Availability and Use of Tools and Technology for Knowledge Transfer: An exploratory study

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Abstract: Modern organizations face many substantial challenges because of turbulent competitive global environment. Among these one of the biggest challenge is how to use available tools and technology for knowledge transfer . This exploratory study focused on the influence of tools and technology on knowledge transfer (KT) among IT professionals. Data collected from 300 IT professionals of top 10 IT companies in Delhi and NCR based on NASCOM 2016.Analysis of data was done by using PLS- structured equation modelling through PLS 3.0, in order to test the measurement model using convergent and discriminant validity and hypothesis testing through structural model. Results suggested that availability and usage of tools and technology influences the knowledge transfer behaviour of IT professionals. Effective tools and technology for Knowledge transfer(KT) included e-mail, teleconferencing , e-meeting etc. Availability of these kind of communication tools influenced the knowledge transfer behaviour. Recommendations are offered for future practice.

Keywords: Knowledge transfer, Tools and Technology, PLS-structural equation modelling and IT professionals

1.   Introduction :

Knowledge comes from ideas, information and processes which is an intangible asset and dynamic resource. Knowledge is the only thing in the world that increases by sharing/transfer. An organization can achieve the biggest strategic advantage over its competitors when its employees have the ability to transfer their knowledge and ideas with adequate support of tools and technology. In today's scenario, specifically in IT industry where there is a trend to change jobs frequently , so it become very challenging to retain knowledge within the organization .In order to achieve competitive advantage, it has become very important for the IT companies to promote knowledge transfer (KT) among employees. In order to boost knowledge transfer/sharing behaviour ,organizations are investing to study out the factors which can influence the knowledge sharing behaviour of employees specifically related to tools and technology .The identification of of tools and technology that increases participation of employees in providing KT helps organizations to improve their   strategies and practices which provide opportunities to discuss know –what , know –how . Though knowledge transfer within organizations direct the organizations towards future development and growth.

2.   Literature Review:

The previous studies such as Taylor and Todd (1995), revealed the importance of technology for sharing knowledge. Therefore two independent variables were considered to see the influence of tools and technology on knowledge sharing(transferring) behaviour through personal beliefs about the perceived existence or non-existence of available resources and facilities that enable or inhibit the sharing of knowledge among employees. Davies and Roche (1999) also explained the importance of accessibility and quality of information as a criterion for information use. Employees can rely on that information which is quickly accessible to them and is relevant, reliable and latest. Wild et.al (2002) supported the usage of technological tools for transferring information among employees. There has been found different types of technological tools used by organizations to transfer information included electronic bulletin boards, discussion forums, groupware, virtual conference rooms, intranet, databases, personal webpages, e-mails, knowledge management index, e-libraries and many more. Smith (2003) found a strong relationship between knowledge transferring and information technology. Technological tools found to be the most significant supporting source for sharing knowledge efforts. Willem and Buelens (2007) also explored knowledge transferring practices and level of utilization of tools and technology and suggested that for effective utilization ofemployee's knowledge, the implementation of an effective knowledge sharing system. Thus the objective of this study was to investigate the influence of availability and use of tools and technology on IT professional for knowledge transfer. This particular section is very important to study as the respondents are from IT industry which is considered to be the most responsive for technology. The following hypotheses were developed to fulfil the objective of the study.

H1: Usage of tools and technology positively influences IT professional for knowledge transfer(KT).

H2 : Tools and technology positively influences IT professional for knowledge transfer(KT).

3. Research Methodology :

In this study a model of factors related to availability and use of tools and technology that   influencing knowledge transfer in IT industry was developed, using a questionnaire based survey of IT professionals.

