Project Knowledge Management: A Survey

Fariba Shoeleh, Siamak Haji Yakhchali, Mahmoud Golabchi, and Nima Yazdani

Abstract— Knowledge management can be regarded as needed for entering to the era of knowledge. Today, along with the increasing advances in technology, stakeholders expect the projects to implement in a quick and better way. In addition, nowadays organizations consider the knowledge of staff as the most valuable asset, that would be probably lost if it will be neglected. Knowledge is a fast growing innovative and important research theme in the project management environment. In this paper the features of project knowledge management is described. The aim of this work is to provide an overview of the research regarding different issues of project knowledge management in project-based organization. It intends to map the existing body of knowledge, but also to identify and classify major theme of research.

Keywords—Knowledge, Project, Project Knowledge Management.

I. INTRODUCTION

ONE of the recent developments in the field of project within organizations is knowledge management. Nowadays managers and organizations recognize that the most valuable asset is the human. In other words 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. Bueno Campos (2009) indicate that in the era of knowledge, this resource is the most important productive factor that organizations must manage [1].

Many organizations are implementing their business operations through projects [2]. By definitions, projects are temporary organization, limited by a certain scope, and implemented within a certain amount of time [3]. 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 [4]. In order to capture knowledge which creates in different projects, project knowledge management is inevitable.

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The aim of the current paper is therefore to provide an overview of the research on different dimensions of knowledge management in projects environment. It intends to map various research of project knowledge management to identify and classify major theme of research. This study provides a survey on subject matter as researched, analyzed, and discussed during the last five years, thus contribute to the research community a platform for future studies .The premise of this paper is that a competent analysis of survey research in any domain opens a window on the thinking that the field has on itself.

The rest of the paper is organized as follows. Section II represents a brief history of knowledge management and project knowledge management. Section III presents the different dimension of project knowledge management and the following section provides classification of the reviewed articles. Section V contains new directions and open question which exist within the subject matter and conclusion. The paper concludes with a summary and a discussion if the research limitations.

II. A BRIEF HISTORY OF KNOWLEDGE MANAGEMENT

Knowledge can be defined as a "justified personal belief." There are different definitions for knowledge in recent research. There is no specific definition of knowledge but for developing a new approach for knowledge, we must first know what knowledge is. In knowledge management literature, it has been established that distinguishing between data, information, and knowledge is important to designing knowledge management programs[5]. However, Davenport and Prusak [6] state that "knowledge derives from information as information derives from data" and further define knowledge as "a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information." In their perspective, knowledge is the refined information, in which human cognition has added value.

Nonaka and Takeuchi [7] differentiates knowledge as tacit knowledge and explicit knowledge to understand how knowledge is shaped and how knowledge can be applied. Fig. 1 shows concepts of which knowledge comes from.
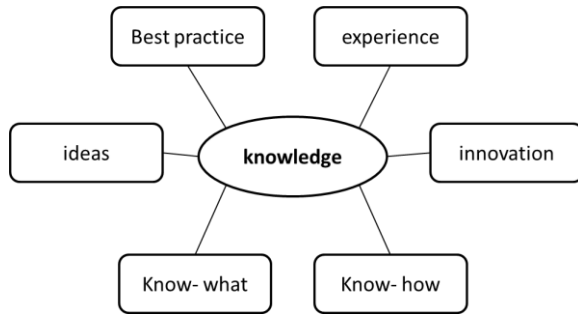
Fig. 1 Concepts of Knowledge

In order to systematize the area of project knowledge management, we first have to understand the main approaches to the definitions of knowledge management. These definitions can be divided into two main categories; the first group focuses on processing the single knowledge element and enumerates functions of its life cycle and the other one definitions and characteristics focuses on the whole knowledge possessed by individuals and organizations and the benefits of its application [8].

Some of the definitions may be mentioned here:

- Knowledge management is a process of systematically and actively identifying, activating, replicating, storing, and transferring knowledge [9].
- The processes of knowledge management include knowledge identification, creation, acquisition, transfer, sharing, and exploitation [10].
- Knowledge management scope is about the generation, communication, transformation, and application of knowledge that is sufficient unto the reasoned action in situated contexts in which individuals and organizations find themselves [11].
- The challenge of knowledge management is how to generate and leverage collective knowledge in the firm to create value that leads to competitive advantage [12].
- Knowledge management is a systematic approach to managing and leveraging an organization's knowledge assets, which may include knowledge of the organization's customers, products, market, processes, finances, and personal services [13].
- Knowledge management refers to the developing body of methods, tools, techniques, and values through which organizations can acquire, develop, measure, distribute, and provide a return on their intellectual assets [14].

