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Research-in-Progress

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Abstract

There is a strong desire to enhance organisational knowledge transfer based on knowledge stock. A review of current literature was conducted which highlighted the importance of IT to identify knowledge stock of people for effective knowledge transfer. Furthermore, we conducted a systematic mapping of scholarly studies to explore the use of IT in tacit and explicit knowledge transfer by conducting a search in four databases: IEEE Xplorer, ScienceDirect, Scopus and Springer. We found that most of the studies have highlighted the importance of IT in explicit knowledge transfer only. We expanded our review to include the top eight journals in Information Systems and obtained the same result. Our findings demonstrate the lack of use of IT towards identifying knowledge stock to enable tacit knowledge transfer. In the next phase of our research, we plan to use an IT artefact for tacit knowledge transfer by identifying knowledge stock of IT professionals.

Keywords: knowledge stock, knowledge transfer, systematic literature mapping, knowledge management

Introduction

Due to the ever-increasing importance of knowledge in organisations, the discipline of knowledge management (KM) continues to play a vital role in strategic management and innovation (Rupietta and Backes-Gellner 2017). At an organisational level, KM refers to the process of determining and using collective knowledge to obtain competitive advantage (Von Krogh 1998). Within the KM process, knowledge transfer (KT) is one of the important steps for organisational growth (Argote and Ingram 2000). Knowledge transfer is a growing spiral flow of knowledge via people, groups and organisations once it is created (Nonaka 1994).There is a challenge within many organisations to transfer knowledge among its staff (Kazanjian et al. 2000). For example, organisations have continued to struggle transferring knowledge among their staff to address customer requirements (Frank et al. 2015; Minbaeva et al. 2014).

A seminal research work suggests that the success of knowledge transfer is dependent on factors such as similar knowledge bases of individuals, extent of interactions among people, motivation of source

and target of knowledge, absorptive capacity and knowledge stock (KS) of their staff (Gupta and Govindarajan 2000). At an individual level, knowledge stock is defined as a set of skills which enhances the ability of a person to perform any task (Nonaka 1994). It is very important for every organisation to identify the knowledge stock of its staff as it enables knowledge transfer (Gupta and Govindarajan 2000). For example, a professional may be under-skilled in some jobs but over-skilled in others. In this case, identification of the current skill set of the professionals will enable them to acquire or transfer their knowledge as needed. The importance of knowledge stock identification method for transferring knowledge has been mentioned by many researchers (Cummings and Teng 2003; Gupta and Govindarajan 2000; Power and Cormican 2015). However, there is scarcity in the research that focuses on methods to identify knowledge stock that facilitates knowledge transfer. Likewise, in this era of technology, various researchers have mentioned about the importance of IT in organisational knowledge transfer (Ismail Al-Alawi et al. 2007). Due to this, it was interesting to find out how important is IT to identify knowledge stock of people for transferring knowledge. Accordingly, the research question for this study is: How important is IT in identifying knowledge stock for knowledge transfer?

A systematic mapping of the extant literature was conducted to address the research question and argue for the importance of IT in knowledge stock identification for knowledge transfer. The main contribution of this paper is to find out number of researches in recent years and present an analysis of the use of IT in KS identification for KT in organisations. There are different views of IT within the Information Systems discipline, viz. tool view, proxy view, ensemble view, computational view and nominal view of technology (Orlikowski and Iacono 2001). In this research, when we refer to IT, we refer to the tool view of technology, i.e. IT as an engineered artefact (software, equipment or technique). In this role, IT is expected to increase performance and enhance information processing abilities of people. In our context, the use of IT refers to using computing resources such as software or technology-enabled methods for knowledge stock identification and transfer process. A simple scenario is where a software tool can be used to create a blog or wiki as sources of knowledge to improve knowledge stock of people. In the next section, we present the conceptual background of knowledge stock identification and knowledge transfer. After that, the systematic mapping methodology is discussed before presenting our findings that justifies our future research undertaking. Using the findings from our current work reported in this paper, we are in the process of evaluating the role of IT artefacts in knowledge stock identification and knowledge transfer of ICT professionals using Skills Framework for the Information Age (SFIA 2018).

