Article

Conceptual Framework of Dynamic Scrum Model and Knowledge Management for Software Product Management

Boraq Ahmad Ammourah[1,a], Sakinah Ali Pitchay[1,b, 2]

[1]*Faculty of Science and Technology, Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia*
E-mail: [a]mr.boraq@gmail.com, [b]sakinah.ali@usim.edu.my

[2]*Cybersecurity and Systems Research Unit, Islamic Science Institute, Universiti Sains Islam Malaysia (USIM), Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia*
E-mail: sakinah.ali@usim.edu.my

Abstract— **Software development methodologies and knowledge management (KM) are a dynamic part of core challenge of the organization in order to deliver on time with less effort and efficient software product. Scrum model is widely known as one of the best common software development methodologies and this paper has conducted a survey on how to transfer the knowledge between team members. Moreover, the Scrum model relies on daily stand-up meeting or daily scrum meeting for capture and share knowledge. Thus, this paper investigates Scrum model and knowledge management process on how to improve the proficiency of knowledge sharing among the software practitioners with less time and effort. It also proposes a conceptual framework where it stores and retrieves the tacit knowledge via Scrum model for software product management. This proposed conceptual framework is used to store and retrieve the tacit knowledge via Scrum process for software product management to save a time consuming and effort.**

Keywords— **Scrum model; Knowledge Management (KM); Knowledge management strategies.**

I. INTRODUCTION

Software knowledge improvement is stored in documents, process, practices, technologies, and project artifacts. In conventional methods the software's practitioners using documents, while in Scrum model being more dynamic process to support working software. In Scrum model, it deals with tacit knowledge while conventional methods, deals with explicit knowledge because it is easier to deal with [1]. The core challenges tackled by software practitioners in the organization to extract tacit knowledge that stored in the minds of people, skills, experience, and applied at the right time and place when needed, hence to inspire the process improvement. Agile methodologies have integral practices that smooth communication of experiences and share knowledge inside the firms [2]. Scrum model is a practice that has solutions and aspect overwhelming the challenges faced in KM. In Scrum model, software practitioners work together at one sprint in same backlogs. The standup meeting of every sprint provides a friendly environment that supports knowledge sharing and transfer [2]-[3]. Furthermore, standup meeting, which is a more effective way of producing backlogs to share and transfer tacit knowledge than looking for knowledge in some documents or serve in the database.

II. RELATED WORKS

Software practitioners lean towards not to document contextual knowledge, and public means of knowledge created over software development for many reasons, such as taking time to extract the knowledge and being inappropriate knowledge [4]. To make sure that knowledge shared among the team is valued to the entire team, even though scrum model is a perfect knowledge management strategy by itself, it would be valuable to capture and store knowledge. There are many software managing knowledge frameworks for managing the knowledge generated, especially while using conventional methodologies. The work in [4] proposed a framework for KM support, which includes how the knowledge is controlled and valued in software process.

A KM system overview comprises seven layers, which starts at the interface, then to access, until repositories the knowledge [5]. This framework contains three main components: knowledge sharing methods, organizational level and key enablers [6]. Many researchers have studied the impact of the Scrum model on factors such as organizational factors, team environment, and management commitment. Process factors, like project management. Technical factors like software development techniques and delivery strategy project factors like project type and project nature [7]-[8]. Only less research bearing in mind the Scrum model as KM factor has been accepted. Moreover, to have a specific framework that assimilates tools and methods for addressing the tacit knowledge generated during the Scrum model has been suggested [9].

A. Knowledge Management Process

KM as a set of processes that seeks to change and improve the organization process [10]. According to [11], the strategies for KM are as follow:

- *Codification:* It is used to systematize and store information that represents the knowledge of the company and makes this available for the people in the company.
- *Personalization:* It is used to support the flow of information in a company for storing information as well as knowledge sources.

KM requires efficient effort between the software practitioners [7]. For instance, communities of practice are groups of dynamic people who face common challenges in organization to do knowledge management more effectively. Moreover, these groups of people are willing to share amongst each other what more effective of knowledge can use [12].

B. The Core Challenges of Scrum Model and KM

Software practitioners faced several problems arise in explicit documentation of knowledge [12]. Experts find themselves spending much time in repeatedly answering the same questions. Development teams face problem same as the previous problem, but they did not remember. Less influence on organizational knowledge. Knowledge lost while one of the team members left the company. The core challenges of KM in the Scrum model are how to deal with knowledge and transfer or share to implicit knowledge to explicit knowledge, other than to transfer explicit knowledge from individuals to groups within the organization [5]. Once created, the new knowledge must immediately be stored in a repository.

The Scrum model consists of daily standup meeting for almost 15 minutes for each sprint to share knowledge of each product backlogs, in the meeting, each member must be confident for specific capture and share the knowledge, thus there are three basic questions raised at the beginning of the meeting.

- What did you do yesterday?
- What will you do today?
- Are there any impediments in your way?

