How to evaluate end-user performance of a business using wikis to share knowledge in IT projects? A contribution to a behavioral model to predict collaborative management process success with structural equations and phantom methodology

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Abstract

Despite the popularity of wikis in public and subsequently in the corporate environment, an empirical investigation of their benefits is still lacking. This study performs an empirical investigation with 174 corporate wiki end-users to evaluate their performance with wiki use in an information technology development project, based on a knowledge management task. Enterprise wiki end-user performance is evaluated by measuring user's project efficiency, effectiveness and capacity development. Phantom Modeling,with a Structural Equation Model, is used to empirically test specific direct and indirect effects. The findings suggest that end-user's efficiency and effectiveness is positively affected by information and system quality of enterprise wikis mediated via wiki use and user satisfaction. Moreover, end-user capacity development is positively associated with collaboration quality and knowledge sharing.

Keywords: Enterprise Wikis, Collaboration, Knowledge Management, Employee Productivity, Web 2.0, Information Technology (IT), Individual Performance, IT Evaluation, Phantom Modeling, Structural Equation Modeling

Résumé

Malgré l'intérêt porté aux wikis dans le secteur public, et plus récemment au sein des entreprises, les études empiriques de leurs bénéfices et de leur succès auprès des utilisateurs font toujours défaut. Cette communication traite d'une recherche empirique, conduite auprès de 174 utilisateurs, destinée à évaluer la performance de l'usage des wikis lors d'échanges de connaissances dans des projets de développement de technologies de l'information. Celle-ci est évaluée en termes d'efficience, d'efficacité et de capacité du développement de l'utilisateur. Un modèle d'équations structurelles avec la méthode *Phantom* est utilisé pour tester empiriquement des effets directs et indirects spécifiques. Les résultats suggèrent que l'efficience et l'efficacité, perçue des utilisateurs, sont positivement affectées par la qualité de l'information et celle du wiki d'entreprise, mais aussi modérées par leur utilisation et satisfaction. Globalement, les capacités que développent les utilisateurs sont positivement liées à la qualité de leur collaboration et partage de connaissances.

Mots-clés: Wikis d'Entreprise, Collaboration, Gestion des Connaissances, Productivité des Employés, Web 2.0, Technologies de l'Information (TI), Performance Individuelle, Evaluation des TI, Phantom Model, Modélisation par les Equation Structurelles

1. Introduction

Wikis have been here for a while now and they have been the nucleus of a substantial amount of discussion by academic researchers and practitioners. These research discussions often focus on the benefits that wikis provide in a corporate environment for various purposes. The tasks for which corporate wikis are thought to be used vary a great deal, but mostly the corporate usage rationale has been for knowledge and project management. Though, a lot of wiki use benefits have been presented but the perception of actual end-user is still somewhat missing in corporate wiki research. This paper aims to advance wiki research in the sense that wiki end-users' perceptions are explored and empirically tested. It identifies whether all the hype created by wikis over the time is really valued by the end-user of corporate wikis.

The advent of web 2.0 has brought a revolution in the way users now access online information and can be a part of online knowledge creation.Web 2.0 is a web architecture that enables people to publish over the internet with ease and share ideas. O'Reilly (2005) identified some changing core patterns of web which led to the identification of Web 2.0. A few of these patterns are specifically related to knowledge management particularly such as web as a platform, services deployment, and active participation of users (Levy 2009).McAfee (2006) argues that companies soon started deploying tools aroundWeb 2.0 functionality allowing their employees to freely communicate over the network. For a time, companies considered Web 2.0 deployment as a fad but it soon became evident that this new model of web has made its way in the organizations. McAfee(2006) coined the term '*Enterprise 2.0'* to define this adoption of web 2.0 mechanism to enterprise IT settings.

Different Web 2.0 technologies have attracted the attention of firms, particularly of large organizations and multinational corporations. These technologies include social networking software (SNS), wikis, blogs, and mashups etc. Many organizations are using SNSs for relationship building, expert identification and internal hiring etc. Blogs are used for information diffusion replacing typical tag boards and for event management planning within the firm providing semi-collaborative environment.Mashups are popular in customer service operations particularly for location identification of customers. Big multinational firms in this regard lead as innovators and early adopters of web 2.0 usage in corporate environment.

Web 2.0 architecture is much beneficial as more people use it – termed as 'critical mass' which means that the value of a technology increases as the number of its users increases(Hsu etLu 2004). Therefore, big firms havinglarge employee headcounts are using internal Web 2.0 tools to benefit from the critical mass of their employees. Nevertheless, these technologies are not just limited to employees, but also used to connect to other stakeholders such as customers, partners and suppliers etc. For example, the use of online social networks to connect to customers in order to understand their needs, getting product reviews in the form of user generated content (UGC), and customer services has become much common in the recent years.Smaller firms follow big industry players butmost of the time, they are unable to see the reason or task for which they are actually deploying these technologies and are just following the trend. The need, therefore, is to address the task-technology fit (TTF) as pointed out by Goodhue etThompson (1995) for Enterprise 2.0 technologies.