Although projects are considered temporary organizations, they are often regarded as an efficient means for combining knowledge and thereby optimizing value from investments [15]. If most or all business activities of an organization are carried out in the form of projects, these organizations are referred to as project-based organizations [16]. Numerous studies of project-based organizations have been conducted to identify barriers and enablers for learning from projects [4][17][18][19].

There have been several KM life cycle models that illustrate the key aspect of KM, ranging from Davenport and Prusaks [6] 3-stage model ("generate, codify/coordinate, transfer") to Ward and Aurum [15] 7-stage ("create, acquire, identify, adapt, organize, distribute, apply"). Moreover, similar models have been presented by other researchers such as McElroy [16], Alavi and Leidner [17], Meehan and Richardson [18], Edwards, Chang Lee et al. [19] and Williams [20]. More recently, King et al. [21] proposed 8-stage model- Creation, Acquisition, Refinement, storage, Transfer, sharing, Utilization, organization performance which covers all aspects of knowledge management. Fig.2. shows the framework and its different steps.
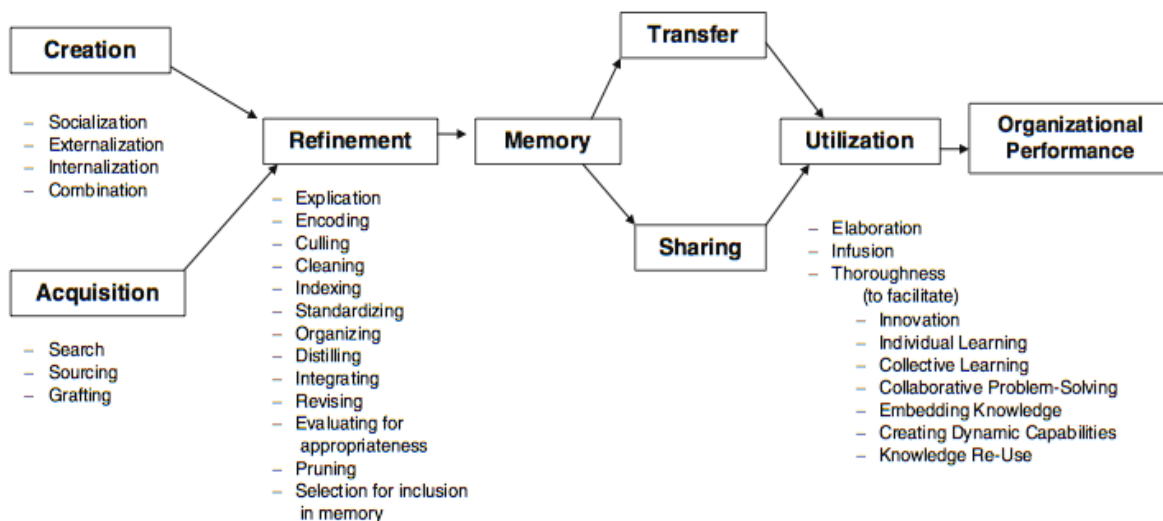

Fig. 2 Knowledge Management cycle [21]

Project Knowledge Management (PKM) is a management of knowledge in project situations and thus, the link between the principles of KM and PM [22]. KM and PM components are very similar. PM components include system, people and tools and KM components include people, technology and organizational factors [23]. As components are analogous this allows for components from both disciplines to be placed on top of each other, so they can merge and work in conjunction with each other as shown by Fig. 3 [24].
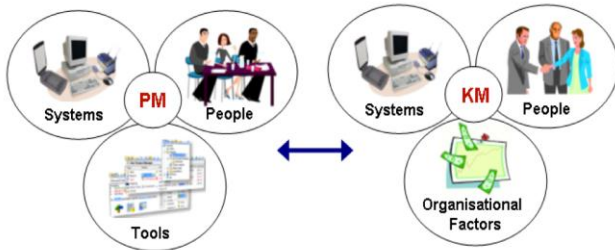

Fig. 3 Knowledge Management and Project Management Components

The ability to manage knowledge on projects includes the capacity to create, absorb and share project-related information, which is a big part of organization's culture. Using gained knowledge to learn from the failures and successes in previous projects is vital for long-term sustainability and competitiveness of the organization.