III. CONCEPTUAL FRAMEWORK FOR CAPTURING KNOWLEDGE

To propose a framework, a few requirements need to be considered and welfares of capture the knowledge [13]:

- Capture the knowledge from the intercommunication friendly among the team that can subscribe to organizational knowledge.
- Expertise can share their knowledge to create and help a clear working environment other teams in firms.
- Make sure the storing knowledge can be reused.

This paper presents a conceptual framework for capturing and sharing the knowledge generated, while using the Scrum model, and how to deal with the knowledge among the team as shown in Figure 1. The method enables a continuous improvement of organizational culture process to capture and share knowledge firms. This framework merges the tools such as emails and social networks, to efficiently capturing, storing and spreading knowledge. The conceptual framework assists a friendly system of knowledge sharing. Meanwhile, daily Scrum meeting along the high tech of social networks helps software practitioners working smoothly towards sharing the knowledge. The conceptual framework affords the software practitioners with a set of tools that helps to capture the knowledge. The knowledge map aids to store any knowledge strongly related to software product information exactly the same as the product backlog list yellow notes or TO-DO lists. Moreover, knowledge that are shared and captured on a specific forum, must have a knowledge repository and a knowledge map to store the knowledge, so that the knowledge can be retrieved efficiently and easily.
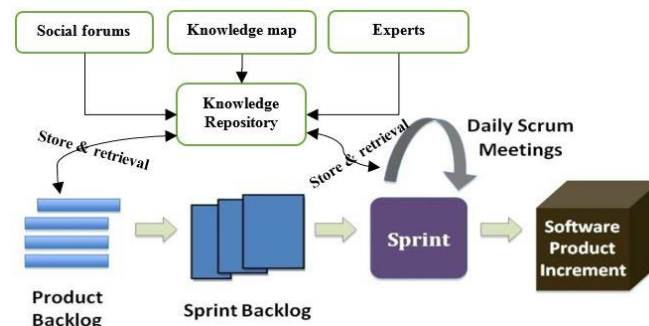

Fig. 1 Conceptual framework of the Scrum model along with managing the knowledge

IV. CONCLUSION

In summary, Scrum model and KM are a dynamic part of the software product. Certainly, the aim of this research is to study the integration of Scrum model and KM which give a right solution and face the challenge when having the impediment in any stage of the software process. Moreover, Scrum model and KM in software product management have been accredited by several researchers. This proposed conceptual framework is used to store and retrieve the tacit knowledge via Scrum model for software product management to save a time consuming and effort.

ACKNOWLEDGEMENT

REFERENCES

[1] A. Harrison, and Q. Hu, "Knowledge transfer within organizations: A social network perspective," in *Proc. HICSS'12,* 2012, pp. 3766–3775.

[2] Arora A., and Chauhan N., "Simplest Agile life cycle for all stakeholders," in *Proc. CONSEG'13,* 2013, pp. 85-90.

[3] A. Singh, K. Singh, and N. Sharma, "Agile knowledge management: A survey of Indian perception," *Innovations in Systems and Software Engineering,* vol. 10, pp. 297–315, 2014.

[4] P. L. Bannerman, E. Hossain, and R. Jeffery, "Scrum practice mitigation of global software development coordination challenges: A distinctive advantage," in *Proc. HICSS'14*, 2014, pp. 5309-5318.

[5] B. V. D. Carvalhoa, C. Henrique, and C. H. P. Mello, "Scrum Agile product development method- literature review, analysis and classification," *Product: Management and Development,* vol. 9, pp. 39-49, June 2011.

[6] C. G. Jardirsky, "Tacit knowledge sharing in distributed Agile software development teams," MBA thesis, University of Surrey, England, United Kingdom, September 2014.

[7] H. F. Cervone, "Understanding Agile project management methods using Scrum," *OCLC Systems & Services*, vol. 27(1), pp. 18-22, 2011.

[8] M. Firestone, and W. McElroy, "Doing knowledge management," *The Learning Organization Journal*, vol. 12(2), pp. 189-212, 2005.

[9] E. Hossain, P. L. Bannerman, and D. R. Jeffery, "Scrum practices in global software development: A research framework," in *Proc. PROFES'11,* 2011, pp. 88-102.

[10] J-N. Lee, "The impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success," *Information and Management,* vol. 38(5), pp. 323–335, 2001.

[11] J. Sutherland, and K. Schwaber. (2018) The Definitive Guide to SCRUM: The rules of the game. [Online]. Available: http://www.scrum.org/Scrum-Guides

[12] K. D. Joshi, and S. Sarker, "Knowledge transfer among face-to-face information systems development team members: Examining the role of knowledge, source, and relational context," in *Proc. HICSS'04,* 2004, p. 11.

[13] R. K. Kavitha, and M. S. Irfan Ahmed. "A knowledge management framework for Agile software development teams" in *PACC'11*, 2011, pp. 1-5.