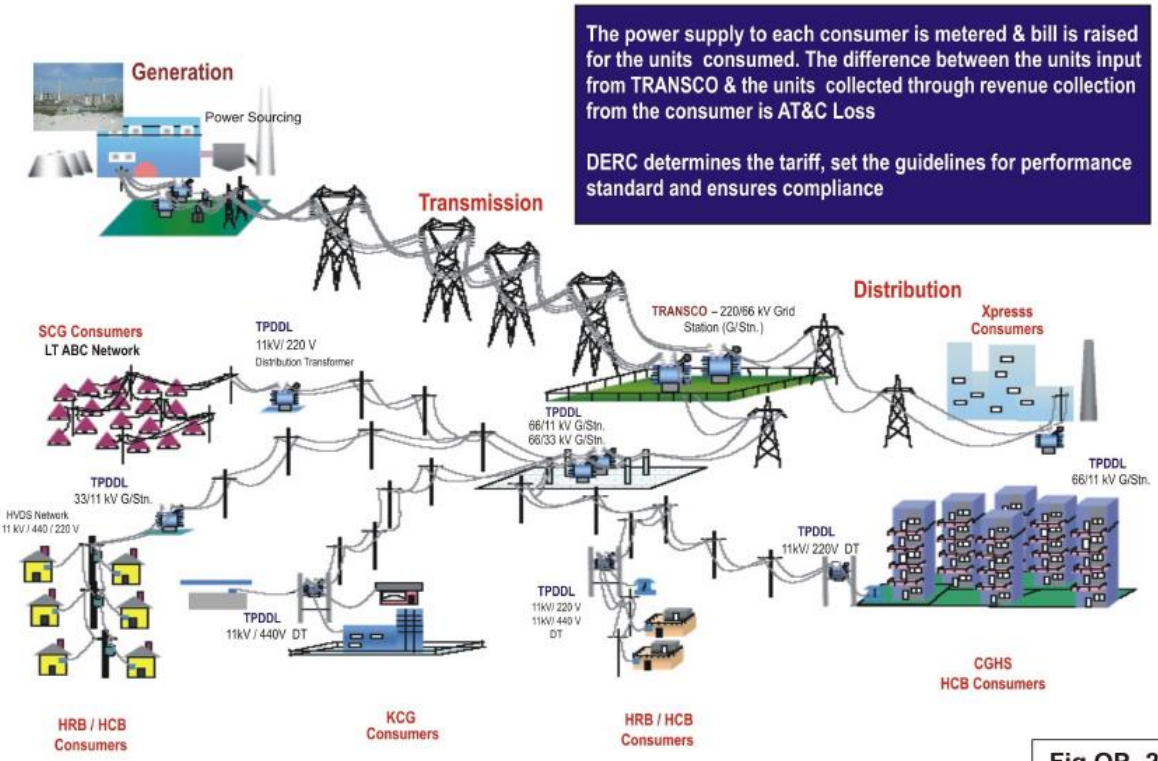


Fig OP- 2

3.0 Company Profile:

TPDDL (earlier North Delhi Power Limited) was incorporated in July 2002 as a JV of Tata Power (51%) and Delhi Government (49%) on the Public-Private Partnership (PPP) model. TPDDL took over the license to distribute electricity to North & North West part of Delhi through a competitive bidding process initiated to reform the distribution sector in Delhi. The Company changed its name from North Delhi Power Limited to Tata Power Delhi Distribution Ltd. in Nov 2011. The new name, while signifying TPDDL's direct relationship with the Tata Power Company Limited, allows the company to significantly leverage its TATA lineage for enhancing sustainability and growth of business.

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In addition to the core licensed business, the Business Development Group was formed in 2010 to leverage TPDDL's domain expertise and provide end to end solutions to other power utilities. The Group has been offering its services through a pool of some of the best known names in the Indian Power Sector fraternity, who have played a major role in contributing to TPDDL's success. Its core competence lies in conceptualizing workable solutions and delivering immediate-to-long term sustainable results to the clients in areas of Project

Management, Technical Advisory, IT Services and Revenue Cycle Management. Further, it also provides support to Tata Power in its global expansion plans in the distribution space and prepares the organization to meet the upcoming external challenges. While TPDDL is taking initiatives to sustain its growth in licensed business, its future growth can be sustained only through new ventures/ initiatives. To create new business opportunities and to offer value added services within and outside the licensed area, a new department "Business Services Group" has been created.

This department is working towards implementing innovative ideas with major focus on Rooftop Solar Projects, ESCO Projects, EMobility charging solutions, Home Automation etc.

4.0 Organization's Internal Environment for Knowledge Managements:

TPDDL is a utility which supplies *electricity* through its distribution network at regulated tariffs to all consumers in its licensed area along with providing consultancy services.

TPDDL has been in the forefront in the adoption of latest technology in the utility sector. Together with its culture of Consumer Service Excellence, Continuous Learning, Performance Orientation, Innovation and Empowerment, it has been able to set benchmarks in accelerated reduction of AT&C losses (~80%), enhance consumer satisfaction and improve employee productivity. TPDDL's leadership had evolved an inspiring Vision, Mission and Values in 2002-03, which have been revisited periodically and revised in 2013 to incorporate technology roadmap envisaged for the future and

growth aspiration to provide services beyond Delhi's licensed area to other utilities nationally and internationally.

Growth plans of TPDDL includes load growth within licensed area (Delhi Govt's expectations), bagging and managing various consultancy assignments from different clients and complementing Tata Power's growth plan into distribution business Internationally/ Nationally (Tata Power's expectations). In order to capitalize on its core competency, enhancing employee engagement, enrichment and increase revenue in Non-regulated business, it has made a foray into IT & OT consultancy and implementation, Management Consultancy & Project Management Services & Revenue Management System both in Domestic as well as International arena. With the proposed modification in the Electricity Act 2003 where existing Distribution business will be split into Wire & Retail businesses, the BD Group is playing a key role in acquiring market intelligence and exploring possible tie up for gaining first mover advantage.

TPDDL has adopted Climate Change Policy in line with Tata Group's CC Policy. It has proactively been advocating with the regulator for driving DSM initiatives , solar rooftop, EV charging etc. TPDDL has a Safety Policy in place embedded within the IMS Policy.

5.0 External Environment: Organizational Relationships

TPDDL's organization structure is designed to meet the strategic objectives and business needs. TPDDL is authorized to operate only in its licensed area and plans to expand its consumer base outside its licensed area through the Open access route once the regulations are in place for segregation of Wire & Retail. TPDDL is working actively with the Govt. of India/Regulatory Bodies to develop an appropriate market design which should result in spurring competition through open access. Although DERC has defined the tariff and performance standard based on the usage and type of consumers, TPDDL's Consumer Segmentation has evolved over the years to address and cater to the differentiated needs of the consumers and business imperatives. .

TPDDL builds and nurtures ethical and value-adding relationships with its suppliers, vendors, partners etc. Supply reliability, AT&C Loss reduction and service excellence have been brought about by TPDDL with support of BAs/Collaborators and also by innovatively adapting and leveraging knowledge from members of GIUNC. BAs have been developed to assist TPDDL in innovative solutions in its work processes. Annual BA Meets, periodic meetings and BA SEEKH sessions throughout the year are organized to provide a formal platform for knowledge sharing and relationship building. TPDDL has established a BA Cell for catering to all statutory and training requirements of the BA employees – a unique concept amongst the utilities in India. This ensures skill up gradation, compliance and alignment to TPDDL's VMV. TPDDL employees also attend workshops, trade fairs and conferences to understand capabilities of existing and potential BAs.

