The Role of Technological Factors in Knowledge Transfer in Transnational Projects

Fariba Shoeleh, Mahmoud Golabchi and Siamak Hajiyakhchali

***Abstract*— Nowadays, with the increase in the number of organizations each one in some way seeks to increase their competitive advantage to the extent possible than other competitors. One of the new approaches that organizations have implemented in the last decade is knowledge management, through which organizations try to reuse the experiences and knowledge created in their projects. Knowledge is a fast growing innovative and important research theme in the project management environment. Today, many projects are carried out by forces outside of its indigenous people, in which projects team come together from different countries with different nationalities and culture and thinking. The purpose of the present study is to design a conceptual framework of the technological factors affecting the knowledge transfer in transnational projects using meta-synthesis method. For this purpose, firstly the previous research has been studied and interpreted the factors that are effective in transferring knowledge from different sources and then analyzed with the coding of these factors.**

***Keywords*—knowledge transfer, technological factors, meta synthesis.**

I. INTRODUCTION

Today managers and organizations recognize that the most valuable asset is the human. So we can conclude that human is important due to their capabilities. The most valuable and exclusive asset by humans is the knowledge. Knowledge is now universally considered as a critical competitive asset.

Many organizations are implementing their business operations through projects [1] by definitions, projects are temporary organization, limited by a certain scope, and implemented within a certain amount of time [2]. Holzmann (2012) mentioned that another challenge is derived from the diversity of the project team, which often consists of members from different backgrounds, with various skills, who work together for the duration of the project and then disperse and reassemble in different teams [3]. In order to capture knowledge which create in different projects, project knowledge management is inevitable.

A number of studies lay emphasis on the acquisition and sharing of knowledge project so as to mitigate the risk [4] [5] [6] [7] .Although organization's projects are considered temporary, they are often viewed as efficient means of combining knowledge, and thus optimizing the amount of investment [8]. Given the above, the purpose of the present research is to identify and classify technological factors affecting transnational knowledge transfer in a comprehensive and coherent framework. To this end, a meta-synthesis method was used to compare, interpret, convert and combine various frameworks. This method discovers subjects and offers a new categorization by combining previous studies.

The paper is organized as follows: In the next section, the previous work on knowledge management and also transnational knowledge transfer are reviewed. Section 3 describes our research methodology. In Section 4, the data analysis and our proposed qualitative meta-synthesis procedure consisting of seven main steps is explained. Finally, the paper is concluded in Section 6 that lists and classifies all obtained effective factors and presents our comprehensive framework.

II. LITERATURE REVIEW

As the researches indicated, knowledge is the most influential factor in continuous innovation and success [9][10][11]. Knowledge management is a collection of processes that oversee the creation, propagation and leverage of knowledge to accomplish organizational objectives [12].

The nature of projects represents a definite end and start. It is an internal contract when signed and implemented within the borders of a country, but international and transnational term refers to parties to a contract traded beyond borders, or it is stipulated that the contract be executed beyond boundaries.

In this research, by transnational projects, we mean those projects where one of the main elements of the project is the host abroad, so project team is comprised of different nations with different languages and cultures who came together to achieve a single purpose. Mei et al. considered the competence, culture, resource, strategy, and organization relationship as the main influencing factors to analyze the project management knowledge transferring [45].

The process of knowledge management can be achieved between two organizations, from outside of an organization to the inside, or between internal departments of an organization, i.e. organizational units. Technical infrastructure plays a central role in intra-organizational knowledge transfer as it allows employees to codify, store and access knowledge [46]. If an organization is able to provide necessary infrastructures for knowledge transfer between organizational units, the way for attracting knowledge from outside of organization will be to a great extent provided. Given the review of the literature, it was

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revealed that the two concepts namely knowledge transfer and knowledge sharing encompass close definitions, inasmuch as they are even used interchangeably in some cases.

Technology has been recognized as an important enabler for managing knowledge and knowledge transfer in organizations. The use of technology has been associated with factors such as functionality, usability [13], "it takes too much time and effort" to contribute [9], structure of the platform [14], "interface design and user needs" [15] and consequently has been identified as a significant factor for employees' knowledge sharing [16].

Information technology is used on a broad level to heighten the level of cooperation among people and groups. Information technology has the potential of acquisition, storage, processing, retrieving, and transferring knowledge [18] and enables scientists to share their knowledge simultaneously despite geographical distance. Although communication channels help the creation, storage, and sharing of scientific knowledge, they are not considered the only factors required for knowledge sharing [11].