Knowledge Stock and Transfer

Knowledge is defined as relevant and actionable information which is partly based on the experience of a person. The works of Polanyi (1962) and Nonaka (1994) referred to two types of knowledge in organisations—tacit and explicit. Tacit knowledge is composed of cognitive and technical elements in which the cognitive elements refer to the mental state of a person containing views, thoughts, and beliefs (Spender 1996). On the other hand, explicit knowledge is defined as the knowledge which is articulated, structured and transferred in symbolic forms or using simple language (Alavi and Leidner 2001). The transfer of tacit knowledge is more complex than that of explicit knowledge (Dhanaraj et al. 2004) — tacit knowledge being acquired by observation or close interaction and, explicit knowledge being easily learned and coded (Doz et al. 2001). Between these two, the focus of this research is on tacit knowledge and how IT can effectively enable transfer of tacit knowledge by identifying knowledge stock.

Organisational knowledge stock is defined as the amount of knowledge obtained by an organisation in a specific period and is used when needed (Wu and Shanley 2009). Understandably, there is a greater emphasis on the use of the knowledge stock in empirical research and practice (Morris and Empson 1998). Without proper utilisation, knowledge stock is an expanding repository without any strategic value (Intezari and Gressel 2017). However, it may be costly for organisations to ignore the status of their current knowledge stock and emphasize the process of knowledge transfer alone (Nahapiet and Ghoshal 2000). This is akin to trying to demonstrate improvement without measurement since there is no evidence to evaluate the effectiveness of the knowledge transfer initiative (Nahapiet and Ghoshal

2000). Proper assessment of the knowledge stock can be considered of strategic value, and hence such assessments can contribute to an organisation's competitiveness (Bartram 2004).

Knowledge is embedded in an individual, but it can be shared in an organisation through various entities such as organisational culture and identity, systems, documents, and fellow employees (Spender 1996). Knowledge is created by individuals but organisations play a vital role in nurturing and transferring it among their staff (Nonaka 1994). It has been reported that the success of knowledge transfer is dependent on an organisation's understanding of the level of knowledge, i.e. knowledge stock of their staff (Cummings and Teng 2003). This suggests that identifying the knowledge stock of staff within an organisation can support knowledge transfer in the organisation.

Research Methodology: A Systematic Literature Mapping

A systematic mapping study was performed for categorizing and summarizing the existing literature on the use of IT towards KS and KT. Systematic mapping is a process of bibliographic review which creates a general idea of the research area. It helps to develop a visual summary map of the field (O'Cathain et al. 2013). In our case, a systematic mapping is helpful in obtaining a broad picture of the research area of knowledge stock and transfer facilitated by IT. Researchers have used this method of classification of appropriate studies to justify future work (O'Cathain et al. 2013). Accordingly, we conducted the systematic mapping followed by a protocol which is presented in Figure 1.
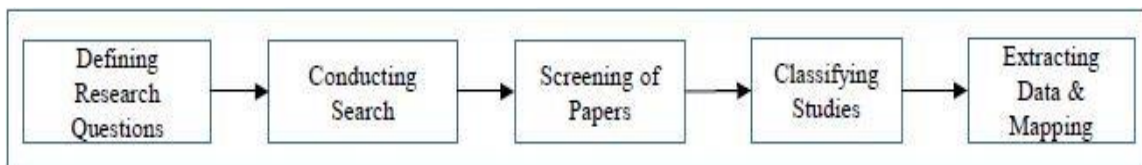
Figure 1. Systematic Mapping Protocol

In the first step, the research question was defined. In the second step, search of relevant articles was conducted using a specified set of search criteria. All the articles obtained using search criteria were then screened in the third step and irrelevant studies were excluded from the list. In the fourth step, the selected articles were classified into relevant areas. In the last step, data was extracted from relevant articles for discussing the research question as well as justifying future research. The execution of the systematic mapping protocol in our research is discussed next.

Definition of Research Question

The initial step was defining the research question which covers the scope of the review and defines the sources for relevant information. As already highlighted, the research question for this study is: How important is IT in identifying knowledge stock for knowledge transfer?

Conducting Search

The second step was to conduct a search for relevant articles associated with the research topic of IT, knowledge stock and knowledge transfer. Four online databases (IEEE Xplorer, ScienceDirect, Springer and Scopus) were chosen in the initial stage in our search. Table 1 shows all the criteria applied during the search of the articles.