6.0 Knowledge Management for Innovation in TPDDL:

The first basic driver for knowledge management's role in innovation in today's business environment is to create, build and maintain competitive advantage through utilization of knowledge and through collaboration practices. Cavusgil *et al.* (2003) indicate that building and sustaining an innovation program has, however, become

increasingly complex due to changing customer needs, extensive competitive pressure and rapid technological change. Organizations find it increasingly difficult to internalize innovations. Some large organizations such as Xerox and Hitachi have therefore started working collaboratively across organizational boundaries to ensure sustained innovation and competitive advantage (Cavusgil *et al.*, 2003). Knowledge management can facilitate such collaboration. Close collaborative relationships can provide access to the processes other organizations use that could be applied in different contexts.
Acquiring knowledge and skills through collaboration is considered to be an effective and efficient way of successful innovation. The second driver of the role of knowledge management in innovation is that knowledge is a resource used to reduce complexity in the innovation process, and managing knowledge as resource will consequently be of significant importance. Innovation is extremely dependent on the availability of knowledge and therefore the complexity created by the explosion of richness and reach of knowledge has to be recognized and managed (Adams and Lamont, 2003; Cardinal *et al.*, 2001; Darroch and McNaughton, 2002; Pyka, 2002; Shani *et al.*, 2003). According to Shani *et al.* (2003) the upsurge in the amount of knowledge that is readily available to organizations seems to add increased complexity to the design and management of new product development, but this complexity can be addressed by knowledge management and knowledge-intensive units in the organization that are strategic in nature. Cavusgil *et al.* (2003) agree that knowledge management is a mechanism through which innovation complexity can be addressed. It assists in managing new knowledge created through the innovation process, but also in managing existing knowledge as a resource used as input to the innovation process. Cavusgil *et al.* (2003) are of the opinion that firms that create and use knowledge rapidly and effectively are able to innovate faster and more successfully than those that do not. According to Pyka (2002), creation of innovation networks are driven by synergistic creation and management of knowledge

The third driver of applying knowledge management to the benefit of the innovation process is the integration of knowledge both internal and external to the organization, thus making it more available and accessible. Knowledge integration implies that timely insights can be made available to be drawn at the appropriate juncture for sense making, i.e. knowledge can be exchanged, shared, evolved, refined and made available at the point of need. Knowledge integration via knowledge management platforms, tools and processes must therefore facilitate reflection and dialogue to allow personal and organizational learning and innovation. This requires linkability, adaptability and dynamic representation of business information and knowledge. Without effective information and knowledge management that drives knowledge integration, which in turn underpins innovation, organizations could be underutilizing knowledge as an innovation resource (Baddi and Sharif, 2003; Chen *et al.*, 2004).

6.1 Theoretical perspective

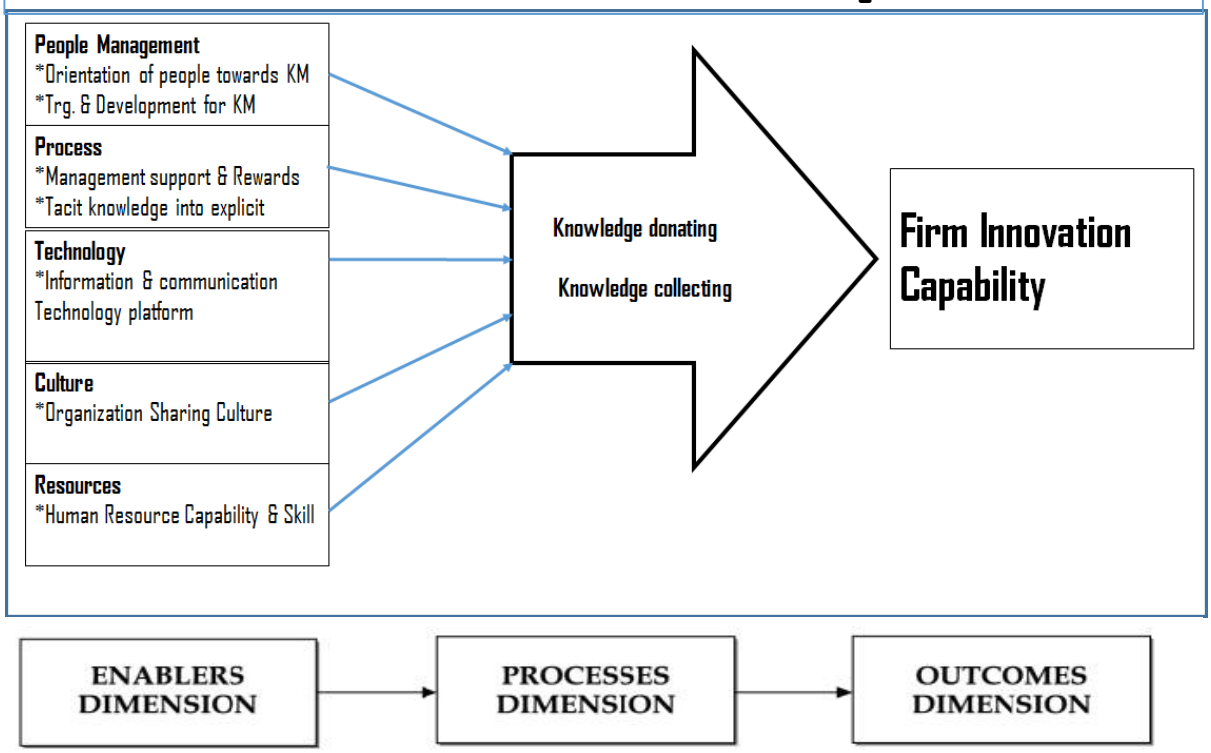
Knowledge sharing creates opportunities to maximize organization ability to meet those needs and generates solutions and efficiencies that provide a business with a competitive advantage.
Knowledge sharing occurs at the individual and organizational levels. For individual employees, knowledge sharing is talking to colleagues to help them get something done better, more quickly, or more efficiently. For an organization, knowledge sharing

is capturing, organizing, reusing, and transferring experience-based knowledge that resides within the organization and making that knowledge available to others in the business. A number of studies have demonstrated that knowledge sharing is essential because it enables organizations to enhance innovation performance and reduce redundant learning efforts (Calantone et al., 2002; Scarbrough, 2003).

To understand the

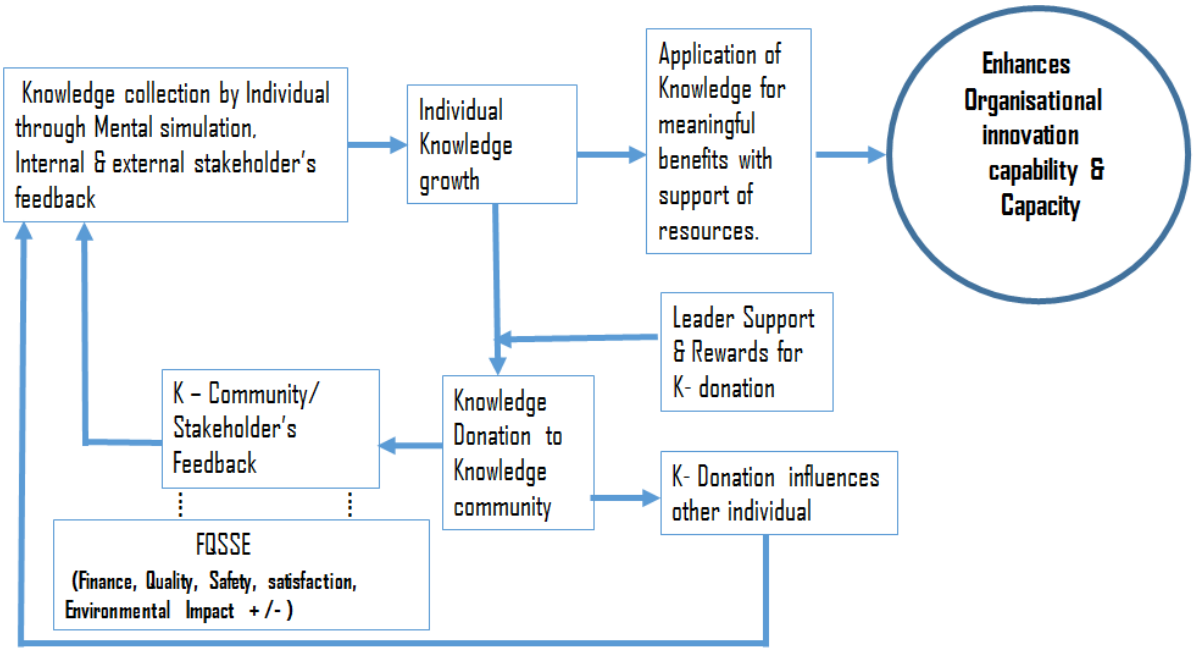
On the basis of PPTCR Model (People, Process, Technology, Culture, Resource). A general framework for studying Influence of KM within the organization.

