The success of corporate wiki systems: An end user perspective

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ABSTRACT
With the ever increasing use of Web 2.0 sites on the internet, the use of Web 2.0 based tools is now employed by organizations across the globe. One of the most widely used Web 2.0 tools in organizations is wiki technology, particularly in project management. It is important for organizations to measure the success of their wiki system implementation. With the advent of new technologies in the market and their deployment by the firms, it is necessary to investigate how they can help organizations execute processes in a better way. In this paper we present a theoretical model for the measurement of corporate wikis' success from the end-user's perspective based on the theoretical foundation of DeLone & McLean's IS success model [17]. We extend the model by incorporating contextual factors with respect to wiki technology in a project management task. This study intends to help firms to understand in a better way, how they can use wikis to achieve an efficient, effective and improved end-user performance. This would also be helpful for companies engaged in wiki development business to improve their products keeping in view the perceptions of wiki end-users.

Categories and Subject Descriptors
K.4.3 [**Organizational Impact**]: Computer Supported Collaborative Work

General Terms
Management, Performance, Theory, Measurement

Keywords
Wikis, Group tasks, Collaboration, Project Management, Web 2.0, End-User Performance, Workplace collaboration, IS success

1. INTRODUCTION
Since the advent of Web 2.0, the socio-technological change it brought has initiated a new way for people to interact, share, and collaborate. Web 2.0 refers to a range of web-based tools that allow users to collaborate and share information. The users of World Wide Web (www) are now increasingly active contributors of content rather than just an audience [72]. Web 2.0 applications play an important role in providing user services, enabling knowledge control, and empowering their end-users [86]. Shang et al. [86] argue that, contrary to the traditional web, Web 2.0 provides a platform where users can find, use, and save different forms of data on the Internet. Tredinnick [93] argues that Web 2.0 transfers the control of information flow from the web administrators to the users of websites and thus changes the architecture of the information systems (IS). This participatory nature of Web 2.0 generates huge amounts of information from the users and can create a 'feeling of community belongingness', empowerment and ownership [3].

One of the applications of Web 2.0 tools is "wiki" technology for collaborative authoring. The primary reason of creating wikis is to provide collaboration among its users. In projects environment majority of the times collaborative authoring is a part of a project. In such scenarios, wikis are very suitable since they can be easily configured and edited with easy-to-use commands. In organizational context, wikis can provide a mechanism for teams and project members to actively share information but there is a need to address how we can evaluate the success of wiki systems in corporate context. This area of IS research needs to be explored that how can web 2.0 tools, specifically wiki technology helps end-users increase their individual performance. As a tool deployed for collaboration among the employees and capturing their knowledge, wikis may yield benefits for their end-users. Therefore, answering the question of measuring wiki success involves the perception of the wiki technology from the end-user's point of view.

As put by DeLone & McLean [17], "*The measurement of Information System (IS) success or effectiveness is critical to our understanding of the value and efficacy of IS management actions and IS investments*" (p. 10). However, the multidimensional nature of IS performance often forces researchers to focus on the point of view of a certain party to model multiple facets of IS [85]. The improvement of business processes can be judged by knowing if the end-users' efficiency and skills have improved, as they are the ones actually using the technology deployed. In this context, the evaluation of the performance of organizational IS becomes an ideal solution for the recognition of skills of the staff and improvement in performance of work. This leads us to the evaluation of the organizational IS from end-user's perspective in terms of his/her work performance improvement with IS use. The choice of end-users for wiki evaluation is motivated by the fact

WikiSym'11, October 3–5, 2011, Mountain View, California, USA.

that users belonging to different organizational units are best positioned to assess the performance of IS and its output quality.

Even though a wide range of Web 2.0 tools exist, wikis are one of the most important and most commonly used Web 2.0 tools especially in the enterprise setting, since organizations need to take advantage of the knowledge retained by their workers and wikis make the best possible use of it. One other reason for their widespread use is their unique ability to support multipurpose usage. Although a lot of research [95,104] has been carried out on the wiki based consumer websites such as Wikipedia and other wiki based public sites, there is not much research on the use of 'wikis in organizations' [41]. Despite the popularity of wiki use in enterprise context, research on corporate wikis is still in its infancy [100]. Web 2.0 applications on the World Wide Web have been widely recognized as the future of knowledge sharing and collaboration, yet critical investigations of their role in organizational knowledge sharing and collaboration are limited [10]. Therefore, there is a need to address and explore the implementation of wiki technology in organizational context and how things have evolved since the introduction of wikis in a corporate setting.