The problem transpires when firms use Web 2.0 technologies for tasks which cannot be efficiently performed with the specific tool (e.g., internal SNSs are beneficial if used for employees' relationship building or expert identification,but they prove to be inefficient for knowledge building). Similar is the case with other tools such as blogs and wikis. The closest of these web 2.0 tools to traditional MIS are wiki systems that perfectly relate to the creation of knowledge spiral as noted by Nonaka*et al*. (1995; p.6) as they argue that "*the raison d'être of a firm is to continuously create knowledge"*.Similar to the knowledge socialization and externalization in human brains, wikis can be called techno-natural application as they pave the way for collaborative knowledge sharing and give the power of authorship to their users.

The basic phenomenon behind this functionality is the underlying collaboration that wikis offer for knowledge building, since collaboration has been a part of human nature since the beginning of time. Wikis exploit the nature of human beings to be collaborative.There is a longstanding task of organizations that needs to be addressed for, first, capturing the knowledge of existing employees for better problem solving and, second,to avoid the brain drain that can occur as employees quit or retire from firms and take all the tacit knowledge in their brains with them. This tacit knowledge needs to be retained and wikis can provide a mechanism to effectively execute that. The basic task of wikis in corporate environment is thus knowledge management which eventually is to efficiently and effectively manage current and future projects of a firm.

This article investigates how do enterprise wiki users perceive the deployment of wikis can play a role in their work place related tasks more speciallywhen it comes to knowledge sharing.

2. Corporate wikis and evaluation environment

Wikis are a relatively new advancement in the field of information systems. More popular in the public internet is one of the biggest websites 'Wikipedia' has gained popularity, wikis have made their way in organizational communication (Wagner et Schroeder 2010). But Wikipedia is not the only successful public internet wiki, there are numerous other wiki based website that successfully allow their users to collaboratively share knowledge such as Vienna History Wiki (Bensing 2015)and crowd sources law reforms in Finland (Aitamurto et Landemore 2015). A wiki is a knowledge management technology that allows its users to collectively author documents (Leuf et Cunningham 2001; Wagner 2004). The success of wikis on the internet has led the organizations to introduce wiki systems within corporate settings for multiple purposes. A few researchers argued that this shift of public wikis (which is open to all) to enterprise wikis might not be successful due to command and control culture of enterprises (Arazy *et al.* 2009). Still, a number of studies have stressed on the increase in enterprise wiki adoption and implementation(AUTHORS2013; Grace 2009; Razmerita et Kirchner 2011).

One of the foremost advantages of using wikis as a replacement of traditional knowledge management systems (KMS) is that no special software is needed to be installed on organizational systems. Web and intranet based solutions to wikis servers allow easy access for their users. In response, wikis are deployed for multipurpose use such as customer resource management (Ortega et Barahona 2007), software development (Trkman et Trkman 2009), and group projects (Morgan *et al.* 2013). However, the most wide and successful use of corporate wikis is knowledge management. Despite the growing literature on wiki technology, empirical research on measuring their success is scarce. An empirical investigation has been carried out in this research investigating how enterprise wiki systems can be evaluated and what are the major reasons for which users prefer them in knowledge and project management tasks. Specially, in project based organizations, collaborative document building is of much use, letting multiple users to take part. Wikis allows different employees or teammates to share information with each other on runtime (AUTHORS 2013).

McAfee (2006) argues that organizations must promote user participation if they are looking to enhance collaboration among their teams. As soon as new technologies are introduced in firms for any task, IS researchers are keen to measure their success. Similar has been the case with wiki systems, but no comprehensive empirical study exists (AUTHORS 2013) to evaluate enterprise wikis.

In IS literature, the examination of IS success or impact has been extensively examined by researchers (Urbach et al., 2010). As argued by Delone et McLean (1992) (D&M), there is no eventual definition of IS success on which all the researchers have argued, since past researchers have used a multiplicity of measure in IS success. They have assessed the then existing definitions of IS success and categorized them into six main categories and provided a multidimensional conceptual model for IS success that incorporates the interdependencies among various success categories (Hu 2003). D&M modelis widely used as measure of IS success and dominates other models due to incorporation of interdependencies among the categories of IS success. After ten years of their first IS success evaluation model, DeLone etMcLean (2003) presented an updated model reviewed in the light of main criticisms (Rai et al. 2002; Seddon 1997; Kiew et Seddon 1994) to their first model. The model was primarily presented to measure success of e-commerce websites. In its recent version the model consists of a causal approach towards the evaluation of IS. It takes advantage of the results obtained during ten years of application and exploitation of their previous model and incorporates critical analysis of authors.

The updated D&M model comprises of six main interconnected measures of IS success namely “information quality”, “system quality”, “service quality”, “use”, “user satisfaction”, and “perceived net benefits”. The model implied that an IS can be evaluated with respect to the information (output), its technical features, and its service quality. It was suggested that these three dimensions have an effect on IS use and end-user satisfaction. Consequently, some benefits or impacts either positive or negative will be achieved which in turn would affect IS end-user satisfaction and further use of IS.

Recently, researchers in IS are exploring the evaluation of Web 2.0 systems and specially wiki technology in organizational and non-organizational contexts(Poole et Grudin 2010; Moskaliuk et Kimmerle 2009), but none of the studies have evaluated wikis with respect to individual performance. Inside organizations, wikis can be deployed to serve a number of purposes.