3.1 Questionnaire design :

The indicators used to measure the constructs were developed based on previously validated instruments of various studies. For measuring Tools and Technology with 8 indicators and Usage of tools and technology (UTT)   with 9 indicators based on Teng and Song (2005) study and For measuring knowledge transfer behaviour (KTB) the 7 indicators based on Lee (2001); Bock et al., (2005) were used. The scale used to measure each factor was based on 7 point Likert scale ranging from 1 "Strongly Disagree" to 7"Strongly Agree" with multiple indicators and reverse indicators in order to improve the reliability and validity. This study measured three constructs and items statements for these constructs were conversant by previous research as summarised in the following Tables 1 , 2 and 3 .

Table 1: Measurement IndicatorsTools and Technologyfor sharing knowledge (TT)

TT1	Whenever I want to share knowledge, I can easily access tools and technology in our organization.
TT2	In our organization, it is easy to use tools and technology to share knowledge.
TT3	In our organization, tools and technology for sharing knowledge is reliable.
TT4	Tools and technology for sharing knowledge is available when it is needed.
TT5	Tools and technology for sharing knowledge can be customized to fit individual needs.
TT6	I am satisfied with the overall quality of tools and technology for sharing knowledge in our organization.
TT7	Tools and technology for sharing knowledge is intimidating to me.
TT8	I hesitate to use tools and technology to share knowledge for fear of making mistakes.

Table 2: Measurement Indicators:Usage of tools and technology (UTT)

UTT1	I use e-mail to share knowledge with my co-workers.
UTT2	I use discussion forum (using tools like electronic bulletin board, chat room etc.) to share knowledge with my co-workers.
UUT3	I use desktop computer conferencing(using networked PC simultaneously for discussion and information exchange with tools such as net meeting, instant messaging, etc) to share knowledge with my co-workers.
UUT4	I share knowledge by inputting it into knowledge repository/company databases (containing existing expertise, lessons learned, best practices etc).
UUT5	I use intranet (including corporate portal) to share knowledge with my co-workers.
UUT6	I use computerized directory on experts with specific knowledge to locate the expertise that my co-workers need.
UTT7	I use videoconferencing to share knowledge with my co-workers
UTT8	I use teleconferencing to share knowledge my co-workers.
UTT9	I share knowledge through face-to-face discussions with my coworkers

Table 3: Measurement Indicators: knowledge transfer behaviour (KTB)

KTB1	I shared factual knowledge (know-what) from work with my coworkers
KTB2	I shared business knowledge about the customers, products, suppliers and competitors with my co-workers.
KTB3	I shared internal reports and other official documents with my coworkers

KTB4	I shared work experiences with my co-workers.
KTB5	I shared know-how or tricks of the trade from work with my coworkers
KTB6	I shared expertise from education or training with my co-workers
KTB7	I shared know-why knowledge from work with my co-workers

3.2 *Sample design and sample selection*

The two phase sampling was used for selection of the sample. In the first phase, the *judgmental* sampling method was used in selecting the top 10 IT companies in NCR. Selection of the companies was based on latest NASCOMM Ratings 2016 based on revenue. And in the second phase, the *random* sampling method was used to collect the sample from IT professionals. The questionnaire was distributed randomly to 500 employees in online as well as printed forms and out of these 300 respondents had reverted back with their responses.

4.   **Data Analysis :**

The research model was analysed using SEM supported by Smart PLS 3.0 . Structural Equation Modelling (SEM) is next generation multivariate data analysis method that normally reasonable in the behavioural sciences because of its ability to attribute relationships between unobserved constructs (latent variables) from observable variables (indicators). *Partial Least Squares Structural Equation Modelling (PLS-SEM)* disintegrated into two sub models, first is Structural Model (inner model) and the other one is Measurement Model (outer model). Structural model mainly indicates the relationship between dependent and independent latent variable whereas Measurement Model focuses on relationship between latent variables and their observable indicators.