2. THE WIKI WAY – INDIVIDUAL VS. GROUP TASKS

While traditional IT systems were used in organizations for project management and problem solving tasks, specific project managers were responsible for the execution of events and gathering knowledge on projects. This has been a bottleneck in the rapid execution of tasks and the efficient dissemination of information to other project members. Traditional IS also lack the ability to actively involve the project members and register their inputs on the project or timely updating of their tasks.

Local intranets in organizations are based on the structure of traditional Internet but are limited to the employees of the corresponding firm. Intranet is basically a knowledge management system, functioning on traditional internet structure, that is, taken care by specific administrators and information is updated by intranet administrators. The basic purpose of an intranet is to store, archive and share information; however, Buffa [9] argues that intranets lack in their ability to capture knowledge and make it readily accessible to the end-users due to their in-efficient search mechanism [1]. Thus, information is difficult to be searched on intranets and since only administrators can upload content, it results in out-dated knowledge. In contrast, wikis provide a live system where information can be updated by anyone working on live documents and enable an easy and efficient search mechanism.

Similarly, email has been a main collaboration tool in organizations for quite some time [91]. Researchers have also found that email is one of the most widely used tools among a variety of other collaboration tools used in organizations [87]. As knowledge management continues to be one of the most important issues in enterprise context, especially in knowledge intensive firms, the lack of specific functionalities in e-mail to support project management tasks have been exposed [4]. For instance, while used in project management, emails eventually create a number of different files that are distributed among a number of people, which makes it difficult to keep track of the recent files and their search-ability. This required management to consider other collaboration tools for documentations. Companies have been looking to resolve this issue. Recently, a lot of companies have embraced the power of collaboration unleashed by Web 2.0 tools in the workplace, such as IBM, SAP etc.

As Web 2.0 technologies move into organizations, IS managers need to be cautious in balancing user control and freedom so as to successfully deploy these technologies [31]. Using Web 2.0 social tools, knowledge management and employee learning can be incorporated for more effective knowledge sharing within an organization. Knowledge management (KM) benefits an organization by emphasizing into the intellectual capital of its workers [51]. Because of the novelty of Web 2.0 technologies, knowledge about their to the end-users and their successful implementation is very little [75]. To enhance collaboration and information sharing among users, organizations must recognize and promote user participation [64].

One of the collaboration tools that enable open collaboration and knowledge sharing in firms is wiki technology. According to Hasan and Pfaff, [38], organizations had an issue in the acquisition of knowledge in that intranets and email did not provide the functionalities needed to capture the knowledge of the employees. Wagner [101] argues that there was always a lag between creating and sharing of knowledge in the organization; moreover, obsolete and inaccurate information was likely to dominate the knowledge base of the firms.

Apart from e-mail and intranets, the introduction of wikis in the workplace to perform project tasks, which were done individually in the past, has dramatically changed the way of project management to build a more sophisticated approach, which involves everyone who is the part of the task. Everyone stays updated to the on-going activities of firm. This in turn has reduced the mess of unnecessary meetings, calls and tedious emails eventually saving time which can be utilized in a more productive manner at the workplace [5]. The new upcoming Web 2.0 tools usage in group problem solving tasks need to be adapted by the firms as it involves knowledge sharing among the teams. Lee et al. [56] emphasize on the importance of collaborative technologies usage in knowledge embedded work in organizations, in order to deploy a greater degree of participation and collaboration.

Growing number of organizations are installing wikis [42] in order to provide their employees with a quick and easy way to share information in a collaborative way. The different nature of tasks in organizations makes the nature of use of wikis to be multipurpose rather than just consisting of articles and discussions [6]. According to Majchrzak, Wagner & Yates [62], wiki activities include technical documentations, issues tracking, and reference information in software development as well as collection of ideas, meeting agendas and status reports in project management. Neus & Scherf [70] characterize wikis as 'ultra-lightweight' content management systems while according to Sofia & Soares [88], due to the flexible nature of wikis, they offer a range of possible applications, for instance, a database for research and writing, as personal information manager, and as collaborative tool among teams to create and maintain documents that need frequent updating, etc. Another view is by Sauer et al. [83], to whom wikis are a method of managing knowledge due to their collaborative nature that helps in continuous communication within teams and a gradual evolution of content. Payne (2008) argues that wikis help newly hired employees to know what had been happening in the organization/project before their arrival and provides a mechanism for the leaving employees to document their knowledge easily. Poole & Grudin [80] define the different genres of the Wikis in an enterprise setting. They propose that

there are three types of enterprise wikis which they named as, "*single contributor wikis*", "*group or team wikis*", and "*inter-use encyclopedias".* The single contributor wikis are those that are managed by a single person for his/her personal use. Group wikis or project wikis are used for project documentations, communications etc and are most widely used, and lastly, the pedias which are used to store company wide information [80].