The main functionality of a wiki system is to enable a collaborative environment where the users of these wikis can share information, exchange knowledge and perform group tasks. In short, all of these tasks require collaborative environments. One of the reasons of choosing wiki technology for evaluation in this research is the recent introduction of wikis (among various Web 2.0 tools) into enterprise environment for project and knowledge management tasks so that teams can perform in groups, share information and develop interpersonal communication exchange. As put by Hasan et Pfaff (2006; p. 378) "*the wiki technology has succeeded in helping employees collaborate and communicate better electronically by transforming the fragmented knowledge in corporations into usable and easily accessible data*".

3. Theorical development

The research model for enterprise wiki evaluation is based on the "Process Model" which is widely used IS research, such as the work on IS efficiency (DeLone et McLean 1992; Seddon 1997). This approach provides an "Inputs – Process – Output" modeling (Crowston et Treacy 1986) and provides a vision of the system as a result of evolution of several levels of complexity. The process approach is articulated as causal relationship between observed variables. We have developed an enterprise wiki success evaluation model based on this theoretical approach.

An input level (level 1) consists of the factors related to perceived success of enterprise wikis. These factors includethe quality of collaboration provided by wikis for knowledge sharing and communication on given tasks, the general quality of output or information, and the technical quality of system to perform given tasks. The intermediary level (level 2) consists of process level which measures employees' use of enterprise wiki for knowledge sharing and retrieval and also the end-user satisfaction. The output level (level 3) refers to the net benefits perceived by wiki usage in terms of the performance of employees. This level describes the indicators that are used in measuring performance of end-user in terms of profit generated by wiki implementation.

The three conceptual levels of our research model are measured by different concepts that evaluate each respective level. The concepts are further evaluated in a multi-dimensional way by variables of the research. The conceptual model of research is based on the recommendation of Delone et McLean (1992; p. 80) , according to which, "…*the IS researcher has a broad list of individual dependent variables from which to choose. (…) In*

reviewing these variables, no single measure is intrinsically better than another, so the choice of a success variable is often a function of the objective of the study, the organizational context, the aspect of information system which is addressed by the study, the independent variables under investigation, the research method, and the level of analysis".Following Figure 1 represents the conceptual model used to measure enterprise wikis' success. Each level of analysis and its respective measures are further described in detail.

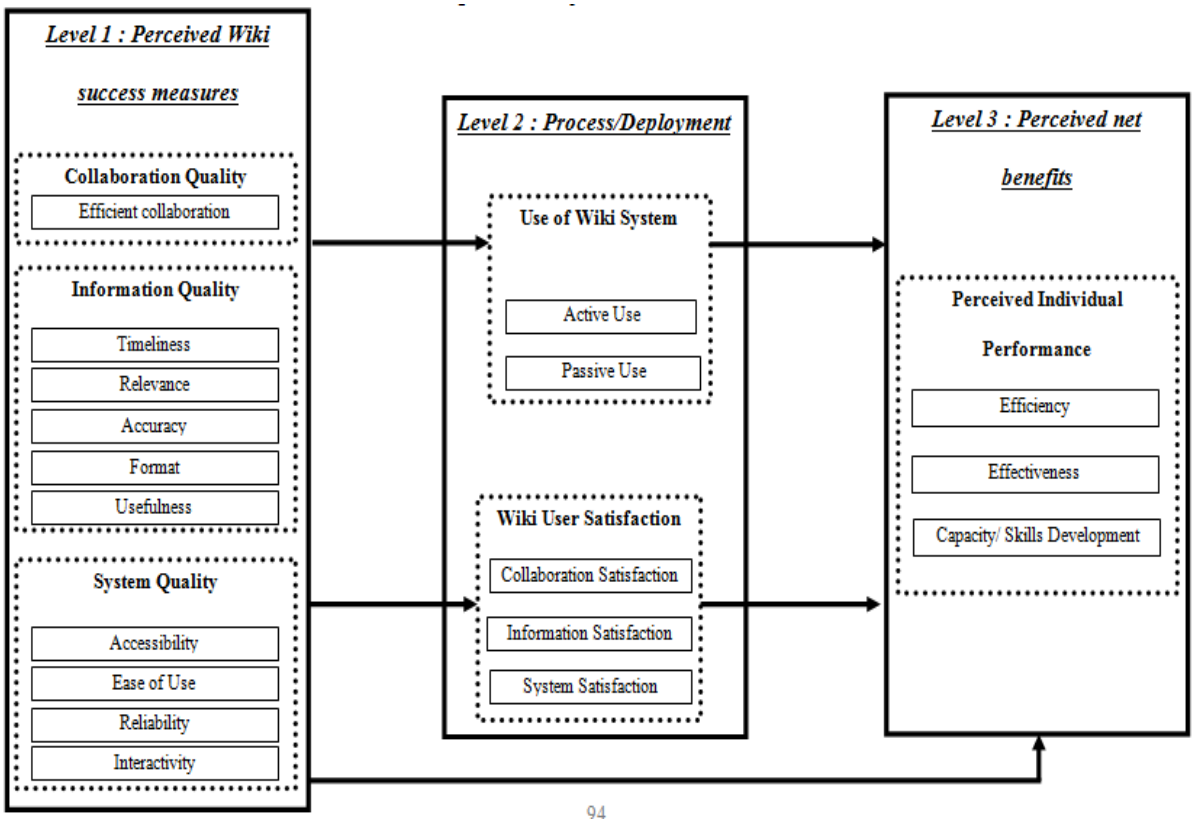

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Figure 1: Conceptual model of research