4.1 **Testing of Measurement Model**:

The testing of measurement model requires to study the two types of validities i.e. convergent validity and discriminant validity. Firstly, the outer loading of each measurement indicator was evaluated. If the outer loading of indicators with value greater than recommended value, i.e. 0.70 (Chin, 1998) or close to the recommend value, it was decided to keep that indicator in the model. As identified in the first assessment of model that five indicators i.e. KTB2, KTB3,TT7,TT8 AND UTT9 should be dropped . The cropped model was re-executed and re-evaluated and the new outer loading after rerunning the PLS Algorithm and bootstrapping procedure measurement indicators and AVE score of latent construct are presented in **Figure 1**. The composite reliability of Knowledge transfer behaviour (KTB) , Tools and technology and Usage of tools and technology found to be 0.928, 0.924 and 0.932 respectively , which are above the acceptable value of composite reliability i.e. 0.60 above (Bagozzi and Yi, 1988; Hair *et.al.*, 1992) and it indicated that the model had good internal consistency. In the last , average variance extracted for all latent variables exceeded the threshold value of 0.5 recommended by Fornell and Lacker(1981). For these reason the convergent validity of latent variables is confirmed. **Table 4** shows the square root values of the AVE score of each latent variable are significantly higher than any correlation value of the latent variables, this means that all the latent variable shows adequate amount of variance with other latent variables in the research model hence this result proved discriminant validity.

Table 4: Fornell and Lacker criterion for discriminant validity

Latent Variables	Knowledge transfer behaviour	Tools and technology	Usage of tools and technology
Knowledge transfer behaviour	0.84		
Tools and technology	0.594	0.918	
Usage of tools and technology	0.657	0.701	0.795
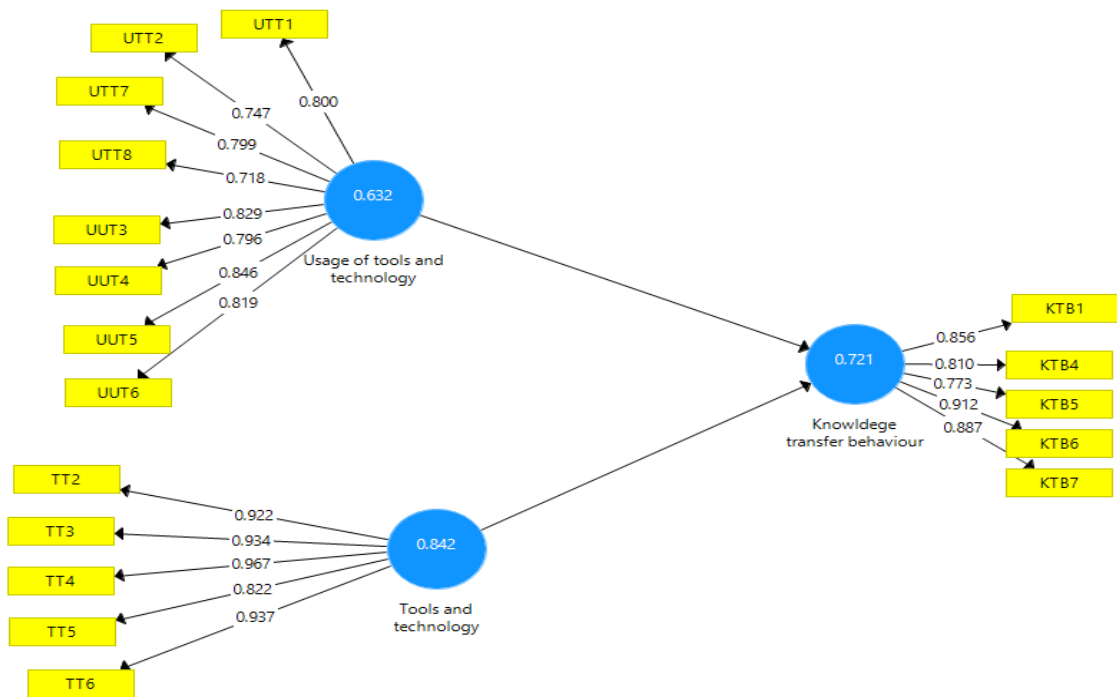
Figure 1: Outer loading of indicators and AVE score of each latent construct

The utilization of tools and technology for sharing knowledge was measured in forms of e-mail, discussion forum, desktop computer conferencing, knowledge repository/company databases, intranet, and computerized directory on experts, videoconferencing and teleconferencing. The following table 5 represents the means and standard deviation of usage of tools and technology.