In KM, a conventional approach is having the knowledge within the organization collected in a centralized database. On the other hand, "conversational" knowledge management focuses on the knowledge residing with the individuals or knowledge workers and integrating this knowledge in the work process [56]. As far as wikis are concerned, they invite individual members working on similar tasks and problems to create collaborative databases for sharing ideas, information, and solutions. There is a possibility of creating a more extensive database as more members use the wiki to share information that could result in generating more ideas, up-to-date information and comprehensive documents. This addresses the "long tail" phenomenon as argued by McAfee [64] that Web 2.0 tools enable 80 percent of users to participate in knowledge creation that was done by 20 percent of the users before their introduction, thus leveraging the long tail. Therefore, wikis enable groups to ensure the "collective intelligence" in the sense that wikis gather information that has been built by the users of a particular group working towards the same problem. From the managerial perspective, wikis provide a platform for the teams to actively share on the project and take part in the project management process. This can ensure rapid execution of tasks and keeps everyone updated on the recent project status. Furthermore, group problem solving and group decision making processes are invoked using wikis in corporate contexts.

Since project management or problem solving in organizations are more of group tasks than an individual approach, a solution that support group tasks effectively is needed in firms. The solution to tackle this group approach has been addressed by the Web 2.0 tools, wikis being one of the most effective, especially in collaborative group problem solving.

3. RESEARCH ON WIKI TECHNOLOGY

Despite the fact that wikis have been introduced for quite some time now, even though there is some research on public wikis but the academic literature on the corporate wiki technology is not found in abundance while there have been a plenty of press articles focusing on them [94]. Wikis are extensively used in educational environment as learning tools and a number of researchers have studied wiki technology use in education and informal learning environments [8,13,35,36,58,71,103], and also in political contexts [63]. Liu [59] studied the acceptance of wiki technology in a university setting in US. Similarly, Clerc, de Vries & Lago [14] have done research on the functionalities of wikis that can be employed to implement architectural knowledge management for global software development

In the following section we will discuss the literature on wikis in organizational context:

3.1 Research on corporate wikis:

Wikis are not only used in the internet but they can also be employed in intranets and on local computers [15]. According to Désilets, Paquets, Vinson [19], wikis do not require special software, they are easily accessible and are easy to use for everyone. These characteristics of wikis make them ideal to be used for multiple purposes. A lot of different applications of wikis have been identified and research has focused on different areas. A few studies on wiki technology focus on thier use as customer resource management, for example, as online communities [20,68,73], and in software development projects [60,94,107].

One of most widely used purpose of wikis inside organizations is for knowledge management in group tasks and they are considered very successful in this regard. As argued by Jing & Fan [50] *"the reason of this success being the wikis keep up a correspondence to the continuous transformation and ascension between explicit and tacit knowledge and is in line with the general requirements and composition of the knowledge-based enterprise management from the application level"*(p. 205). Grace [29] studied a multiple case study of wiki deployment as a knowledge management tool, and according to her, "*Wikis in particular embody the highest attainable information sharing dream of an organization where a group of its members is voluntarily and unselfishly collaborating and creating knowledge and working towards a common goal to benefit the organization*" (p. 64).

Research on corporate wikis mostly focuses on the challenges and benefits of the wiki use, e.g., [16], [43], [38] and [32]. Research has shown the use of corporate wikis in variety of activities such as project collaboration, project management and resource management etc [44]. Hester & Scott [41] provided a conceptual model of research for the diffusion of wiki technology and factors that are important in user adoption of wikis in organizations. As one the first organizations implementing corporate wikis, there are a few studies found on IBM, such as Arazy et al. [2] and Scarff [84].

Research on corporate wiki technology has been done in different aspects, but most of the research focused on the statistics of the usage of wikis in corporate contexts. Our research aims to study wiki technology in enterprises from the view point of wiki end-users and their perceptions on the effect of wikis' use on their performance. Even though, it has been established wikis have a variety of uses inside the organization, still a lot of wiki projects fail in their initial phase. This implementation of wiki in the enterprise context needs to be explored with a focus on the factors that lead to wiki technology success in organizations. In this paper, we investigate the implementation of wiki in a corporate environment in which the end-users can create, edit, share and retrieve knowledge on work or project related activities. The paper builds on insights into the need of the collaboration technology in project management as an alternative to previous IT and the need of individual versus collaborative problem solving. More importantly, the paper discusses success of wiki systems in collaborative tasks within the e-collaboration corporate environment.