3.1.The input level(1) - perceived wiki technology success determinants

To measure success of enterprise wiki systems we have proposed three quality dimensions namely collaboration quality (CQ), information quality (IQ) and system quality (SQ). Each of the subsequent quality dimension is discussed following:

Collaboration Quality (CQ)

Collaboration is the process of working together to achieve a common goal. One of foremost features of wikis isthe facilitationof collaboration among their users (Mader 2008; Reinhart 2005). According to Reinhart (2005), the open and collaborative nature of wikis allow communication, collaboration and documentation of the relevant knowledge in groups.

Therefore, while in group or project, a larger number of people can more easily engage in meaningful interactions using wikis (Deering *et al*. 2008). While collaborative aspect of IS was not measured in D&M model,Urbach*et al*. (2010)measured CQ to assess employee portals, therefore the definition of wiki collaboration quality [CQ] is adapted from their study. *"It evaluates the extent to which the utilization of wikis enhances communication and improves the effectiveness of information sharing as well as of social networking"*.

Researchers (for instance (Tapscott et Williams 2006; Xiao *et al.* 2007)) have mentioned use of wikis in workplace collaboration(e.g., in geographically dispersed teams for software development and project management). If a wiki system provides good functionalities for collaboration, it helps its users to easily share or retrieve information from the system referred to as "actively" or "passively" using wikis, respectively. Following the argument of Urbach*et al.*(2010), we argue that higher the CQ of a wiki system, the more a user will be satisfied with it. Furthermore, higher the users' perceived quality of collaboration of wiki system, it is more likelyto provide net benefits to end-users. Thus, we propose that CQ of a wiki system has a positive direct and indirect effect (via wiki use and wiki user satisfaction) on perceived net benefits of end-users and helps users in carrying out their work in a more effective and efficient manner.

Information Quality (IQ)

The measures of IQ include different dimensions such as information accuracy, completeness, currency, format, and usefulness of information (Nelson *et al.* 2005). IQ is defined as the quality of documentation produced by the end-users in a collaborative fashion. IQ has always been considered an important aspect of IS evaluation, though it is of much importance in wikis since many users are involved in creating and editing knowledge simultaneously and the information is continuously changing (Phillips 2006). Gohr*et al.* (2010) mention implementation of wikis calls for reorganizing and restricting of information that may cause outdated, wrong, inaccurate and obsolete information. Thus, it is hypothesized that high quality information perception leads to end-user satisfactionand more usage of wiki system. Moreover, good quality of information helps users in doing their tasks rightly and in lesser time. It also helps them improve their skills as users can enhance their skills by learning from knowledge shared by others. Therefore, we argue that IQ has an impact on perceived individual benefits. There are 5 dimensions (timeliness, relevance, usefulness, accuracy, and format) of IQ that have been identified from the literature in order to measure IQ of enterprise wikis.

The first dimension of IQ, *timeliness*[TIME] is defined as "… *the degree to which information is up-to-date or the degree to which the information precisely reflects the current state of the world that it represents"*(Nelson *et al.* 2005; p. 203). The measure reflects the fact that all wiki users are involved in the process of document creation by editing, deleting, or adding old and new information. According to Friberg et Reinhart (2009), timeliness of information in enterprise wikis is a significant measure as wikis edited documents are assigned timestamps whenever they are modified. One of the basic requirements of deploying wikis is to make the information as current and timely as possible by giving the rights to every member of the community to add and edit existing information. The second measure of IQ, *relevance*[RELEV] of information is described by Bailey et Pearson (1983; p. 542)as, *"…the degree of congruence between what the user wants or requires and what is provided by the information system. It is concerned with issues such as relevancy, clearness and goodness of information"*.It is important in a corporate setting for the users to acquire relevant information for their tasks in order to perform them in a better way. Particularly, in a project setting, the relevance of information with respect to project tasks would enhance user satisfaction level. Poole etGrudin(2010) argue that Wikipedia is a major issue of vandalism and disagreement among contributors on different topics and due to less anonymity of information-sharing in corporations, these issue are not faced with the same intensity. We argue that a consensus of users on information redundancy can actually provide the right information status. Metrics such as 'click popularity', described by Friberg et Reinhardt (2009), which measures information relevance by counting the number of clicks emphasize the importance of measuring relevance of information. Another important aspect of IQ is *accuracy*[ACY] which is defined as *"…the degree to which the information is correct, unambiguous, meaningful, believable, and consistent"*(Nelson et al. 2005; p. 204). Much of debate has been done on the accuracy of information on Wikipedia but Hasan et Pfaff (2006) argue that firms' internal wikis have less contentious information. This is because of the incorporation of documents' revision control tracking.*Format*[FORM] is another important dimensionclassified as a representational measure of IQ and is defined as "…*the degree to which information is presented in a manner that is understandable and interpretable to the user and thus aids in completion of a task"*(Nelson *et al.* 2005; p. 204).Since multiple authors are editing information, the ability of a wiki to provide templates for a comprehensible format is important (Philip *et al.* 2009). *Usefulness*[USE] is also considered a part of IQ, since the information that user receives from an enterprise wiki must be perceived useful in order to

perform his/her project tasks collaboratively with the colleagues. It is defined as "*the intensity with which the user believes that information provided by the system will increase his or her job performance and meet his/her professional needs*".