Table 1. Search Criteria

Search String	*("knowledge base" OR "knowledge stock") AND ("knowledge transfer" OR "knowledge sharing" OR "knowledge flow")*
Date Range	1980 to 2017
Language	English
Options	Scholarly Journal and Conference (Peer reviewed) publications, Full Text, References Available

Initially, the date ranges from 1980 to 2017 for the research conducted in KS and KT was investigated using the four databases. Figure 2 shows that there has been an increasing interest towards the research conducted in KS and KT. During the 1980s, the total number of publication was only 241. The publication count has increased steadily over the years and in the last seven years alone (from 2010 to 2017), the number of articles has increased to 9,230.
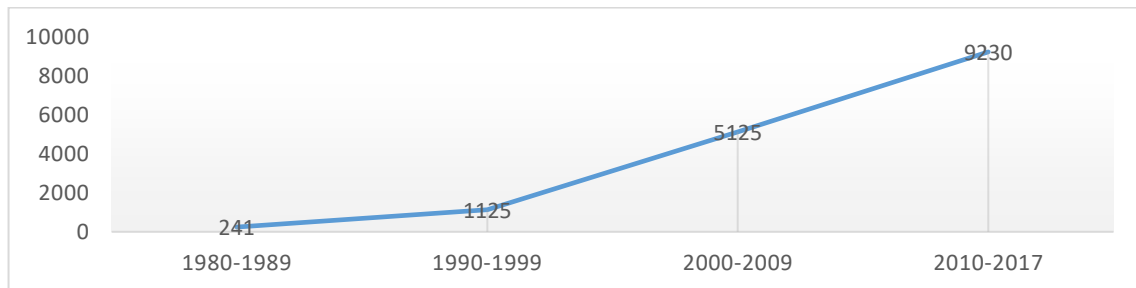
Figure 2. Number of Relevant Publications in Decades

As the number of research publications during the period of 2010 to 2017 is the largest and most recent, our further review of the papers was concentrated during this period and we altered the search setting to review the role of IT in KS and KT by using the search string as follows:

("knowledge base" OR "knowledge stock") AND ("knowledge transfer" OR "knowledge sharing" OR "knowledge flow") AND ("information technology")

A total of 1442 research articles was found from the four databases namely: IEEE Xplorer (1), ScienceDirect (625), Scopus (398) and Springer (418). Further screening of research articles is discussed next.

Screening for the Relevant Papers

The titles and abstracts of all the 1442 papers were inspected and the following criteria were applied to reduce the papers to 652. The exclusion criteria included removing the duplicate papers and the titles and abstracts that contained only one of the three topics among "KS", "KT" and "IT" and titles and abstracts that contained only "KS" and "KT" but no "IT".

The inclusion criteria used was articles having titles & abstracts that contained all three terms, i.e. "KS", "KT" and "IT" and titles and abstracts that contained either "KS" and "IT" or "KT" and "IT. For all the 652 papers, the methodology section of the papers were read and reviewed in detail. In this step, all the papers that discussed IT artefact from the perspective of the tool view of technology (Orlikowski and Iacono 2001) i.e. software, equipment or technique driving the process of KS identification and KT, were selected. We filtered down to 45 research articles after this step. 45 papers were further reviewed in detail to determine research activities surrounding the role of IT as a tool towards knowledge stock and transfer. Each paper was read thoroughly and was classified into different areas such as research disciplines, research methodology, knowledge types, publication types and country of publication. The details of classification and finding are described in the next section.

Finding and Classification of Studies

Each research article was classified based on the types of knowledge – tacit or explicit. It was found that IT helps to transfer predominantly explicit knowledge at the expense of tacit knowledge. In order to investigate research work specific to the Information Systems community, a literature search was conducted in the widely accepted top eight journals in IS (AIS 2018). 14 unique papers were subsequently added after applying the same search criteria as mentioned in Table 1 and using the search string as follows:

("knowledge base" OR "knowledge stock") AND ("knowledge transfer" OR "knowledge sharing" OR "knowledge flow") AND ("information technology")

Screening of papers were undertaken by applying the same inclusion/exclusion criteria as mentioned above.

Table 2 presents a classification of the studies based on their category, methodology, publication type and primary country of research (based on affiliation of the first author). Most of the studies naturally belonged to the KM discipline (39) but there were few in organisational performance (10) and innovation (5) among others. Maximum number of paper were review papers (23) and papers with quantitative data i.e. survey (23). There were minimum number of papers with qualitative data (13) and data from design and experiments (5). Significant number of publications were journals (50) and significant research was conducted in the Asia Pacific region (42%).