4. SUCCESS OF CORPORATE WIKIS

In the past, Information System (IS) research community has been working to measure the success of different technologies in terms of their usefulness, individual and organizational performance, financial outcomes etc. With the advent of the new technologies in the market and their deployment by the firms, it is necessary to investigate how they can help organizations execute processes in a better way. Similarly, in this paper we present a theoretical model for the measurement of corporate wikis' success from the end-user's perspective. Based on the theoretical foundation of DeLone & McLean's (D&M) IS success model [17], we extend their

model by incorporating contextual factors with respect to wiki in a group problem solving/ project management environment. This study intends to help firms to understand in a better way, how to use wikis to achieve efficient, effective and improved end-user performance. This would also be helpful for companies engaged in wiki development business to improve their products, as perceived by the end-user of their product. Managers can effectively reap benefit of the wiki and can speed up processes and employee task performance. Therefore, we present here a framework of measuring the success of corporate wiki systems.

Since wikis in work is a relatively new concept; there are not many studies on the success of wikis at work. One recent study by Trkman & Trkman [94] explores and evaluates wikis as intranet concept in a small firm based on D&M model of IS success [17]. The model has been use in the past for different aspects of IS success – more than 180 examples are summarized by Petter et al [77]. Our study also uses the framework of D&M IS success model [17] to measure the success of wiki systems in organizations and extends the model according to wiki workplace environment. The reason for choosing D&M IS success model is that it evaluates IS in the contextual task in which that particular IS is used and provides a measure in terms of *perceived net benefits* by the use of IS.

System quality and *information quality* constructs have been adopted from D&M IS success model [17], whereas DeLone & McLean [17] have also suggested that IS success model should include *service quality* construct for electronic commerce systems. However, *service quality* which is a part of D&M IS success model, in an enterprise setting is not a good measure for knowledge based systems because it determines success rather than being part of it [106] since *service quality* in an organizational context refers to the service provided by support personnel. D&M [17] included in this construct to measure the *service quality* of e-commerce websites. While measuring success of employee portals in organizations, Urbach et al. [96] measured *service quality* despite the criticism of some authors on the inclusion of this dimension of end-user's perceived success [69,80]. However, results confirmed that the service of support personnel do not play an important role in the context of employee portals. Since wikis, like employee portals, are front-ends to KMS (Knowledge Management Systems), the construct has not been included in this study [96].

We have introduced a new measure for measuring of success of wiki systems derived from the study of Urbach et al. [96] that is called *collaboration quality* of the wiki system in use. The usage of wiki system has been decomposed in two types of uses, that are *active use* and *passive* use of the system [94,97]. *Active use* refers to the active sharing of knowledge/information with the colleagues in an enterprise, whereas, *passive use* refers to the retrieval of knowledge/information of the project or task on hand by a wiki end-user.

Finally, the success of corporate wikis in a project management task is measured by focusing on *perceived net benefits* of the wiki end-user in terms of his/her project task performance. Different measures have been operationalized in a project task-fit environment to measure the *perceived net benefits*.

It should be noted that a process framework of determinism is chosen in this study for modeling the success of the corporate wiki systems. This is described by three levels of process and expressed as causal relationships between the observed facts. On the basis of theoretical development, a success model of corporate wiki systems is developed. It aims to examine the effect of relationship between the determinants of success, that is, the perceived success of deployed wiki system on the end-user performance. This model attempts to present a framework for analysis of direct and indirect effects of explanatory levels to explain the wiki system benefits. Next we describe the theoretical constructs of the model in more detail:

4.1 Level 1: Perceived wiki success

Level 1 of conceptual model refers to the factors of perceived wiki success and represents the exogenous variables of the model. These variables are regarding the quality dimensions of corporate wiki systems. This includes *collaboration quality*, *information quality* and *system quality* of wiki system. These quality dimensions are further measured in a multidimensional way. They are discussed as following in a more detailed manner:

4.1.1 Collaboration Quality

Collaboration is the process of working together to achieve a common goal. One of the main qualities of wikis is their ability to support collaboration between users [61,82]. *Collaboration quality* covers the quality of collaboration support to influence the success of wiki systems. In IS success model of D&M [17], *collaboration quality* of IS is not sufficiently covered by any of the other propose quality dimensions. The concept of *collaboration quality* has been used in the assessment of success of employee portals by Urbach et al.[96] and was found to affect the portal use and satisfaction level of the end-user. *Collaboration quality* is defined as "the ability of system to enable collaboration among the employees or members of a project in order to collectively perform a task". In the same manner as employee portals, wikis are front end to KMS, wikis enable employee to collaboratively edit documents, do updates and foster communication [91]. This is much useful in the case of geographically dispersed teams that are working on the same project and need to work collaboratively towards the same goal. For example, Xiao et al. [107] describe the use of wikis in global software development communities, especially in open source development where team are using wikis for documentation and coordination rather than for programming purposes. This is a classic example of off-shore collaboration in a software development project. The collaboration feature of wikis allows multiple authors for the documents simultaneously which allows information to be quickly available for the other users. Bean & Hott [4] state one of the advantages of the wikis is that they incorporate the assistance of experts, peers and friends, and professionals (in corporate wikis). For a firm, this is advantageous since it enables networking between the employees, colleagues, and members of a project.