Framework- Influence of KM on innovation within the organization



Individual plays a vital role in enhancing firm innovation capability and capacity. Individual knowledge growth influences the innovation capability of the organization and also influence other individual's knowledge growth by K- donation & K- collection when recognized and supported by the Leader of the organization as depicted in below framework:

Framework- Influence of Individual Knowledge on innovation within the organization



6.11People Management in TPDDL:

Knowledge and knowledge management fulfils a myriad functions in the innovation realm. The first major role that knowledge management plays in innovation is enabling the sharing and codification of tacit knowledge. Tacit knowledge sharing is critical for organizations' innovation capability (Cavusgil *et al.*, 2003). According to Cardinal *et al.* (2001), replication of knowledge-based competitive advantage is inhibited by two factors. Causal ambiguity leads to specific practices or inputs (e.g. knowledge) for replication being unknown. Secondly, social complexity or unique firm history that produces the knowledge makes it difficult to replicate. Getting tacit knowledge from customers and suppliers is a valuable source for organizations' innovation programs due to scarcity of such knowledge that can be used as input for innovation. Marina du Plessis also indicate that collaboration between organizations plays a significant role in sharing of tacit knowledge, which in turn positively impacts innovation capability (Cavusgil *et al.*, 2003).

The sharing of tacit knowledge as resource for innovation is especially important in developing fields where not a lot of explicit knowledge exists, such as biotechnology. Innovators in these fields combine partially codified knowledge with complimentary resources such as cross-functional teams or learning-bydoing capabilities, which leads to new product and process innovations (Cardinal *et al.*, 2001).

Cardinal *et al.* (2001) indicate that, in situations where a lot of tacit knowledge is used for innovation, collaboration between cross-functional teams is essential. Such interactions produce the routines that create new "recipes". However, the knowledge in these "recipes" is not necessarily codified, but often stays within the innovation and operational teams' routines and skills.

Various platforms exist for capturing & sharing knowledge at TPDDL for various stakeholders. SANCHAY portal is the repository of organizational tacit and explicit knowledge accessible to workforce. SEEKH is based on the principles of 'Community of Practices (CoP)', wherein team members of a Group / District meet to share

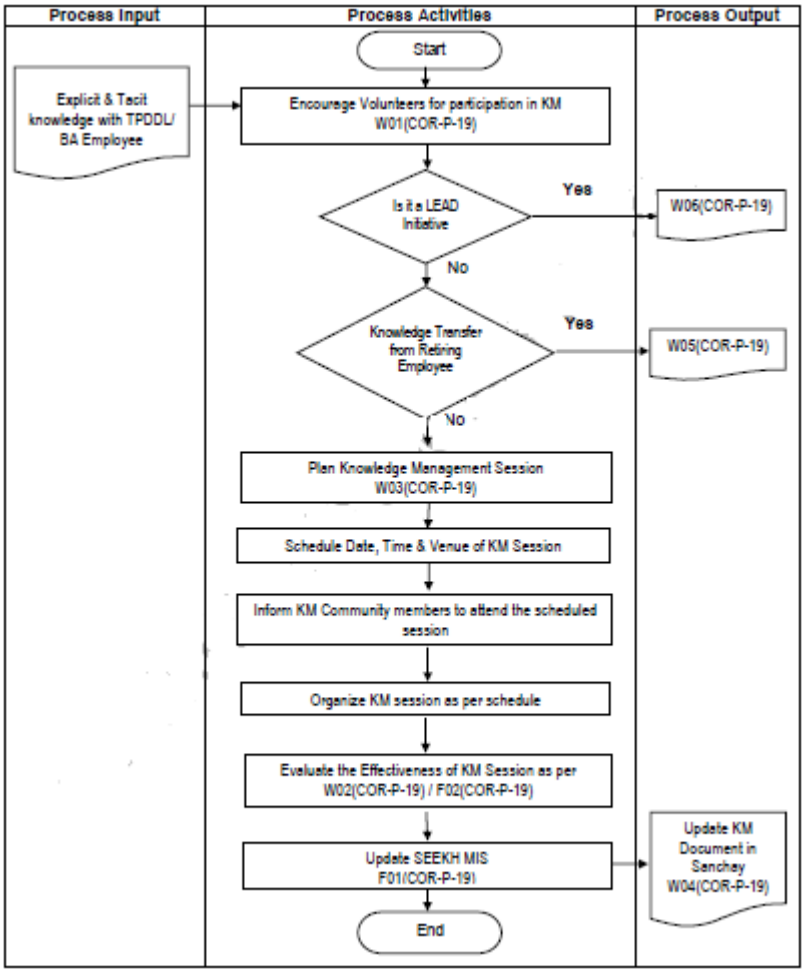
knowledge. To cover people at the ground level SEEKH platform, Quality Circle and PRAYAAS projects has been extended to Zonal level.

Customers, BAs, partners and collaborators are engaged through KM platforms for dissemination of relevant knowledge, e.g. Contracts, EHV Projects, COS, etc. Consultants, experts, customers, collaborators, Technology Partners and BAs and regulator through various forums share knowledge and provide key inputs, which is also used in SPP. A window to the outside world is also provided through our website, where information related to customers, BAs and other stakeholders are available. Comments by reviewers on reports / MIS, MOMs, ATRs form an invaluable set of knowledge for daily work management. New policies, circulars, information, MIS and Zonal / District Scorecards are shared through SANDESH mails. The SAP CRM has a feature of building knowledge bank about customers profile, thus even a new employee joining will come to know about the customer history. TPDDL's monthly magazine Surkhiyan and Aap Tak captures the major initiatives, new imperatives and events across the organization which is shared with all employees, key associates, and key members in TPC / TNF, key customers and visitors / guests. Similarly, SAMPARK newsletter, RWA meetings and JIFs reinforces sharing of information with customers and employees.

6.12 Knowledge sharing process in TPDDL:

Knowledge Management is concerned with systematic, effective management and Utilization of an organization's knowledge resources. Keeping in mind the above philosophy,
TPDDL introduced SEEKH as a platform for learning and sharing knowledge. SEEKH is based on the philosophy and principles of K-Community. The objective of KM is to capture tacit and explicit knowledge so that it can be shared across the organization.