System Quality (IQ)

System Quality (SQ) measures the quality of wikis system's technical functions. It refers to the properties related to system's performance such as functionality and usability(Lee *et al.* 2002; McKinney *et al.* 2002).Seddon(1997; p. 246) defines SQ as "… *whether or not there are bugs in the system, the consistency of the user interface, ease of use, quality and maintainability of the program code*". SQ is used widely in measuring IS success since having a simple, easy-to-use technology is an important enabler of the users' engagement (Wagner et Majchrzak 2007). A few studies (Etezadi-Amoli et Farhoomand 1996; Goodhue 1995; Kiew et Seddon 1994) have shown the direct positive association of SQ and individual performance. Research has shown a positive relationship between quality of IS and use of the system, e.g., perceived ease of use has shown to be positively related to system dependence (Kositanurit *et al.* 2006; Rai *et al.* 2002). Users are more likely to be employed in wiki usage and document development if the system is easy to use (Waldrop 2008). We propose that SQ of an enterprise wiki system has a positive influence on wiki user's satisfaction. There is a strong support in literature for this relationship (Iivari 2005). Different researchers have analyzed different types of IS and type of constructs used for the evaluation of SQ has been dependent on system type (Petter *et al.* 2008). Finally, we also propose that SQ has a positive impact on net benefits since research suggests a relationship between perceived usefulness of the system and its perceived ease of use (Po-An Hsieh et Wang 2007; Venkatesh et Davis 2000; Venkatesh et Morris 2000). Therefore, the enterprise wiki system's quality has a direct positive effect on perceived net benefits and also an indirect positive effect via wiki use and wiki user satisfaction.

System quality was also measured by multiple dimensions. The first dimension of SQis *accessibility*[ACC] thatrefers to *"the degree to which the system and information it contains can be accessed with relatively low effort"*(Nelson *et al.* 2005; p. 205). The more a user perceives that wiki system is easily and consistently accessible, the more s/he perceives the system is of better quality. According to Gohr*et al.*(2010), the problem of accessing of information in wikis may arise as the system grows to a large number of engaged users in a firm.*Ease of use* describes the level of physical and mental effort required in the use of a system (Davis *et al.* 1989).In an enterprise wiki system, the ease of use refers to user

perceptions concerning its friendliness of use, ease of access, simple layout, and technical operations etc. for tasks execution. The third dimension,*reliability*[RELIAB] refers to the technical availability of IS(Nelson *et al*. 2005; p. 206).Nelson *et al*.(2005) opined that despite of the fact reliability is measured objectively, it can also be measured by analyzingend-user perceptions of a system. As a supporting argument to this, they give the example of a user who uses the system once in a week and finds the system unavailable due to technical reasons; this would at once reduce his perceived reliability of the system. The last dimension of SQ is concerned with the *interactivity*[INTERACT] of wikis.In IS research, this measure has been mostly used to evaluate the websites in order to analyze their designs and interactions with the costumers or website users (McKinney *et al.* 2002; Palmer 2002). In wikis context, we believe that since wikis are based on web pages internal to the firm, and the users interact with the system very frequently for sharing and retrieving information, the interactivity of system determines the quality of wiki software. Interactivity inwikis is defined as *"the evaluation of its interface design and the ease of interaction of the user to share and retrieve information"*.

3.2.The process level (2) – the wiki deployment

The second level of the research model consists of the concepts of wiki use and wiki user satisfaction. Both of its relative dimensions are discussed in further detail.

Wiki Use

Use of information system is one of the most frequently reported measures of success of in IS research. DeLone et McLean (2003) argued that frequency of use is not the only measure of IS success. They suggest that IS researchers must also consider the nature, extent, and appropriateness of IS use. Even though, wikis are open to all participants, some users are more likely to edit old and add new content while others use them for primarily for information retrieval or reading. Based on the argument of Trkman etTrkman(2009), we have termed the former users as active while later as passive users of wikis. In KMS use, *knowledge sharing* and *knowledge sourcing* terminologies have been used to depict active and passive use, respectively (Velasquez *et al.* 2009). Thus, in enterprise wikis, with *active use* [AU] users search existing knowledge and/or make new knowledge by either updating the existing contents or creating new pages from scratch, and with *passive use* [PU], they would only read existing information. Literature suggests IS use has significant positive effect on individual performance such as improved decision making (Yuthas et Young, 1998). Urbach*et*

al. (2010) found employee portals use to be helpful in improved productivity, efficiency, and effectiveness of employees. Hence, we propose the hypothesis that enterprise wiki use will lead to better individual performance and therefore mediates the relationship between perceived quality and net benefits.