We hypothesize that *collaboration quality* of wiki system has a direct positive influence on wiki *use* and also on the wiki *user satisfaction* [96]. The quality of collaboration provided by wiki system has a direct positive effect on the *use* of wiki system for sharing and retrieving knowledge and thus collaborating with their colleagues. Thus if a wiki system provides good functionalities for collaboration, it helps the user to easily share or retrieve information from the system that is actively and/or passively using the system, respectively. *Active use* and *passive use* will be discussed later in more detail. Following the argument of Urbach et al. [96], Reinhart [82], and Mader [61] we propose that higher the *collaboration quality* of wiki system, more the user is satisfied with the wiki system. Furthermore, higher the end-

users' perceived quality of collaboration regarding wiki system, more will be the *perceived net benefits*. Thus, *collaboration quality* (level 1) of wiki system has a direct and an indirect positive effect (via wiki *use* and wiki *user satisfaction*) (level 2) on *perceived net benefits* (level 3) of wiki end-user (see Fig. 1).

4.1.2 Information Quality:

Petter et al. [77] argue that *information quality* of a system is a key dimension in measuring the satisfaction of IS end-user. In this study *information quality* refers to the quality of text created by collaborative efforts of members of the project in the form of documents and communications etc. This is the output that a wiki system provides to its end-users. *Information quality* in the case of wikis is even more important, since the end-users are a part of the team that creates the content, thus quality of information is a crucial measure of the satisfaction of wiki users [94]. Phillips [78] argues that since a large number of users are responsible in a wiki for the content development, the end product is the perception of the recent and exact information. Whereas, Trkman & Trkman [94] argue that a wiki is always changing, since the users keep on adding content to the existing information. According to Gohr et al [26], the introduction of wikis in the firms stimulates many users to be a part of editing information and as the wiki grows, organizing and structuring takes place that may result in outdated, wrong, inaccurate or obsolete information.

We therefore argue that it is important to measure the *information quality* provided by the wiki system as a measure of *user satisfaction* and wiki *use*. We measure *information quality* as a multidimensional concept for corporate wiki systems. Researchers [28,57,90] have identified different measures for *information quality* such as *timeliness, relevance, usefulness, accuracy* and *format* of the information provided by the system. These determinants affect the usage of the system and level of satisfaction of the system user [49]. Further, research [24,53] has shown that *information quality* has a direct association with the *individual performance*. Thus we propose in wiki success model that *perceived net benefits* (level 3) is positively directly affected by the *information quality* (level 1) of the wiki system and indirectly affected via the mediation of *use* and *user satisfaction* regarding the wiki system (level 2) (see Fig. 1).

4.1.3 System Quality:

System quality consists of measures of a wiki 'system' itself that is the quality of its technical operations. It considers performance characteristics, functionality, and usability, among others [57,67]. *System quality* can be regarded as the "*degree to which the system is easy to use to accomplish tasks"* [96] (p. 187).

As far as the Wikis are concerned, Wagner & Majchrzak [100] stated that for collaboration in a project, especially in case of corporate wikis, a simple technology that is easy to use is an enabler of the engagement process. Moreover, Waldrop [102] argues that more users will be engaged in the wiki use and collaboration process if it is easy and fun to use. Trkman & Trkman [94] also stress on the importance of quality of the wiki system in terms of its usability and interactivity for the wikis to be successful in a company's intranet. The results of a survey on wiki use in Finnish companies by Henriksson et al., [40] showed that respondents rated on average of 3.25 on a Likert scale of 1-5 to show the importance of wiki system's ease of use and functionality in their usage of enterprise wikis.