6.121 PROCESS APPROACH FLOW CHART:



6.122 Evolution of KM in TPDDL:

Year	Initiatives	Objectives
2005-07	KM Portal - For ALL	Sharing of Knowledge across TPDDL through portal
	Community of Practice through SEEKH	Engagement of maximum people through SEEKH
		KM Campaign across TPDDL Awareness about KM
	SHIKSHA	To capture learning from Training Conference, seminars etc
2007-09	O-PEDIA	Separate KM paltform for explicit knowledge
	Ask the Guru	Domain based Knowledge sharing
	Migration of KM Application	To include new Features, Improve user friendliness
	KM Audit (Internal & External)	KM health Check up and improvement on KM system
	R&R for KM	To motivate people in knowledge sharing
2009-11	Knowledge Café	Promoting unstructured way of knowledge sharing
	SEEKH Index	To increase the quality of K Sessions,ReUse of Knowledge
2011-13	Tata Innoverse	Inherent Knowledge of the workforce
	Benchmarking	Sharing of Best Practices with National / International utilities
	KM Portal revamp	In-house revamped KM Portal - SANCHAY for workforce
	YLDP/ BE sessions	Sharing of knowledge on Safety,CC, Innovation,Ethics, CSR
	Interaction with BA / Partners	Sharing of knwoledge on new technology, Involvement in process improvement & product development
	IWA / RWA Meet	Safety, Ethics, CSR and CC sensitization, Innovative Suggestions
2013-15	Auto alerts	Subscription based auto-alerts on KM Portal
	Knowledge Sharing	Knowledge Update through Sandesh Mailers
	KM Revamp	Revised KM index, Migration to new platform, Additional features

[redacted] - E&I of KM Framework [redacted]

6.13 Technology:

TPDDL is also partnering with technology partners and building Smart Grid Lab which shall serve as learning platform for implementation of new technologies.

SEEKH on replicable SHINE project involves coming together of employees and BAs from other work units, so that learning can be rapidly deployed. Learning shared in SEEKH sessions are captured and stored in SANCHAY. Monthly reviews at Group level involve brainstorming, analysis and knowledge exchange among Group members leading to identification of SHINE projects and task-oriented improvements. R&R functions also facilitate KM as it involves presentation / sharing of learning by the Award winners. Change management process of IT converts tacit knowledge to explicit in the form of concept note/ SRS, Release notes. SHIKSHA posted on SANCHAY is the repository of key learning from employees attending external trainings / workshops/ conferences / employee exchange programs, and this is also shared in Group level SEEKH sessions. Learning of completed SHINE projects are captured through SIPS and is available on SANCHAY. SIPS information is further analyzed for identifying best practices and deployment across TPDDL, wherever applicable.

6.14 Organisational Learning culture:

To inculcate the culture of innovation, TPDDL encourages its employees to give suggestions on the identified challenges through TATA Innoverse application. The Innovation Council formed also identifies opportunities for breakthrough innovation in products & services. MEGA SEEKH competition is organized at organizational level to share best practices / learning's. The knowledge of separating employees is shared and captured through knowledge capturing form as per the exit process.

Sources of Knowledge	Process To Use Knowledge		Process To Manage Knowledge
	Collect Knowledge	Transfer Knowledge	
Workforce Knowledge(Including contract workers)	SANCHAY, SEEKH, SRS/Concept notes, IMS & ISMS documents, MoM, SHIKSHA, TPDDL-o-Pedia, Manuals, Tata Innoverse	SANCHAY, SANDESH, IT Gyan Manch, Meeting, CFTs, Training, SHIKSHA, SEEKH, SHINE Assessment, BE R&R, Surkhiyan, Functional Newsletter, CENPEID & CENCARE Library	Community of practice (SEEKH), SHIKSHA, Meetings, Reviews, Newsletters
Customer Knowledge	RWA / IWA meets, Website, Customer feedbacks, Call centre feedback calling, CSS	Website, Call centre, IVRS, letters, meetings, face to face interaction, Nukkad Natak, Energy Clubs, e-Bills, e-SAMPARK	EoC, IVRS, Customer feedback analysis, Surveys Analysis & ATR
Supplier Knowledge	BA Meet, Vendor workshops, Supplier presentations through SEEKH, Technical literature, Manuals, Media, Internet	BA Meet, Vendor workshops, Supplier presentations through SEEKH, Technical literature, Manuals, Media, Internet	Consoldation of feedback, followed by ATR, SLAs, Contracts, SEEKH
Partner / Collaborator	Website, Letters, Meetings, Workshop, Conference	Website, Letters, Meetings, Workshop, Conference	Consolidation of feedback, followed by ATR, Association during project implementation
Rapid Identification, Sharing and Implementation Of Best Practices	Engaging Consultants based on criticality of requirement, Bechmarking, Interaction with group companies, GIUNC, Award Ceremonies	Bechmarking, Interaction with group companies, GIUNC, Award Ceremonies	Benchmarking, Best practice sharing session (e.g. TPDDL success story on SAP, information security benchmarking with Tata group cos.)
Transfer Of Knowledge For Use In The SPP	Stratgey workshop, Regulatory Information, Media informaion, BSC, FIBRES	Stratgey workshop, Regulatory Information, Media informaion, BSC, FIBRES	Strategic Planning Process
Knowledge Management Platforms at TPDDL			

6.15 Resource:

TPDDL takes intelligent risks by pursuing Strategic Opportunities. The projects are critically evaluated by a CFT from Finance Function and operational risks are identified and suitably mitigated. Based on the recommendations and management approval, the financial and other resources are made available for the projects. TPDDL conducts pilots for establishing Proof of Concept and validating the Business

Case for all new opportunities Identified. The pilots of innovation management (innovation done in engineering design) which present a Business Case, are routed through Regulatory Approval process and scaled up suitably on obtaining concurrence. In case the financial viability is not evident then the same is discontinued and other higher priority alternatives are pursued.

7.0 Drivers of the application of knowledge management in innovation

The first basic driver for knowledge management's role in innovation in today's business environment is to create, build and maintain competitive advantage through utilization of knowledge and through collaboration practices.