One of the most powerful forms of informal networks is the new ICT. They have the potential to eliminate significant barriers of communication. The barriers of time and space can be overcome as well as the organizational barriers due to hierarchy or departments. The influence of ICT in knowledge transfer has been investigated by many researchers (such as [18] [19] [20] [21]. In this context, Kwan and Cheung mentioned that the technological hardware is applicable for supporters of the knowledge transfer, because the efficacy of the transference of knowledge can be improved to increase the transfer and diminish the costs due to time and distance [22].

III. Research Methodology

The quality of a scientific research rests on research purpose, the choice of a good method, and observance of scientific research principles. The research method of this study is meta-synthesis. This method is used to identify the technological factors for transnational knowledge transfer in order to integrate several studies in order to design a comprehensive and interpretive framework.

Providing a systematic perspective for researchers through combining different studies, meta-synthesis explores new and fundamental themes. By doing so, it builds up the existing knowledge and comes up with a thorough perspective on issues. Sandelowski and Barroso proposed a seven-step method which is used in this research [23].

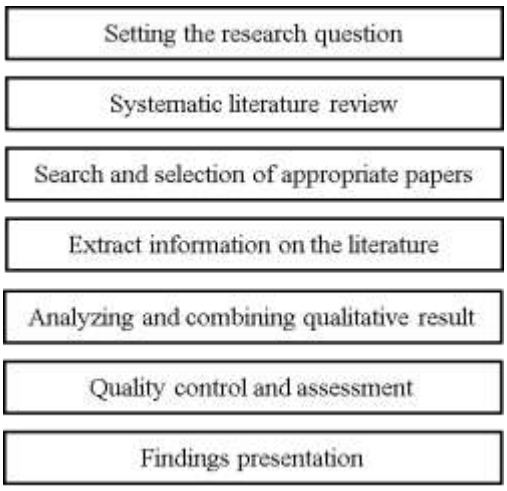

Fig 1: Meta-Synthesis Steps

IV. Meta Synthesis Procedure

In our meta-synthesis study, we followed the seven-step meta-ethnography approach proposed by Sandelowski and Barroso.

According to the stated questions, the research question to follow the next steps is as follows: What are the technological factors in knowledge transfer in transnational projects from 2002 to 2018? How can these factors be categorized?

After framing the qualitative meta-synthesis by determining the research questions, firstly relevant studies should be recognized and then those which are more relevant and useful should be decided to be included. To do so, a systematic search has been carried out to find the articles related to research question by selecting valid and relevant scientific journals and databases, as well as choosing the right keywords.

TABLE I: Relevant keywords

Keywords	Electronic Databases
Knowledge Transfer	Emerald
Knowledge Sharing	ScienceDirect (Elsevier)
Contextual Factors	IEEE
Projects	Springer
International	ProQuest
Transnational	Emerald

Fig. 2 illustrates the review process for selecting the Intended articles. After reviewing articles and rating them, 1 very good articles, 6 good articles and 17 moderate articles were evaluated. In this step, articles whose results are not usable or trustworthy will be deleted.

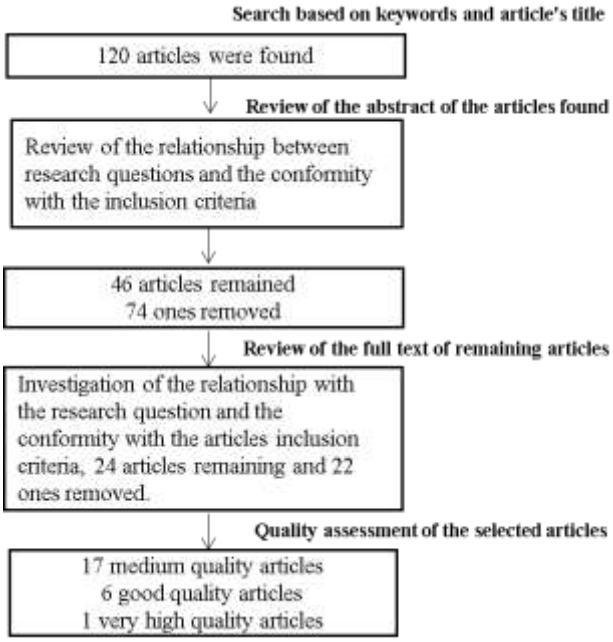

Fig 2: Review Process for Selecting the Intended Papers

The analysis and integration of findings in this research have been done through open coding. At first, we consider all the factors extracted from the studies as codes, then, by considering the meaning of each of these codes, we classify them in the same sense. In this way, we formulate research concepts. In Table 2, the factors are briefly shown.