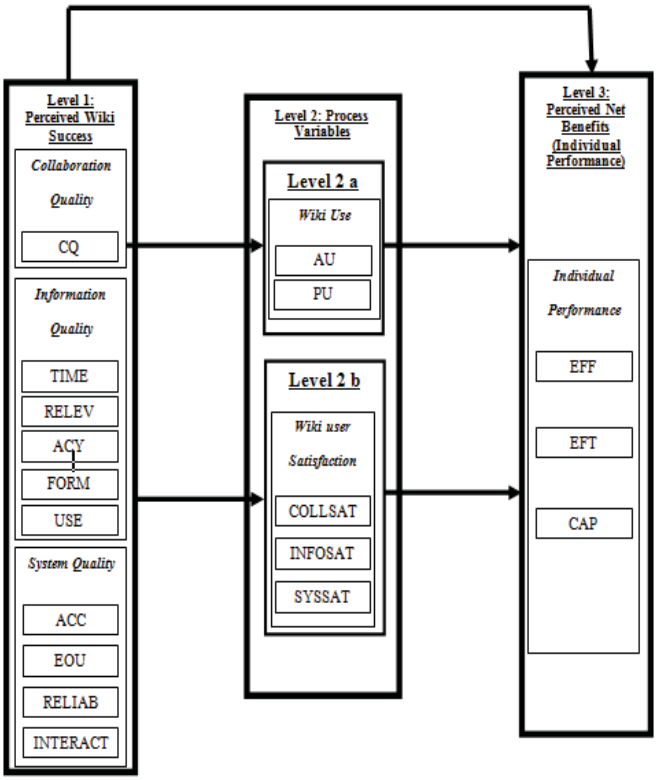

Fig. 1: Conceptual model of research for measuring corporate wikis' success

System quality is taken as a multidimensional construct. In the case of wiki technology, ease of use, the appropriate functionality and the convenience of access would reflect the quality of wiki system. Further, it is important for a wiki system that is deployed in an organization to be reliable and free of errors and bugs, so as to ensure the speed of work. Interactivity, which refers to end-user's ease of interaction with the wiki to share or retrieve information, is also an important factor in determining the quality of wiki system. All these factors play a major role in the level of use and satisfaction of the users. We propose that *system quality* of corporate wikis has a positive influence on wiki *user satisfaction*. There is a strong support in the literature for this relationship [46]. Different researchers have analyzed different types of IS and the types of constructs used for the evaluation of *system quality* are dependent on the system under evaluation [77]. The types of system evaluated includes KMS [37,55], internet websites [54,74] etc.

Finally, we also propose that *system quality* has a positive impact on the *perceived net benefits* (individual impacts) since research suggests a positive relationship between perceived usefulness of the system and its perceived ease of use [79,98,99]. A few studies [24,28,53] have shown the direct association of *system quality* and *perceived individual performance*. Therefore, the corporate wiki's *system quality* (level 1) has a direct positive effect on *perceived net benefits* (level 3) and also an indirect positive affect via mediation of wiki *use* and wiki *user satisfaction* (level 2) (see Fig. 1).

4.2 Level 2: The Process Level

4.2.1 Use of Wiki System (Active Use & Passive Use):

DeLone & Mclean [17], in their revised model of IS success argued that *system use* is an appropriate measure of success in most cases. They further argued that *use* of a system cannot be measured by just measuring the frequency of *use* of the system rather researchers must also consider the nature, extent and appropriateness of *use* of the system [17,48]. In this study we have categorized *use* of wiki systems into two types of uses i.e., *active use* and *passive use* as proposed by Trkman & Trkman [94]. Considering the wiki system, *use* can mean either *passive use* that is end-user's utilization of available content/information provided by the wiki system, and/or *active use* that is the modification/editing of existing information in the system and preparation of new content [94]. In a similar fashion, He & Wei [39] have argued that intranet of an organization must have a dynamic balance of active and passive users. Khandaker & Soh [52] have also analyzed wikis in an educational setting with respect to active and passive users. Thus, in the case of corporate wiki systems, users search the existing knowledge and/or make new knowledge by either updating the existing contents or creating new pages from scratch. Hence two different types of *use* depending on the nature of use are included in the research model [48].

A similar approach was adapted by Velasquez et al. [97], who argue that while studying knowledge management and KMS, researchers have identified two different roles in the use of a KMS namely "*knowledge sourcing*" [30] and "*knowledge sharing*" [25]. According to Velasquez et al. [97], knowledge sharing is "*the extent to which individuals intentionally share their expertise, experience, insights, and opinions*" (p.2) whereas, knowledge sourcing as "*the extent to which individuals intentionally access others' expertise, experience, insights, and opinions*" (p. 2). It should be noted that a user can simultaneously have both roles [23][18]. Considering a process approach of D&M model there is a positive impact of IS *use* on *user satisfaction*. We argue that in enterprise wiki systems *use* of wikis in a project task for sharing or retrieving information would have a positive effect on end-user's *satisfaction*. Even though this directional relationship has not been vastly explored by researchers [77], studies show a support for this relationship [12,34,37] (see Fig. 1). Studies have also shown support for the positive relationship of IS *use* with the *perceived net benefits* on the individual level of analysis. For instance, Yuthas & Young [109] found a significant positive relationship between the improved decision-making of workers and IS use. Similarly, Burton-Jones & Straub [11] found significant positive impact of IS *use* on task performance and other researchers found this support as well e.g., [37].