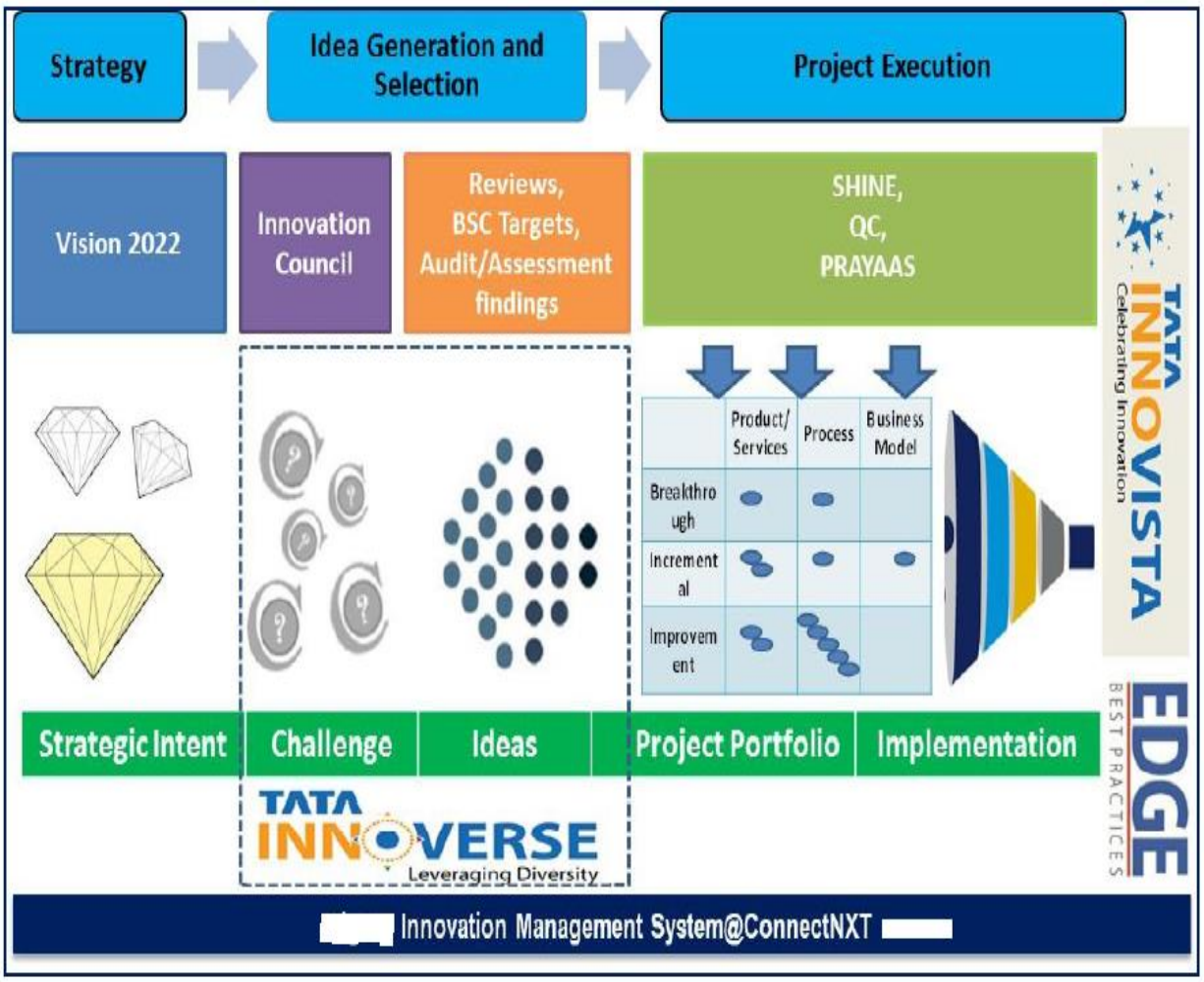
The second driver of the role of knowledge management in innovation is that knowledge is a resource used to reduce complexity in the innovation process, and managing knowledge as resource will consequently be of significant importance.

The third driver of applying knowledge management to the benefit of the innovation process is the integration of knowledge both internal and external to the organization, thus making it more available and accessible.

In nutshell, Innovation is a process that recombines existing knowledge in new ways. Knowledge management can play a significant role in making explicit knowledge available for recombination into new and innovative ideas. Knowledge management provides the tools, processes and platforms to ensure knowledge availability and accessibility, e.g. through structuring of the knowledge base. Knowledge management can also ensure that explicit knowledge, which can be used as input to the innovation process, is gathered internally and externally. Knowledge management finally also provides the means of ensuring the leverage of knowledge and to determine the gaps in the explicit knowledge base of an organization that could potentially negatively impact the organization's innovation program.
In conclusion, it can be said that knowledge management systems have a distinctive contribution in the development of sustainable competitive advantage through innovation. Whilst information and knowledge management systems alone do not possess the qualities required to provide organizations with sustainable competitive advantage, the bundling of knowledge management systems with other firm resources and core competencies is the key to developing and maintaining sustainable competitive advantage through product and process innovation. In such a position, knowledge management systems play a major role in the conversion of learning capabilities and core competencies into sustainable advantage by enabling and revitalizing organizational learning and resource development processes (Adams and Lamont, 2003):

7.1 Drivers of Innovation and km in TPDDL:

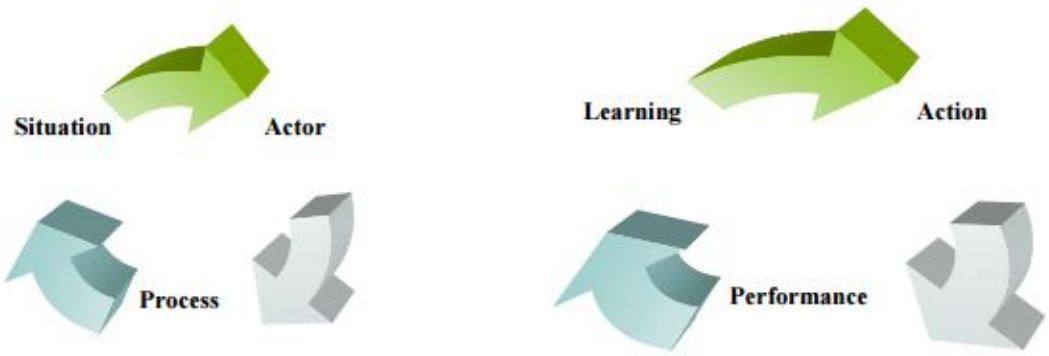
TPDDL has a defined process for Managing Innovation. Innovation is fostered at strategic level through creation of Innovation Council which explores new Business Models, Products, Services and Solutions and paves way for identification and nurturing new Strategic Opportunities. Innovation amongst the workforce is managed through several initiatives such as SHINE, Shikhar Awards (which rewards new concepts / business model idea), Quality Circles, participation of workforce in group level innovation platforms like Tata Innoverse and Tata Innovista.



8.0 Case Study on Process Innovation through Enhanced workforce skill:

8.1 Methodology Adopted:

SAP-LAP analytic Model has been given by Sushil (2001). SAP-LAP model is the basis of flexible manufacturing systems management (Sushil, 1997). SAP-LAP Framework (Sushil, 2000) A holistic framework is developed that contains the basic entities in any management context. Basically, any managerial context consists of a "situation" to be managed, an "actor" or a group of actors to deal with the situation and a "process" or a set of processes that respond to the situation and recreate it. The "situation", "actor" and "process" and their interplay comprise of the SAP framework where the freedom of choice lies with the actor . An interplay of SAP leads to Learning-Action-Performance (LAP). "Situation" is external and internal environment of the organization and its performance. "Actor" can be individual managers, groups, departments or class of actors. The interface of "actor" and "situation" defines the organizational climate and culture that is important for the evolution of the business processes. "Process" is the overall transformation converting inputs into outputs



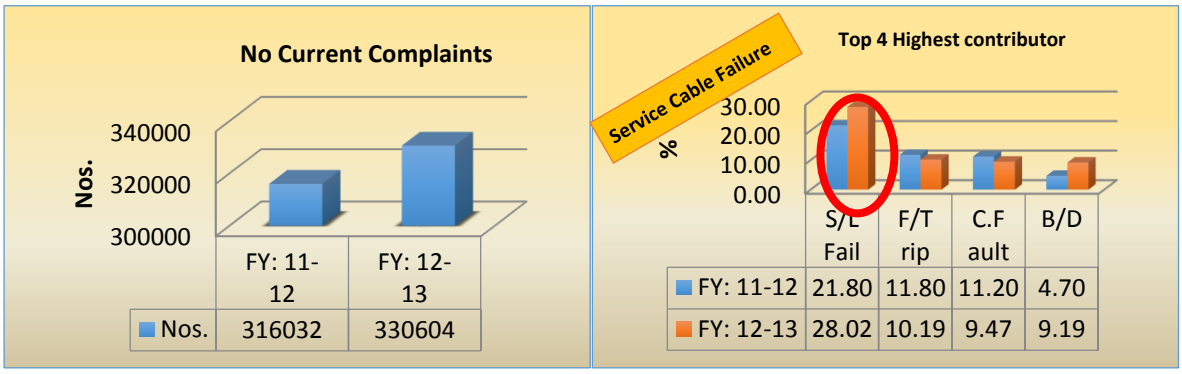
SAP-LAP Framework (*Sushil, 2000*)