Table 5: Usage of Tools and Technology to Share Knowledge

| Tools and Technology	Mean	Std. Deviation
E-mail	4.5675	1.67555
Discussion forum	4.5950	1.75032
Desktop computer conferencing	4.9050	1.65160
Knowledge repository/company databases	4.7100	1.74600
Intranet (including corporate portal)	4.4725	1.89293
Computerized directory on experts	4.2525	1.78092
Videoconference	4.3250	1.77122
Teleconference	4.8275	1.56968
Face to Face discussions	5.4550	1.43636

4.2 Testing of Structural Model :

PLS algorithm and bootstrapping procedure was used to test hypothesis, with knowledge transfer behaviour (KTB) of IT professionalas the dependent variable andUsage of tools and technology (UTT)   and Tools and Technology (TT) as independent variables. As Table 6 specified that the coefficient of determination (R^2) with value of 0.467 and R-Adjusted with value 0.456   by running PLS algorithm, which indicate that 46.7 % variance of KTB was found by combined influence of   independent variables i.e. Usage of tools and

technology(UTT)   and Tools and Technology (TT) . This figure was found to be worthy and signifying that, the combination of independent variables have sound influences on knowledge transfer of IT professionals.

Table 6: R^2 and R-Adjusted value of Knowledge transfer behaviour

Variable	R Square	R Square Adjusted
Knowledge transfer behaviour(KTB)	0.467	0.456

The result shown in Figure 2, that utilization of tools and technology (UTT) significantly influencingKTB with path coefficient of 0.474 ,   p value of 0.00 (p< 0.05) and Tools and Technology (TT) also significantly influencing KTB with path coefficient of 0.262 , p value of 0.014(p< 0.05) . So the results proved that path coefficient for UTT ->KTB and TT-> KTBfound statistically significant .
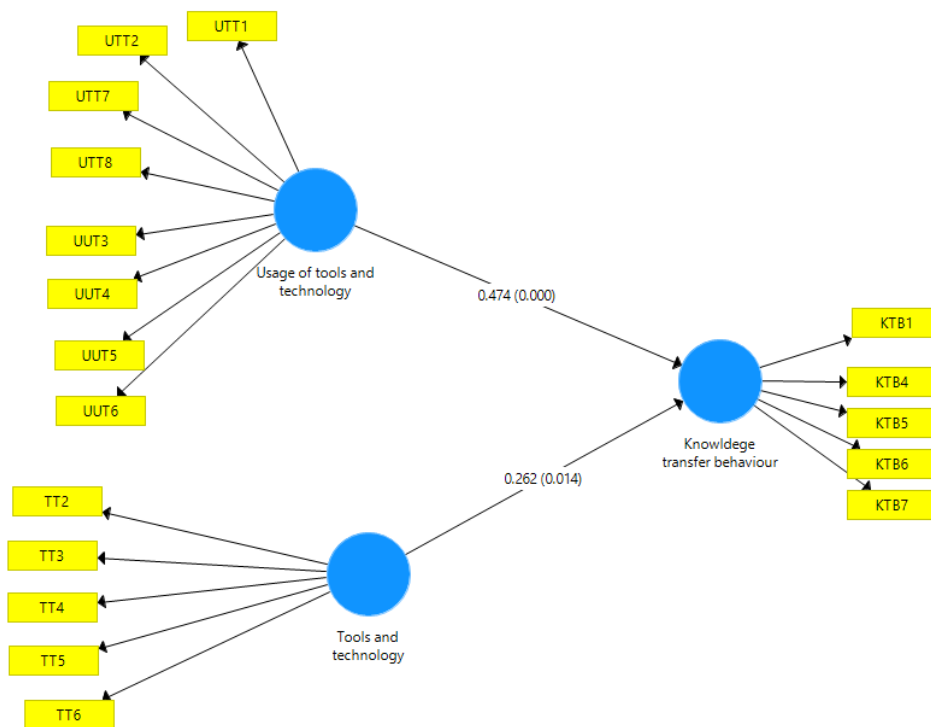
Figure 2: Path coefficients(p value) of each latent construct

It shows that both the independent variables i.e. UTT and TT have positive influences on IT professionals for knowledgetransfer (KT).