Thus keeping in view wiki *active use* and *passive use*, this means if a user is using the wiki system for sharing or retrieving of information in an organizational task, this would affect his/her performance at job. The performance could be different depending on the type of user, i.e., active or passive. Therefore, we hypothesize that wiki *use* (level 2a) positively mediates the relationship between *perceived wiki success* (level 1) and *perceived individual performance* (level 3) (see Fig. 1).

4.2.2 Wiki User Satisfaction:

User satisfaction is the attitude of the end-user toward an IS who directly interacts with it [21]. *User satisfaction* of IS end-user has been considered a significant metric in the measurement of IS success in the literature [96]. Many researchers [18,21,22,47,85] have agreed on this measure being very important in IS evaluation of success.

In marketing literature similar differentiation of constructs exists in which satisfaction is not measured as overall satisfaction rather measured as construct specific satisfaction, for example, Spreng, MacKenzir & Olshavsky [89] have separated attribute satisfaction and information satisfaction as antecedents of satisfaction. McKinney et al. [67] also separate information satisfaction and system satisfaction in measuring the user satisfaction regarding shopping on an internet website. Similarly, Nelson et al. [69] measure system and information satisfaction as separate constructs rather than overall satisfaction for data warehouse. We have also followed the same convention and proposed different types of satisfaction associated with the wiki system rather than measuring overall user satisfaction. We have included *collaboration satisfaction, information satisfaction,* and *system satisfaction* measures to address multiple dimensions of user satisfaction. *Collaboration satisfaction* refers to the wiki end user satisfaction with the collaboration features provided by the wiki system to perform his/her tasks i.e., sharing and retrieving information and collaboration with the colleagues. *Information satisfaction* refers to the user satisfaction with the output provided by the system. Finally, *system satisfaction* refers to the wiki end user satisfaction with the quality of the wiki system and its use. It should be noted that these different types of satisfaction are all affected by *collaboration quality, information quality* and *system quality (perceived wiki success)* of wiki system. According to Nelson et al. [69] the key determinants of *information quality* and *system quality* of an IS collectively explain both *information satisfaction* and *system satisfaction*. We argue that the determinants of *collaboration quality, information quality*, and sys*tem quality* collectively effect *user satisfaction*. *Collaboration quality* of the system helps creating better information collaboratively and enhances system and information satisfaction. Similarly, better information provided by the system enables user to perceive the system better in quality. Therefore, as Nelson et al. [69] argued, we suggest crossover or interaction effects between the three constructs of *collaboration satisfaction, information satisfaction,* and *system Satisfaction.* The *satisfaction* of wiki end-user positively affects the *use* of wiki system. Studies have shown support for this relation between the two constructs. More the user is satisfied with the system, more likely he/she will use the system for his/her tasks [106]. We propose that the end-*user satisfaction* has a direct positive effect on wiki *use*.

Furthermore, we suggest that *satisfaction* of the wiki end-user positively affects the *perceived net benefits* from the system. There is a strong agreement on this relationship found in the literature of IS success, since *satisfaction* is an important determinant of success of IS. Therefore, an end-user believe that a satisfactory system can enhance his/her productivity or individual performance at the job. Petter et al. [77] have summarized that *user satisfaction* has been found to have a positive impact on a users' job [33,92,108], to improve performance [65], to increase productivity [37,45,66,81]. Therefore, we also propose these relationships in our theoretical model of success for corporate wiki systems. Thus, we hypothesize that wiki *user satisfaction*

(level 2b) positively mediates the relation between *perceived wiki success* (level 1) and *perceived net benefits* (level 3) (see Fig. 1).

4.3 Level 3: Perceived Net Benefits

4.3.1 Perceived Individual Performance:

The evaluation of net benefits generated by IT investments remains a priority for researchers and practitioners who wish to justify the increased dependency of organizations on new emerging IT applications. The evaluation of IT *perceived net benefits* particularly allows to measure the effectiveness of IS and to appreciate the efforts of the responsible IS function for improving organizational performance. However, there have been difficulties associated with the measure of system benefits. McGill et al. [65] state that it is more advantageous to measure net benefits in terms of costs associated with that (for instance, cost savings), but they argue that these numeric measures are often not possible as system effects can be intangible and numeric measures can be effected by other environmental factors. According to Wu & Wang [106], there is no agreement on the choice of metrics for measuring net benefits from the use of IS, and therefore users' perceptions of net benefits as surrogate of IS success are often used in IS research [105].