LAP links three components, i.e. learning issues, actions and performance. Actors consistently evaluate situation, follow 'practice, take actions, learn from their performances and depending on the results of performances either the processes are modified or same process followed for repeat performance. SAP-LAP framework can be used for case analysis, managerial inquiry and problem solving

8.11 SITUATION ANALYSIS:

TPDDL WITH PREDOMINANT URBAN GEOGRAPHY HAS VAST UNDERGROUND CABLE NETWORK WHICH DELIVERS RELIABLE AND QUALITY SUPPLY TO ITS VALUABLE CUSTOMER

BASE OF 1.4 MILLION. UNTIMELY FAILURE OF THESE CRITICAL POWER DELIVERY ASSET RESULTS IN CUSTOMER DISSATISFACTION VIZ. LOSS OF REVENUE AND EXPENDITURE INCURRED ON REPAIR AND REPLACEMENT. BASED ON CUSTOMER INTERRUPTION PRIMARY DATA IT HAS BEEN OBSERVED THAT THERE IS RISING AND ALARMING TREND IN FAILURE OF LOW TENSION CABLES. CUSTOMER COMPLAINTS ANALYSIS OF FY11-12 & FY 12-13 REVEALS THAT APPROX. 30% OF INTERRUPTIONS ARE DUE TO SERVICE CABLE FAILURES.



Customer Supply Interruption & Analysis Data (FY 12 & 13)

8.12 ACTORS:

THE SERVICE CABLE RELATED COMPLAINTS IS THE MAJOR CONTRIBUTOR AFFECTING CUSTOMER INTERRUPTION AND RELIABILITY IN LOW VOLTAGE SEGMENT. ON MICRO ANALYSIS, IT HAS BEEN OBSERVED THAT EXPOSED CABLE INSULATION DEVELOPS CRACKS WITHIN 0.5- 3 YEARS OF INSTALLATIONS & LEADS TO WATER INGRESS AND RESULTS IN UNTIMELY FAILURES OF CABLE & ASSOCIATED EQUIPMENT'S. CUSTOMER INCONVENIENCE DUE TO UNTIMELY FAILURES AND INTERRUPTION OF POWER SUPPLY WAS KEY TRIGGER FOR OUR IMPROVEMENT PROJECT.

8.13 Process:

To identify and define the real problem, root cause analysis and field study was carried out. Focus group discussion revealed that improper installation & ultra violet retardation are only two probable reasons for untimely failure of cables at exposed locations. Measurement of bending radius as per IS were carried out and found to be within limit.

Based on research literature & lab test, it was found that any material which allows easy passage to UV rays is prone to UV failure. Conventional design of cables with RYB coloured pigmented XLPE allows penetration of UV rays at exposed locations and their gradual failures.

Conventional Design of cable as per IS: 7098

Issues: cracking of R,Y &B ph XLPE insulation & moisture ingress in conventional design

Main idea was to reduce the high customer complaints occurring on account of service cable failure. After validation of real problem, re-discussion within focused group was carried out to identify & evaluate sustainable solution to UV retardation failure.
UV retardant heat shrinkable kits and paints are conventional solution but increases customer downtime viz. escalation of cost by 25-30%. To sum up, failure of customer service cable due to ultra-violet radiation was key problem that need to be solved with low cost and sustainable solution.

8.131Problem Analysis: Implications for KM Model

Customer inconvenience due to untimely failures and interruption of power supply was key trigger for our improvement project. Based on analysis of customer interruption data, it was found that approx. 30% of interruptions are due to service cable failures. To identify and define real problem, cause analysis and field study was carried out within focus group. Focus group discussion revealed that improper installation & ultra voilet retardation are only two probable reasons for untimely failure of cables at exposed locations. Measurement of bending radius as per IS were carried out and found to be within limits. Improper installation as cause has been vetted out based on site measurements.
Based on research literature survey, it was found that any material which allows easy passage to UV rays is prone to UV failure. Conventional standard design of cables has RYB coloured pigmented XLPE which allows penetration of UV rays at exposed locations and their gradual failures. After validation of real problem, re-discussion within focused group was carried out to identify & evaluate sustainable solution to UV retardation failure.

8.132 Alternative Solutions:

ALTERNATIVE SOLUTIONS HAVE BEEN IDENTIFIED THROUGH BRAIN STORMING OF CFT. UV RETARDANT HEAT SHRINKABLE KITS AND PAINTS ARE CONVENTIONAL SOLUTION BUT INCREASES CUSTOMER DOWNTIME VIZ. ESCALATION OF COST BY 15-20%. FURTHER SOLUTION IS NOT SUSTAINABLE DUE TO HUGE INVENTORY REQUIREMENT AND NON-AVAILABILITY AT WIDELY SPREAD GEOGRAPHY (510 SQ. KM). TO SUM UP, FAILURE OF CUSTOMER SERVICE CABLE DUE TO ULTRA-VIOLET RADIATION WAS KEY PROBLEM THAT NEED TO BE SOLVED WITH LOW COST AND SUSTAINABLE SOLUTION.

8.14Learnings:

Total installed length of Low tension (including service cable) is more than 20,000 KM in TPDDL network and failure of cable insulation due to UV tracking thus has large cost and reliability impact.

8.15 Actions/ Intelligence Genration:

The proposed solution is to re-design all the phases (RYB) through Black pigmented insulation. Extruded colour on different phases was provided during manufacturing for phase marking and identification. Phase marking was proposed either through non contactable laser printing or extruded coloured line on insulation. It has been studied through analysis and various tests that a black pigment additive does not allow UV radiations to pass through the insulation. New Design LT cable with Black pigmented insulation has good ultra violet retardant properties and same has been validated through laboratory test and pilot installation. Further USP of new product is that it provides UV retardant property to XLPE insulation at zero additional cost. Overall proposed solution resulted in high reliability of LT XLPE cables viz. reduction in revenue loss and OPEX incurred on repair and replacement. Specification has been revised & hence all new procurements of LT XLPE cables are done with this new proposed design. Around about 80 Ckt. Km of new LT XLPE cables are already installed.

Innovative design: All Black cores with extruded colour coding for phase identification

8.16 Performance:

Subject innovation has given both tangible & intangible benefits to TPDDL. On financial front, there is cost saving from non-usage of UV protective kit and reduction in cost incurred on repair and replacement of cables. It is approx. 100Lac/Annum.
Moreover revenue loss due to unserved power owe to untimely failures of cables have got gradually decline & resulted into a savings of Rs. 150 Lac/Annum
Qualitative benefits are basically intangible benefit i.e. Internal & external customer satisfaction due to reduction in untimely failure of LT cables. Enhance safety for working staff/lineman & reduction in cycle time. Overall benefits from subject innovations are listed below:-

- Customer satisfaction due to reduction in untimely failure of LT cables from UV retardation.
- Enhanced customer safety & TPDDL line staff from electrical shocks due to damage cable insulation.
- Improved reliability of Customer service cable network
- Reduction in downtime of customer complains due to non-usage of additional UV retardant kit.
- Reduction in revenue leakage from unserved power due to UV failures of low tension cables
- Reduction in Operational expenditure incurred on additional UV retardant kits and their installation cost
- Optimization of inventory related to low tension cables and accessories.

9.0 Intelligence dissemination/ Knowledge Sharing

Based on innovative product design & successful pilot implementation, specifications for LT cable design has been revised in TPDDL & all new procurements of LT XLPE cables are done with this new proposed design. Revised manufacturing & Installation processes disseminated to each employee in the TPDDL through trainings, Seekh sessions and Sandesh mail.

The innovation was also shared at various platforms.

a. TATA groups of companies at innovation platform “TATA Innovista”. Appreciated by all jury members
b. Tata Power at their innovation platform “Shikhar”. Appreciated by them too.
c. At “Knowledge Fair, Mumbai”. Appreciated by Chairman-TATA Group.
d. Research paper is been selected, published and presented in the International Competition- GRIDTECH organized by Power Grid Corporation of India Limited.