Wiki User Satisfaction

End-user satisfaction of IS has been considered a significant metric in measuring IS success in literature. McKinney *et al.*(2002; p. 297) noted that *"although many studies in end-user satisfaction do not explicitly separate information and system features when identifying the structure and dimensionality of the user-satisfaction construct, Delone et McLean* (1992)*made an explicit distinction between information aspects and system features as determinants of satisfaction"*.Similarly, information satisfaction and system satisfaction were segregated by McKinney *et al.*(2002) for internet shoppers. This research proposed three dimension of user satisfaction namely*collaboration satisfaction*[COLLSAT], *information satisfaction*[INFOSAT], and *system satisfaction*[SYSSAT]. It is proposed that user satisfaction has a positive effect on end-user's job performance based on the findings of past research such as Petter*et al.*(2008) and Urbach*et al*. (2010). Therefore, wiki user satisfaction mediates the relationship between perceived wiki quality and individual performance.

3.3.The output level (3) - perceived net benefits

The final level of analysis is concerned with perceived net benefits gained with enterprise wikis. The assessment of net benefits gained with IS use has been a main concern for IS researchers. Since, this research focuses on individual level analysis, net benefits have been measured by individual benefits gained (improved productivity in task execution and improved professional competency) with wiki use in knowledge and project management.Three dimensions namely, *efficiency, effectiveness,* and *capacity development* have been taken into consideration.*Efficiency*[EFF] is defined as executing a task in less time with IS use (Jain et Kanungo 2005), which is a measure of enhanced individual performance. According to a study by Arazy(2009) et al. wiki users reported ease in work and enhanced productivity with the wiki use in a survey of corporate wiki users. *Effectiveness*[EFT] refers to the improvement in quality of work done with IS use (Goodhue & Thompson, 1995). Pentland(1989) has also suggested effectiveness as a dimension of end-user performance. The final measure of individual performance is *capacity or competence development* [CAP], which is the development of new skills and knowledge by IS use. Since wikis are

collaborative in nature, therefore they increase the likelihood of skill development as users frequently interact with others, share knowledge and learn (Cress et Kimmerle 2008). Also as suggested by Nonaka*et al*. (1995), such collaborative tools help in socialization of knowledge thus enhancing the knowledge spiral.

4. Research hypotheses

In this research, three types of hypotheses are investigated to justify the structure of conceptual model, referred as thegeneral hypothesis, the adjacent-hypotheses and the hypotheses concerning direct and indirect dependences. The general hypothesis (HG) concerns all the relations of the research model. It is further decomposed into adjacent-hypotheses (HA) that define the relationships among conceptual levels. Each of these sub-hypotheses is analyzed by partial hypotheses of direct dependence (HDD) and indirect dependence (HDI) among the proposed research variables (See Figure 2).

4.1. The general hypothesis:

HG*: The perceived enterprise wiki success (Level 1) has a direct and an indirect positive effect via mediation of process variables (Level 2)on wiki end-user performance (Level 3)*

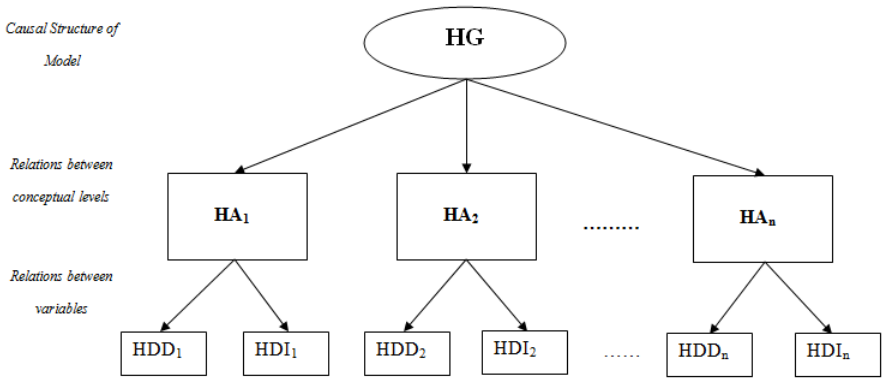

Figure 2: Levels of hypotheses

The general hypothesis (HG) leads to three underlying sub-hypotheses, concerning:

HG$_1$: *The perceived enterprise wiki success (Level 1) has a direct and an indirect positive effect via mediation of process variables (Level 2)on end-user efficiency (Level 3)*
HG$_2$*: The perceived enterprise wiki success (Level 1) has a direct and an indirect positive effect via mediation of process variables (Level 2)on end-user effectiveness (Level 3)*
HG$_3$*: The perceived enterprise wiki success (Level 1) has a direct and an indirect positive effect via mediation of process variables (Level 2)on end-user capacity development (Level 3)*

4.2. The hypotheses of direct (HDD) and indirect dependence (HDI) among variables:

HDD: *The variables of perceived wiki success (Level 1) have a direct positive effect on the variables of perceived end-user performance (Level 3)*
HDI$_1$*: The variables of perceived wiki success (Level 1) have an indirect positive effect on variables of perceived end-user performance (Level 3) via mediation of wiki use variables (Level 2 a)*
HDI$_2$: *The variables of perceived wiki success (Level 1) have an indirect positive effect on variables of perceived individual performance (Level 3) via mediation wiki user satisfaction variables (Level 2 b)*

Following Figure 3 represents the theoretical model of research.

