

# Implementing Knowledge Management Systems in Software Engineering: Opportunities and Challenges

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**Abstract**—Knowledge Management Systems are the technological infrastructure that allows an effective usage of knowledge within an organization. In a context of an experience of an implementation of a KMS in a Software Engineering organization, this paper synthesizes the challenges and the opportunities related to such an initiative.

**Keywords:** *Software Engineering, Knowledge Management Systems, KMS, Challenges, Opportunities*

## I. INTRODUCTION

During the software engineering (SE) activities, collaborators and developers produce and consume knowledge. Organizations have problems keeping track of what this knowledge is, where it is, and who owns it.

Knowledge Management (KM) is a method that simplifies sharing, distributing, creating, and capturing the company's knowledge [1]. KM relies on an infrastructure called Knowledge Management System (KMS) [2].

A good implementation of KM in software engineering requires putting a robust KMS infrastructure in place, which is not an easy task. SE has his own specificities that can hamper or encourage the KMS implementation.

Our laboratory has initiated a project of implementing a KMS in a SE organization [3]. As a synthesis, this paper summarizes the challenges and the opportunities that have to be considered in any similar project.

## II. CHALLENGES

Some factors could be real challenges when it is about the implementation of KMS in a SE organization:

1) SE is a vast domain: Building a conceptualization that targets such a domain is a real obstacle as it needs estimable efforts of development and validation.

2) Convince software engineers to use the KMS: because of the overloaded schedules of collaborators, it is very difficult to convince collaborators to consecrate some time to share knowledge and to use the KMS.

3) The KMS impacts are difficult to measure: Developing metrics that measures the impacts of the KMS is hard [4] and consequently, the ROI is difficult to estimate.

4) Technology-related knowledge obsolescence: The KMS should provide the mechanisms that ensure that the accessed knowledge is still up-to-date to make it useful to the current projects.

5) The KMS integration: The integration of the KMS with existing CASE tools is not an easy task.

6) The KMS should support software processes: The KMS should be capable of supporting SE processes and activities.

## III. OPPORTUNITIES

SE has some specificities that can encourage a successful KMS implementation:

1) An important part of SE knowledge is in electronic format: Fortunately, in SE a considerable amount of the knowledge assets are formal. These assets can be documents, plans, reports or source code files

2) The SE environment is a KMS-friendly environment: Most of middle-sized and large-sized development companies do have the adequate environment (software and hardware) to host the KMS.

3) Many CASE tools are extensible: In SE, many of the CASE tools have an extensible architecture that allows the integration of third-party plugins. This open architecture permits the easy integration of the tools with the KMS.

4) Research is converging to a SE ontology: To address the conceptualization challenge, some separate works that address developing ontologies for SE can be found in the literature [5] and used in KMS implementation projects.

5) The knowledge sharing culture is well-established in the SE community: some tools and practices in SE do encourage the sharing culture: source repositories, intranet documents ...etc.

## IV. CONCLUSION

Implementing a KMS in a SE organization is not an easy task. On the basis of a previous work in this domain, we listed some challenges that could be obstacles to such a project. Fortunately, the SE is not only characterized by barriers, we pointed in this papers some opportunities that could be the foundation of success of KMS implementation.

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