Therefore, in the evaluation of corporate wiki systems, only those benefits that affect end-user's individual performance at work are considered in our proposed model since wiki evaluation is done in a project management task. These *perceived net benefits* are related to the personal goals of improved productivity in the accomplishment of tasks and development of professional competencies [48,92]. Specific to wiki systems, researchers have conducted surveys in firms to know if the use of corporate wikis in managers' tasks leads to individual performance improvement. For example, Henriksson [40] conducted a survey in 50 biggest companies using wikis in Finland, where a majority of the employees agreed that use of wikis in their work improve their workplace efficiency, execution of tasks, and enables new methods to work. Similarly, in another survey of the corporate wiki users [62], 75 percent of the employees answered that wikis often make their work easier, and 49 percent answered the wikis often improved their work processes. We have therefore included multiple dimensions of *perceived individual performance* to measure wiki end-user's *perceived net benefits*.

Firstly, the explanation of the success of IS through the impact on individual performance must necessarily include a measure of productivity gains [18,27,76,85]. The concept of *efficiency* thus reflects an improvement of individual performance resulting from the effective utilization of the system proposed by the IS function. Pentland [76] defines efficiency as "*the speed of execution of a task* "(p. 215). Jain & Kanungo [48] define *efficiency* as when an employee may be able to execute more tasks in less time with the use of the system.

Secondly, apart from the benefits from IS regarding the speed of execution of tasks, researchers [27,48] have also suggested benefits as the improvement of the quality of the work. In this context, Pentland [76] conceives *effectiveness* as a measure of individual performance that reflects the effect of IS on the quality of results of end-users and their professional expertise. Interviews conducted with corporate wiki users by Danis & Singer [16] yielded that users believed the use of wiki might make their work easier by bringing their colleagues into direct conversation on strategic directions.

Finally, in the process of evaluation of perceived performance of IS, a measure of *skills or capacity development* allows to verify if the IS under investigation helps in the improvement of professional skills and competencies. Researchers have been inclined towards the e-learning phenomenon introduced by the new collaborative tools. Wikis being one of the collaboration tools are thought to enhance end-user's learning since they provide new opening for learning and enhancing knowledge in a collaborative manner as well as the comprehension of these processes [15]. Wikis enable skill development of end-users since they are sharing knowledge as everyone is allowed to add information on wikis. Therefore, wikis facilitate the process of knowledge creation by involving and empowering people, and by creating an environment collaborative in nature for the interaction of both knowledge seekers and knowledge donors. Since, in organizations using corporate wikis, they are deployed to improve information processes, this measure in our model helps to investigate the extent to which end-users believe that using wiki helps increase their professional skills and see problems in a different manner [7].

Fig. 1 represents the graphical representation of the theoretical model of corporate wiki success proposed in this paper. The model is applicable to corporate wiki users in project settings such as project managers and project members involved in wiki use. A task involving project activities can be a possible environment to empirically test this theoretical model, since it involves both active and passive users of the wiki system.

Thus, following general hypotheses (HG) are proposed to measure the success of corporate wiki systems from end-users perspective (See Fig. 1):

HG1: Perceived wiki success (level 1) has a direct positive effect on perceived individual performance (level 3)

HG2: Perceived wiki success (level 1) has an indirect positive effect on perceived individual performance (level 2) via the mediation of process variables [level 2 (level 2a/ level 2b)]

5. CONCLUSION

This study proposes an extension to existing IS success models in the context of enterprise wiki systems. In this paper, we suggest additional measures to D&M IS success model such as collaboration quality of the wiki system, which is not measured by any other quality dimension of the previous IS theory Moreover, use of the wiki system has been categorized into active and passive use and we suggest measuring the frequency of actively and passively using the wiki system. This can help in understanding the role of the users in a wiki system and see the level of satisfaction with both types of users, and eventually to know which type of users have improved performance with the wiki use. The implementation of this wiki success model can be applied in firms using wikis for project management, documentation and as a knowledge sharing tool. We aim to do an empirical validation of the model in the firms using corporate wiki systems in their project settings. The empirical study will involve a survey of wiki end-users, followed by statistical analysis of the survey results to test the proposed hypotheses. The study aims to benefit organizations implementing wiki systems to better implement the systems and those with already existing wiki systems to get the most out of them in terms of end-user performance.

6. ACKNOWLEDGMENTS

Our thanks to CERGAM, IAE Graduate School of Management, Aix-en-Provence, France and Prof. Jacques André Bartoli, for all the support and help.

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