TABLE II: THE CODES AND REFERENCES OF TECHNOLOGICAL FACTORS AFFECTING KNOWLEDGE TRANSFER

Concept	Codes	Recent References
Technological factors	Social networks	Inkpen and Tsang (2005)[24], Chiu et al. (2006)[25], Chow and Chan (2008)[26], Noorderhaven and Harzing (2009)[27], Wang and Noe (2010)[28] Vuori and Okkonen (2012)[9], Nooshinfard and Nemati-Anaraki (2012))[10].
	ICT	Schlegelmilch and Chini (2003)[29], Syed-Ikhsan and Rowland (2004)[30], Hasty et. al. (2006)[31], Adenfelt and Lagerstrom (2006)[32], Al-Alawi et. al. (2007)[33], Van den Hooff and Huysman (2009)[12], Frey et. al. (2009)[34], Gang and Bosen (2010)[35], Liang et. al. (2010)[36], Nooshinfard and Nemati-Anaraki (2012)[10], Gopal et. al. (2015)[37].
	Availability of ICT	Connelly and Kelloway (2003)[38], Yang and Chen (2007)[39], Dawes et. al. (2012)[40], Nooshinfard and Nemati-Anaraki (2012) [10]
	Training	Chow and Chan (2008)[26], Moskaliuk et. al. (2014)[41],
	Overload information	Sajeva (2007) [42], Paroutis and Al Saleh (2009)[43],
	Usability	Sajeva (2007) [42], Vuori and Okkonen (2012)[9], Lin (2007) [44]

V. CONCLUSION

Having completed the processes of meta-synthesis, a framework for technological factors affecting transfer of transnational knowledge consisting of two layers (criteria and factors) was developed; table 3 has shown these criteria.

TABLE III. THE BREAKDOWN STRUCTURE OF "TECHNOLOGICAL FACTORS AFFECTING KNOWLEDGE TRANSFER"

Concept	Codes	Issues
Technological factors	Social networks	Define the appropriate social networks for employees to use in the process of knowledge transfer
		Usability of programs and employee familiarity with updates and functionality of programs
	ICT	Availability of hardware and software infrastructures
		Strengthen the channels of transmission of knowledge and information in a user-friendly program
		Ability to easily import and extract information and knowledge from programs
	Availability of ICT	Ease of use for employees
		Ability to set access levels for different levels of organizations
	Training	Create workshops to learn how the program works
		Providing specialized films and animations of activities
	Overload information	The large volume of information available causes confusion in the acquisition and transfer of knowledge.
	Usability	The impact of the type of networks and software used for knowledge flow
		The presence of guidance and proper definition in different parts of the program

This study employs a meta-synthesis approach to compare and contrast factors affecting knowledge transfer in different/related projects. Meta-synthesis is a relatively new approach in synthesizing results of studies. Based on a systematic investigation of factors currently available in the literature, a common frame of reference for knowledge transfer development is developed and presented as a result.

To analyze the findings and better understanding of our research implications, our framework of factors affecting knowledge transfer is mapped in Figure 4.

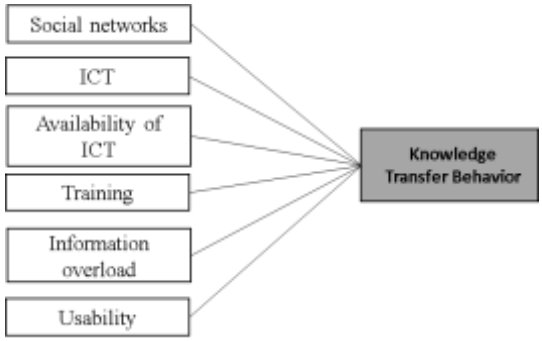

Fig 4. A framework of technological factors affecting knowledge transfer in transnational projects

Among studies done in this area, most of them dealt with a

limited number of influential factors and none provided a comprehensive list of influential factors under transnational project circumstances. One of the aspects of the difference between the present research and other related studies is the presentation of a thorough framework with factors other than transfer of transnational knowledge compared to previous studies.

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