5. Research methodology

5.1.Wiki experience field

We have investigated various organizations and visited their facilities in-person. Ten interviews with the social media managers/ MIS implementation managers were carried out in order to find out what are the main purposes of wiki use within those firms. It was found that majority of the organizations use corporate wikis for knowledge and project management where employees are encouraged to build a database.

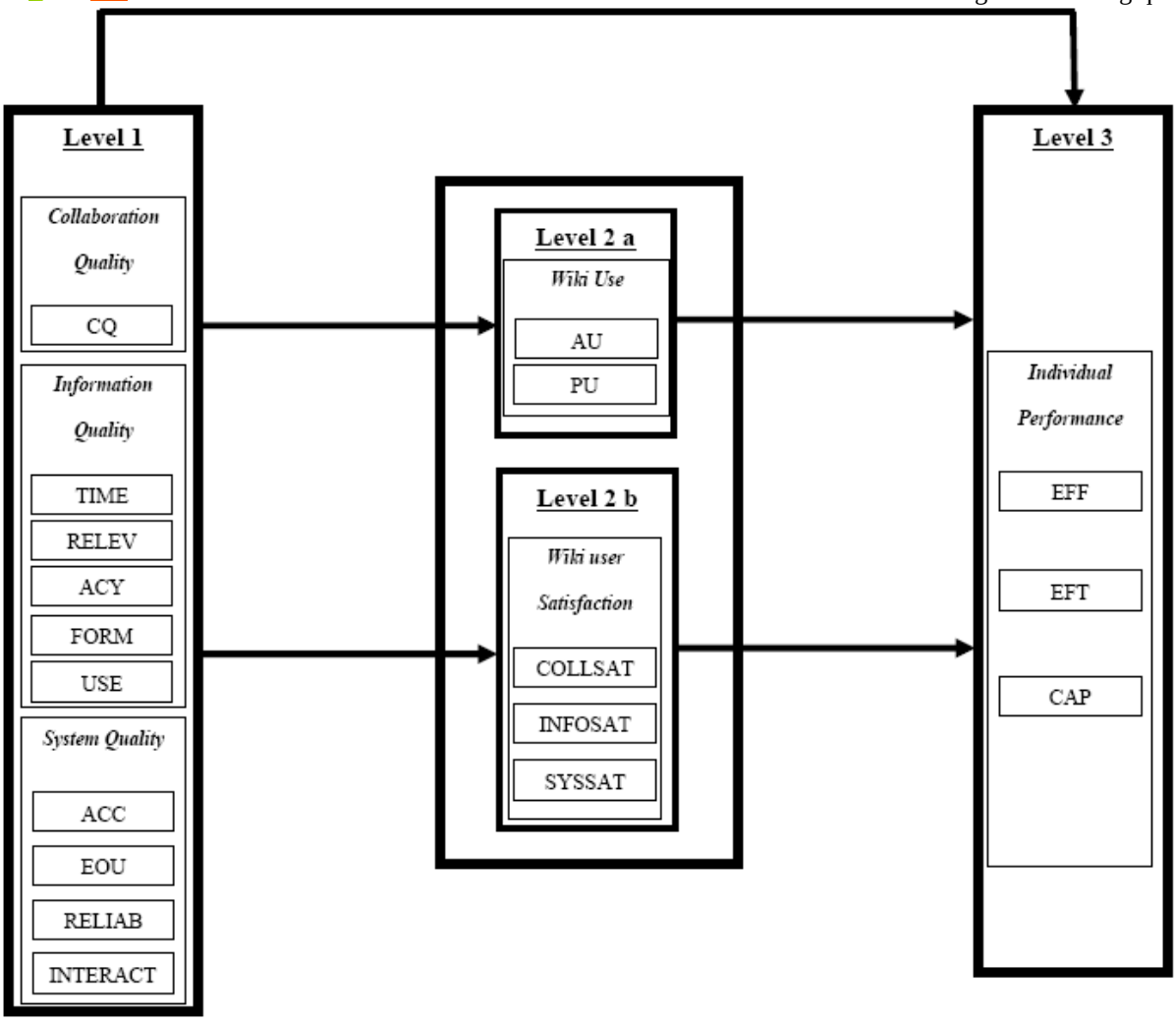

Figure 3: Research model to be tested with different levels

5.2.Subjects and instrumentation

Next, an online questionnaire survey was developed to be filled in by corporate wiki users. During pre-testing, the questionnaire was tested with the professional users of enterprise wikis. Majority of the constructs were adopted from existing scales but modified in this research context. Wordings of some items were changed after pilot testing, especially for new items that were incorporated for the constructs collaboration quality, active use, and passive use. Respondents were sent a link of online questionnaire in English language hosted onGoogle Docs. Follow-up emails were sent as reminders to increase the response rate. A brief description of research was given with the questionnaire link in the emails gathering data from a total of 181 responses out of which 177 observations were used after performing a multivariate outlier test using Cook's and Leverage method.

6. Results

Before testing the hypotheses, we carried out a preliminary analysis aimed at testing the dimensionality of each construct.