III. DIMENSIONS OF PROJECT KNOWLEDGE MANAGEMENT

There are different areas in knowledge management which related to project environment. Researchers have investigated these areas in recent rive years. These areas are shown by Figure 4.
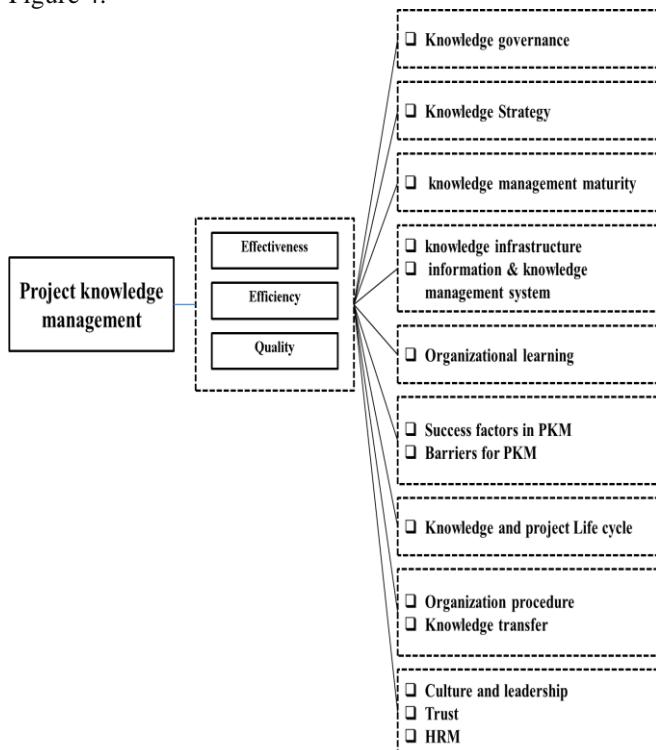

Fig. 4 Categorizing project knowledge management

This article reviews recent research in the fields of project knowledge management and for this purpose has been reviewed journal articles in the past five years to suggest insights regarding future research directions in this field.

These areas consist of: knowledge governance, knowledge strategy, knowledge management maturity model, knowledge infrastructure, knowledge transfer and share, knowledge life cycle, organizational learning, culture and leadership, success factors in PKM.

IV. CATEGORIZING RECENT RESEARCH IN PROJECT KNOWLEDGE MANAGEMENT

According to the researches in last 5 years, there are different areas of project knowledge management. Table 1 demonstrates research in each area and the year and authors.

Table 1 shown recent research in project knowledge management. It demonstrates that in which areas more study have been done. So according to the findings and the number of research in each area we can prioritize issues that require future research.

Nowadays, knowledge is shared between geographically dispersed individuals and organizations, and across cultural and national boundaries. Therefore, understanding how knowledge can be transferred from one organization or sub-unit to another is extremely important, Knowledge Transfer (KT) is one of the most stages in knowledge management, but is considered to be laborious and time consuming to achieve effectively.

For more than a decade, learning from projects has received much attention in practice and research. Driven by the intention to improve the performance of project-based organizations (e.g. in construction, aerospace, motion pictures) numerous studies have been conducted to identify barriers and enablers for learning from projects.

The different approach of learning appears to be very attractive for the learning between projects, since projects seem to form distinctive entities of temporary nature and with organizational boundaries, which make the transfer of lessons learned between them necessary and plausible.
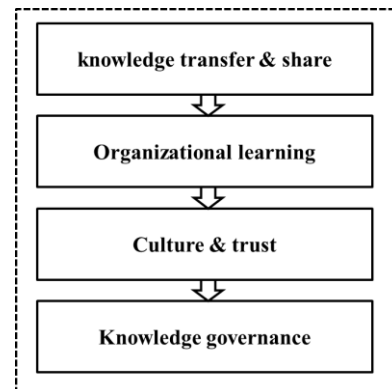

Fig. 5 Prioritizing the issues of project knowledge management.