Table 2. Classification of Relevant Studies

Discipline		Methodology		Publication Type		Country	
Knowledge Management	39	Secondary research (Review Papers)	23	Journal	50	Asia	24
Organisational Performance	10	Quantitative study (mainly Survey)	23	Conference	9	Europe	20
Innovation	5	Qualitative study (mainly Interviews)	13			North America	14
Outsourcing partnership	3	Design & Experiments (e.g. Software tool)	5			Australia	1
Human Resource Management	1						
Education	1						

Data Extraction and Mapping Process

In this step, all 59 papers were studied in detail and the explicit relationship of IT in knowledge stock and knowledge transfer was identified. The final list of 59 papers was sourced from ScienceDirect (21), Scopus (19), Springer (4), IEEE Xplorer (1) and IS journals (14). Only 21 papers (35%) discussed tacit knowledge transfer enabled by IT tools. Based on our findings, we discuss its relevance to our research question to justify our future research next.

Discussion

There have been some significant research findings about the use of IT in transferring knowledge—64% of the studies highlighted the importance of IT in explicit knowledge transfer. Alavi and Leidner (2001) stated that knowledge should be made explicit with the help of IT before transferring. Use of social media can enhance knowledge transfer among people through the management of their knowledge stock and resources (Yates and Paquette 2011). It means that the knowledge stock of people can be managed by social media which helps in successful explicit knowledge transfer among them. Web-blogs are very important for facilitating voluntary knowledge transfer (explicit) in a virtual community (Wan et al. 2015).

The research conducted by Hurt et al. (2014) mentioned that students learn more easily when knowledge or information is transferred via digital medium. This means that explicit knowledge transfer using IT is very helpful for students in their learning process. There is a positive and strong relationship between IT and explicit knowledge transfer (Barcelo-Valenzuela et al. 2016). The research conducted by Mehta et al. (2014) stated that the frequent use of IT enhances explicit knowledge transfer which leads to project success in a software team.

To preserve the knowledge stock and information from employees, and for successful transfer via the Internet, an organisation developed a web-based KM tool which could capture knowledge and information from the employees (Lagos et al. 2013). This research also proved that IT is very useful in explicit knowledge transfer. Knowledge transfer among employees of an organisation can be promoted by motivating them to use mobile technology (Yuan et al. 2017). The research conducted by Fei (2011 revealed that IT has enabled the knowledge transfer among employees of a shipping industry. Majority of the studies which have been found demonstrate the important role of IT in explicit knowledge transfer.

Nevertheless, several studies have stated that IT can be relevant for tacit knowledge transfer as well (Panahi et al. 2016). Students also find it easier to share their knowledge among their friends using IT, i.e. tacit knowledge transfer among students has become easier with the use of IT (Stale 2013). It is difficult to transfer tacit knowledge during the outsourcing process of organisations. However, use of IT makes it easier and helps in identifying competencies of the contemporary colleagues (Teo and Bhattacherjee 2014). Organisations have used IT-based enterprise system (Jayawickrama et al. 2016), IT-based software tool (Alvarez et al. 2016), IT-enabled learning mechanism (Park et al. 2015). 2015), IT-enabled business models (Wu et al. 2013), semantic web platforms (Mezghani et al. 2016) and intranet-recommender systems (Lindgren et al. 2003) to capture skills and competencies of employees and to enable tacit knowledge transfer. We conclude that IT can enable tacit knowledge transfer by helping to identify knowledge stock of the workforce.

There is limited extant literature regarding the role of IT in knowledge transfer (both tacit and explicit) in general. Where IT has been considered as a key enabler for knowledge transfer, the research findings relate predominantly to explicit knowledge. Consequently, the role of IT in tacit knowledge transfer has not been investigated in depth. It is also found that while there is evidence of the importance of IT in knowledge transfer, the role of IT in identifying knowledge stock is under-researched. The need to conduct empirical research to measure the knowledge stock of people to enable tacit knowledge transfer is evident from our literature review. Based on this finding, we briefly present our future research plans and a conclusion to this paper next.

Future Work and Conclusion

The aim of this paper was to understand the role of IT as a tool in knowledge stock and transfer. A systematic mapping was conducted using four databases and the top eight IS journals to achieve the objective. The main preliminary finding reported in this work in progress paper justified that there is significant opportunity for IT-enabled tacit knowledge transfer. The research so far has also confirmed that IT can play a vital role in identification of knowledge stock for facilitating tacit knowledge transfer. Therefore, in the next stage of our research project, we are measuring the tacit knowledge of ICT employees in a large financial institution using a cloud-based tool that captures skills and competencies based on the Skills Framework for the Information Age (SFIA 2018). Our research is intended to be a part of the digital transformation journey of the organisation whereby an evaluation will be conducted to determine whether the identification of knowledge stock using a software tool enables tacit knowledge transfer.

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