10.0 Responsiveness/ Feedback from Stakeholders:

Failure rate has been reduced by 19% in FY: 13-14 & 23% in FY: 14-15. So, internal customers are very happy with this new product design.

11.0 Model applicability and Scalability:

On uniqueness front, TPDDL is the only utility to adopt this new design product. It challenges conventional design as per IS 7098/IEC 60502 standards. Further, proposal already submitted to BIS to amend the existing IS to accommodate this unique design. Patent already filed for this innovative product design. **Reg. No. 1301/DEL/2014.**

On scalability part, all procurements LT XLPE cables are done as per new product design. Further, this is replicable across all power distribution utilities.

12.0 Findings – People component plays a most significance role in enhancing innovation capability of the organization. At functional level, workmen is the key player in executing the job of manufacturing the product or providing services to the customers. The quality of product or service is depend upon the skill set of workmen. Although various platforms exist for capturing & sharing knowledge at TPDDL for various stakeholders. SANCHAY portal is the repository of organizational tacit and explicit knowledge accessible to workforce. SEEKH is based on the principles of 'Community of Practices (CoP)', wherein team members of a Group / District meet to share knowledge. Also all workmen are given relevant trainings to enhance their skill as continuous process. But effectiveness was not upto the mark. The gap identified as requirement of knowledge expert mentors to improve their skills at field rather than in class room. The requirement has been fulfilled which lead to process improvement and resulted in enhancing the innovation capability shine projects. The teams are rewarded by the management to motivate for innovation and inculcate the innovation culture

13.0 Conclusion:

Based on this study, it is clear that knowledge management plays a significant role in innovation and enhancement of knowledge at ground level. Further study shows the potential role of knowledge management in innovation and how the value of knowledge management can be maximized to ensure a more efficient and effective innovation process. Impact studies in this area may be extremely valuable, especially in organizations that have distinct knowledge management and innovation programs.

It is important for both innovation and knowledge Management professionals to understand the systemic relationship between these concepts and the value that it can

generate in respect of creating and maintaining sustainable competitive advantage for organizations.

Survey Questionnaire:

Survey Questionnaire on: Influence of KM on innovation within the organization

Name of company:

Kindly (✓) on a 5 point scale. 1 Strongly Disagree, 2 Disagree, 3 Neither Agree nor Disagree, 4 Agree, 5Strongly Agree.

		1	2	3	4	5
Q-1	There is a process for Sharing of best practices across the organization					
Q-2	My firm has Process for evaluation and selection of ideas					
Q-3	Top leader promote knowledge sharing culture in the firm					
Q-4	Firm allocate funds for selected ideas					
Q-5	Company ensure transparency and speed to select/reject ideas					
Q-6	There is process to track and report progress on Innovation					
Q-7	There is a Process to differentiate improvements and innovations					
Q-8	Team leader encourages employees to conduct bold experiments					
Q-9	Rewards to promote knowledge culture motivate employees to share the knowledge					
Q-10	In dealing with its competitors, my firm has a strong tendency to be ahead of other competitors in introducing novel idea or products					
Q-11	KM process exist in the firm contributes to donate and collect knowledge					
Q-12	There is process to develop the skill of the employees through training					
Q-13	Teams trained on tools and techniques for idea generation					
Q-14	All employee segments excited to generate these ideas					
Q-15	User-friendly firm's IT infrastructure facilitates Knowledge Management					
Q-16	Knowledge organization ensures availability of required data to various stakeholders through IT enabled channels					

Q-17	company's IT infrastructure enable the security of sensitive data and information through dedicated firewall					
Q-18	Company's hardware and software system are reliable, secure					
Q-19	Robust IT policies and procedures in place for ensuring data and information accuracy, integrity, reliability, timeliness, and their security and confidentiality					
Q-20	Action plans (or strategic objectives) exist in Corporate Balance Score card towards working on innovations					
Q-21	Defined long term objectives for innovation and action plans are visible in short term objective of the company					
Q-22	Employee PMS (Performance Measuring System) include indices on innovation					
Q-23	Firm shapes the environment by introducing new products, technologies, administrative techniques than merely react					
Q-24	Self motivated employee voluntarily share the knowledge					
Q-25	Stakeholder's feedback helps individual knowledge growth					
Q-26	Individual's knowledge sharing enhances collective learning in the organisation					
Q-27	Employees transfer relevent knowledge to and from customers, suppliers and collaborators					
Q-28	Company have a formal IP Policy					
Q-29	Systems exist to protect its IPR					
Q-30	My company ensure resourcing the implementation of Long Term innovation ideas appropriately					
Q-31	Stakeholder's feedback helps individual knowledge growth					
Q-32	Acquired collective knowledge improves organisational critical processes					
Q-33	Acquired knowledge generate new knowledge					
Q-34	People blend and correlate data from different sources to build new knowledge					
Q-35	Contribution of new knowledge visible in firm growth in terms of innovation in product/ services					
Q-36	Our company has shown a great deal of tolerance for high risk projects					
Q-37	stories are used to inspire managers for Innovation and especially risk taking					
Q-38	This organization supports many small and experimental projects realizing that some will undoubtedly fail					
Q-39	People are often encouraged to take calculated risks with new ideas around here					

Survey Feedback: 60 Nos participants quoted their views.

	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	Q-7	Q-8	Q-9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
R-1	5	5	5	4	4	5	5	5	5	4	5	5	4	5	4	3	4	2	4	3	1	3	4	5	5	4	5	2	4	2	4	5	5	5	5	4	3	3	2
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Communalities

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VAR00032	1.000	.744
VAR00033	1.000	.762
VAR00034	1.000	.828
VAR00035	1.000	.836
VAR00036	1.000	.689
VAR00037	1.000	.682
VAR00038	1.000	.798
VAR00039	1.000	.807

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.356	18.861	18.861	7.356	18.861	18.861
2	4.522	11.594	30.455	4.522	11.594	30.455
3	3.235	8.294	38.749	3.235	8.294	38.749
4	2.952	7.570	46.319	2.952	7.570	46.319
5	2.433	6.238	52.557	2.433	6.238	52.557
6	1.921	4.925	57.482	1.921	4.925	57.482
7	1.851	4.745	62.227	1.851	4.745	62.227
8	1.696	4.348	66.575	1.696	4.348	66.575
9	1.472	3.773	70.348	1.472	3.773	70.348
10	1.136	2.913	73.262	1.136	2.913	73.262
11	1.074	2.755	76.016	1.074	2.755	76.016
12	.990	2.539	78.555			
13	.883	2.265	80.820			
14	.835	2.140	82.960			
15	.749	1.920	84.880			
16	.735	1.885	86.765			
17	.651	1.670	88.435			
18	.533	1.367	89.803			
19	.500	1.283	91.086			
20	.454	1.164	92.249			
21	.424	1.086	93.336			
22	.378	.970	94.305			
23	.315	.809	95.114			
24	.278	.713	95.827			
25	.252	.647	96.474			
26	.246	.630	97.105			
27	.209	.537	97.641			
28	.180	.462	98.104			
29	.162	.415	98.518			
30	.127	.325	98.843			
31	.100	.255	99.099			
32	.083	.214	99.312			
33	.072	.184	99.497			
34	.054	.139	99.636			
35	.048	.124	99.759			
36	.039	.099	99.858			
37	.027	.069	99.927			
38	.018	.047	99.974			
39	.010	.026	100.000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component										
	1	2	3	4	5	6	7	8	9	10	11
VAR00001		.801									
VAR00002											
VAR00003		.696									
VAR00004											
VAR00005				.659							
VAR00006		.580									
VAR00007		.507									
VAR00008											
VAR00009		.576									
VAR00010						.501					
VAR00011		.696									
VAR00012											
VAR00013											
VAR00014		.565									
VAR00015			.610								
VAR00016			.567								
VAR00017											
VAR00018			.547								
VAR00019				.531							
VAR00020							.502				
VAR00021											
VAR00022											
VAR00023											
VAR00024	.650										
VAR00025	.689										
VAR00026	.744										
VAR00027	.760										
VAR00028											
VAR00029											
VAR00030											
VAR00031	.659										
VAR00032	.639										
VAR00033	.735										
VAR00034	.694										
VAR00035	.748										
VAR00036						-.540					
VAR00037								.525			
VAR00038											
VAR00039											

Extraction Method: Principal Component Analysis.

a. 11 components extracted.