Table 7: Summary of Proposed Hypothesis testing

Hypothesis	Result
H1: Usage of tools and technology positively influences IT professional for knowledge transfer(KT).	Accepted
H2 : Tools and technology positively influences IT professional for knowledge transfer(KT).	Accepted

5 .Discussion on findings :

5.1 Tools and Technology (TT)
The finding suggests that IT professionals frequently use tools and technology for knowledge transfer. The results suggested that more than 70% of the respondents found tools and technology easy and reliable to share knowledge whereas 68.5% respondents believe that tools and technology available when it is required. The result also highlighted that 62.8% respondents believe that tools and technology are customized to fit individual needs and 74% respondents are satisfied with the overall quality of tools and technology for transferring knowledge in their organization

5.2 Usage of Tools and Technology (UTT)
The result showed that Utilization of tools and technology (UTT) had significantly influences the knowledge transfer . The possible explanation for the contribution of usage of tools and technology found in the study of Wild et.al (2002)stated that the usage of technological tools for sharing information among employees. There has been found different types of technological tools used by organizations to share information included electronic bulletin boards, discussion forums, groupware, virtual conference rooms, intranet, databases, personal webpages, e-mails, knowledge management index, e-libraries and many more. Tools and technology and usage of tools and technology were considered to influencing the factors of KT.

- Majority of IT professionals i.e. 12 % very frequently and 24.3 % frequently reported utilizing email to share their knowledge.

- 17.8 % IT professionals reported using discussion forum on daily basis i.e. many times daily to share.

- 19.5 % of IT professionals reported using desktop computer conferencing very frequently. 20.8 % used it frequently on daily basis to share knowledge.

- 19% used it frequently and 16.8 % used knowledge repository/company databases very frequently on daily basis i.e. utilized many times a day.

- 17.8 % of IT professionals reported utilizing intranet very frequently on daily basis and 18.3 % used it frequently that means utilized many times a day.

- 14.8 % of IT professionals utilized computerized directory on experts frequently many times a day.

- 16% of IT professionals reported utilizing videoconferencing very frequently on daily basis.

- 16% of IT professionals share knowledge through teleconferencing very frequently and 23% of IT professionals utilized it frequently on daily basis i.e. used many times a day to share knowledge.

- 27% of IT professionals reported utilizing face to face discussions very frequently and 30 % used face to face discussions frequently to share knowledge on daily basis i.e. used face to face discussions many times a day .

Conclusion:
This study explained the contribution of tools and technology for knowledge transfer . The availability of tools and technology that supposed to be very helpful in transferring knowledge among employees. Previous studies also revealed the strong relationship between knowledge transfer and information technology. Technological tools found to be the most significant supporting source for sharing knowledge efforts. (Lynda,2000; Smith, 2003; Ibrahim Seba, Jennifer Rowley and Sian Lambert, 2012; Rahab and Purbudi Wahyuni, 2013; Zalk, M., Bosua, R. & Sharma, R., 2011).

Recommendations for practice:

- The study revealed that employees have ability to share their knowledge and they can easily share knowledge with the help of tools and technology but due to busy schedule they don't have sufficient time for knowledge transfer *(KT)* and it's a very time consuming process. So organizations should make sure that employee have sufficient time and resources in terms of tools and technology before engaging him for KT.
- Organizations should allocate a proper time as per convenience of employees who engage in knowledge transfer by incorporating it into the work activities and also time invested for knowledge transfer should not be considered as some lost in cost element.

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