TABLE I
PROJECT KNOWLEDGE MANAGEMENT RESEARCHES

Organizational Culture	Author(s) and year
Cultural impacts on knowledge management and learning in project-based firms	Mian M.et al. 2009 [26]
Impact of cultural differences on knowledge management in global projects	Vittal S. Anantatmula,2010 [27]
Organizational culture and willingness to share knowledge: A competing values perspective in Australian context	Wiewiora et al.,2012 [28]
Knowledge Governance	
A conceptualization of knowledge governance in project-based organizations	Sofia Pemsel et al., 2014 [29]
In the right place at the right time!: the influence of knowledge governance tools on knowledge transfer and utilization in MNEs	Ulf Andersson et al., 2015[30]
The governance of knowledge in project-based organizations	Pemsel and Müller, 2012[31]
Knowledge Management Maturity	
Measurement of knowledge management maturity level within organizations	Khatibian et al.,2010 [32]
Project and Knowledge Life Cycle	
implementing knowledge life cycle in the body of project life cycle by using knowledge management system (KLC in PLC)	Sadat and Ashraf,2010 [33]
Knowledge Infrastructure	
Role of knowledge infrastructure capabilities in knowledge management	Pandey and Dutta,2013 [34]
Knowledge Impacts On Performance	
How knowledge management impacts performance in projects: An empirical study	Horner Reich et al.,2013 [35]
The moderating effect of human resource management practices on the relationship between knowledge absorptive capacity and project performance in project-oriented companies	Popaitoon and Siengthai,2014 [36]
Knowledge leadership to improve project and organizational performance	Yang et al.,2013 [37]
Organizational Learning	
Developing a systemic lessons learned knowledge model for organizational learning through projects	Duffield and Whitty,2014 [38]
Systematizing knowledge management in projects	Davidson and Rowe, 2010 [39]
Learning in project-based organizations: The role of project teams' social capital for overcoming barriers to	Bartsch, et al.2012 [40]
Sourcing knowledge for innovation: knowledge reuse and creation in project teams	Khedhaouria and Jamal,2015 [41]
Learning between projects: More than sending messages in bottles	Hartmann and Doree,2014[42]
Success Factor In PKM	
Project success analysis framework: A knowledge-based approach in project management	Todorović et al., 2014 [43]
Success factors of knowledge management in temporary organizations	Lindner and Wald, 2010 [44]
Knowledge Transfer and Sharing	
Exploration and exploitation in project-based organizations:	Eriksson, 2010 [45]
Exploring the performance of transnational projects:	Adenfelt, 2009 [46]
How to apply the Systemic Lessons Learned Knowledge model to wire an organization for the capability of storytelling	Duffield and Whitty,2015 [47]
Knowledge development and transfer in a mindful project-organization	Andersen and Hanstad, 2013 [48]
Knowledge sharing in information systems development projects: Explicating the role of dependence and trust	Park and lee, 2013 [49]
Knowledge transfer in project-based organizations: a meta-analysis of the Current issues	Bigabwa et al., 2015 [50]
A decision tree conceptualization of choice of knowledge transfer mechanism:	Jasimuddin et al.,2013 [51]
Transferring knowledge about knowledge management: Implementation of a complex organizational change program	Pollack, 2012 [52]
Knowledge transfer frameworks: an extension incorporating knowledge repositories and knowledge administration	Jasimuddin et al.,2012 [53]
Formal and Informal Practices of Knowledge Sharing Between Project Teams and Enacted Cultural Characteristics	Mueller et al.,2015
Information and Knowledge Management System	
A Model of Project Knowledge Management	Gasik et al., 2012 [8]

Because knowledge is largely people-based, the cultural characteristics of different groups of people play a key role in successful KM.

V. CONCLUSION

The current study surveyed the existing body of knowledge in the field of project knowledge management. It offers an investigation into diverse levels of literature analysis, including journal and year of publication, sector, and region of study. It reviews developing areas of interest and suggests insights regarding future research directions in this field, hence presenting a comprehensive set of concepts, terms and activities that make up this professional domain.

Overall, reviewing and analyzing a recent research on the subject of project knowledge management, yielded a valuable understanding of this developing topic. The paper provides a platform for future research by highlighting interesting issues and demonstrating the recent trends in the subject.

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