Correlations

		VAR00024	VAR00026	VAR00031	VAR00033	VAR00025	VAR00035	VAR00032	VAR00015
VAR00024	Pearson Correlation	1	.633**	.398**	.288*	.631**	.338**	.482**	-.117
	Sig. (2-tailed)		.000	.002	.026	.000	.008	.000	.372
	N	60	60	60	60	60	60	60	60
VAR00026	Pearson Correlation	.633**	1	.400**	.479**	.637**	.537**	.480**	-.019
	Sig. (2-tailed)	.000		.002	.000	.000	.000	.000	.886
	N	60	60	60	60	60	60	60	60
VAR00031	Pearson Correlation	.398**	.400**	1	.560**	.298*	.547**	.546**	.005
	Sig. (2-tailed)	.002	.002		.000	.021	.000	.000	.968
	N	60	60	60	60	60	60	60	60
VAR00033	Pearson Correlation	.288*	.479**	.560**	1	.406**	.762**	.533**	.151
	Sig. (2-tailed)	.026	.000	.000		.001	.000	.000	.249
	N	60	60	60	60	60	60	60	60
VAR00025	Pearson Correlation	.631**	.637**	.298*	.406**	1	.490**	.506**	-.132
	Sig. (2-tailed)	.000	.000	.021	.001		.000	.000	.315
	N	60	60	60	60	60	60	60	60
VAR00035	Pearson Correlation	.338**	.537**	.547**	.762**	.490**	1	.413**	.168
	Sig. (2-tailed)	.008	.000	.000	.000	.000		.001	.199
	N	60	60	60	60	60	60	60	60
VAR00032	Pearson Correlation	.482**	.480**	.546**	.533**	.506**	.413**	1	-.257*
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.001		.047
	N	60	60	60	60	60	60	60	60
VAR00015	Pearson Correlation	-.117	-.019	.005	.151	-.132	.168	-.257*	1
	Sig. (2-tailed)	.372	.886	.968	.249	.315	.199	.047	
	N	60	60	60	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		VAR00026	VAR00033	VAR00035	VAR00006	VAR00007	VAR00009	VAR00011	VAR00014	VAR00001	VAR00003
VAR00026	Pearson Correlation	1	.479**	.537**	.103	.197	-.031	.169	.088	-.033	.230
	Sig. (2-tailed)		.000	.000	.435	.131	.815	.197	.504	.804	.077
	N	60	60	60	60	60	60	60	60	60	60
VAR00033	Pearson Correlation	.479**	1	.762**	.022	.024	-.024	.257*	.150	-.044	.131
	Sig. (2-tailed)	.000		.000	.870	.856	.855	.048	.252	.736	.317
	N	60	60	60	60	60	60	60	60	60	60
VAR00035	Pearson Correlation	.537**	.762**	1	-.042	-.006	-.155	.037	.058	-.192	.031
	Sig. (2-tailed)	.000	.000		.749	.964	.238	.779	.658	.142	.813
	N	60	60	60	60	60	60	60	60	60	60
VAR00006	Pearson Correlation	.103	.022	-.042	1	.608**	.241	.373**	.219	.355**	.575**
	Sig. (2-tailed)	.435	.870	.749		.000	.063	.003	.093	.005	.000
	N	60	60	60	60	60	60	60	60	60	60
VAR00007	Pearson Correlation	.197	.024	-.006	.608**	1	.041	.250	.358**	.392**	.389**
	Sig. (2-tailed)	.131	.856	.964	.000		.753	.054	.005	.002	.002
	N	60	60	60	60	60	60	60	60	60	60
VAR00009	Pearson Correlation	-.031	-.024	-.155	.241	.041	1	.485**	.141	.415**	.363**
	Sig. (2-tailed)	.815	.855	.238	.063	.753		.000	.284	.001	.004
	N	60	60	60	60	60	60	60	60	60	60
VAR00011	Pearson Correlation	.169	.257*	.037	.373**	.250	.485**	1	.405**	.559**	.533**
	Sig. (2-tailed)	.197	.048	.779	.003	.054	.000		.001	.000	.000
	N	60	60	60	60	60	60	60	60	60	60
VAR00014	Pearson Correlation	.088	.150	.058	.219	.358**	.141	.405**	1	.500**	.347**
	Sig. (2-tailed)	.504	.252	.658	.093	.005	.284	.001		.000	.007
	N	60	60	60	60	60	60	60	60	60	60
VAR00001	Pearson Correlation	-.033	-.044	-.192	.355**	.392**	.415**	.559**	.500**	1	.616**
	Sig. (2-tailed)	.804	.736	.142	.005	.002	.001	.000	.000		.000
	N	60	60	60	60	60	60	60	60	60	60
VAR00003	Pearson Correlation	.230	.131	.031	.575**	.389**	.363**	.533**	.347**	.616**	1
	Sig. (2-tailed)	.077	.317	.813	.000	.002	.004	.000	.007	.000	
	N	60	60	60	60	60	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations

		VAR00026	VAR00033	VAR00035	VAR00011	VAR00003
VAR00026	Pearson Correlation	1	.479''	.537''	.169	.230
	Sig. (2-tailed)		.000	.000	.197	.077
	N	60	60	60	60	60
VAR00033	Pearson Correlation	.479''	1	.762''	.257'	.131
	Sig. (2-tailed)	.000		.000	.048	.317
	N	60	60	60	60	60
VAR00035	Pearson Correlation	.537''	.762''	1	.037	.031
	Sig. (2-tailed)	.000	.000		.779	.813
	N	60	60	60	60	60
VAR00011	Pearson Correlation	.169	.257'	.037	1	.533''
	Sig. (2-tailed)	.197	.048	.779		.000
	N	60	60	60	60	60
VAR00003	Pearson Correlation	.230	.131	.031	.533''	1
	Sig. (2-tailed)	.077	.317	.813	.000	
	N	60	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	VAR00033, VAR00003, VAR00024, VAR00011, VAR00031, VAR00026[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: VAR00035

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811[a]	.657	.618	.64842

a. Predictors: (Constant), VAR00033, VAR00003, VAR00024, VAR00011, VAR00031, VAR00026

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.716	6	7.119	16.933	.000[a]
	Residual	22.284	53	.420		
	Total	65.000	59			

a. Predictors: (Constant), VAR00033, VAR00003, VAR00024, VAR00011, VAR00031, VAR00026

b. Dependent Variable: VAR00035

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.329	.473		.696	.490
	VAR00024	.015	.100	.016	.150	.881
	VAR00031	.108	.109	.103	.987	.328
	VAR00011	-.146	.098	-.153	-1.501	.139
	VAR00003	-.031	.099	-.031	-.314	.755
	VAR00026	.246	.135	.211	1.826	.074
	VAR00033	.675	.115	.641	5.863	.000

a. Dependent Variable: VAR00035

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