6.1.Data Preliminary Analysis

Various reliability and validity tests were performed. Initially, for purification and specification of internal scale structure, an exploratory factor analysis with Varimax rotation was run.Uni-dimensionality and hence convergent validity followed by a discriminant validity of measurement scales was established with factor analysis. Next, a confirmatory analysis was conducted to confirm the convergent and discriminant validities of the scales. The synthesis of results concerningpreliminary scale testing is provided inAppendix.It establishes the dimensionality of each variable, with a high explained variance (i.e., VE> 50%) for each factor extracted by thePrincipal Component Factor Analysis (PCFA) and factorial solutions of all variables of high factor loadings, which are all above the minimum threshold of 0.50.

Two of the items for variable *collaboration quality* [CQ] were dropped due to low factor loadings. Furthermore, variables *relevance* [RELEV] and *usefulness* [USE] were merged into single variables named [RELEV_USE] since discriminant validity was not established between the two. This is why, they are merged into a single variable named [RELEV_USE]. This is perhaps due to the reason that individuals perceive information provided by the wiki system to be useful only if it is relevant to their work needs.Similar findings were observed for variables *accessibility* [ACC] and *ease of use* [EOU], merged into [ACC_EOU]. Again, the conceptual similarities and overlapping between these two variables led merging them into a single independent variable. This shows that end-users perceive wiki system to be user friendly if the system is easily accessible or quick to access. Wiki use was measured by two dimensions *active use* [AU] and *passive use* [PU],the discriminant analysis revealed they were not considered different factors, therefore, merged into a single factor [AU_PU].

This shows that individuals use wiki system for both retrieving and sharing information; if a user is retrieving information via the wiki, s/he is likely to share the information as well. In addition, *collaboration satisfaction* [COLLSAT] and *information satisfaction* [INFOSAT], merged into [COLLSAT_INFOSAT] after running a discriminant analysis. Since, collaboration satisfaction has not been measured before, we infer that wiki end-users who are

satisfied with the quality of information provided also feel satisfied to its collaborative features since the information is collaboratively build.

Finally, at the dependent level, initially we conceptualized three constructs (*efficiency*, *effectiveness* and *capacity*) from the literature to the perceived net benefits from wiki use in a project management task.The discriminant analysis revealed that *efficiency* [EFF] and *effective* [EFT] did not discriminate as perceived by wiki users and therefore merged into a single variable [EFF_EFT]. This means the improvement in work speed and quality of task is perceived to be similar. Reliability of the scales was measured using Cronbach's Alpha which was found to be greater than 0.75 for all scales (See Appendix).The model fit indices of discriminant validity among different variables are shown inTable 1.

CONCEPT	**VARIABLES**	**MODEL FIT INDICES**							
		χ^2	**df**	**p**	**Normed χ^2**	**RMSEA**	**TLI**	**CFI**	**GFI**
INFORMATION QUALITY	TIME, RELEV_USE, ACY, FORM	194.37	107	0.00	1.81	0.06	0.948	0.959	0.888
SYSTEM QUALITY	ACC_EOU, RELIAB, INTERACT	127.98	69	0.00	1.85	0.07	0.953	0.964	0.910
SATISFACTION	COLLSAT _INFOSAT, SYSSAT	123.67	41	0.000	3.016	0.107[1]	0.946	0.967	0.897
INDIVIDUAL PERFORMANCE	EFF_EFT, CAP	83.318	38	0.000	2.193	0.082	0.947	0.963	0.918

Table 1: Discriminant Validity with CFA

6.2.Structural model and results of hypotheses testing

This analysis is subjected to two successive stages.First, to validate the general hypothesis (HG) of "fit" between the proposed conceptual model and data, and secondly, to test the adjacent hypotheses of direct and indirect causalities among variables.The aim is to test direct linear relationship between each of the first level exogenous variables (measuringperceived

[1]RMSEA can be a poor estimator of fit for small samples, whereas IFI is relatively unaffected by sample size(Bollen, 1990; p. 451). Therefore, RMSEA results should be interpreted with caution.

wiki success [CQ, TIME, RELEV_USE, ACY, FORM, ACC_EOU, RELIAB and INTERACT]) and the third level of the endogenous variables (measuring perceived net benefits [EFF_EFT and CAP]). Further, the indirect relationships via mediation of process variables [AU_PU, COLLSAT_INFOSAT and SYSSAT] are also tested in this analysis.

6.2.1. Identification and validation of model structure – testing of general hypothesis

The process of identification and validation of the optimal structure (See Figure 4),is an essential step to justify the linear relationships between endogenous and exogenous variables of the proposed model. The analysis of fit indices shows that the causal model is over-identified. The conditions of data fit (calculated with "maximum likelihood" method) are met (See Table 2). Therefore, the general hypothesis (HG) stating that *the perceived enterprise wiki success (Level 1) has a direct and an indirect positive effect via mediation of process variables (Level 2)on wiki end-user performance (Level 3)* is validated.

Indices	Estimated Values
Chi square χ2	**15.267**
P (χ2 = 15.267)	**0.851**
df	**22**
GFI	**0.987**
AGFI	**0.947**
RMR	**0.019**
RMSEA	**0.000**
NFI	**0.989**
CFI	**1.000**
IFI	**1.005**
TLI	**1.018**
Normed χ2 (χ2/df)	**0.694**
R^2	**%**
EFF_EFT	**39.6****
CAP	**66.5****
(**) α<0.01	

Table 2: Fit indices of optimal model structure

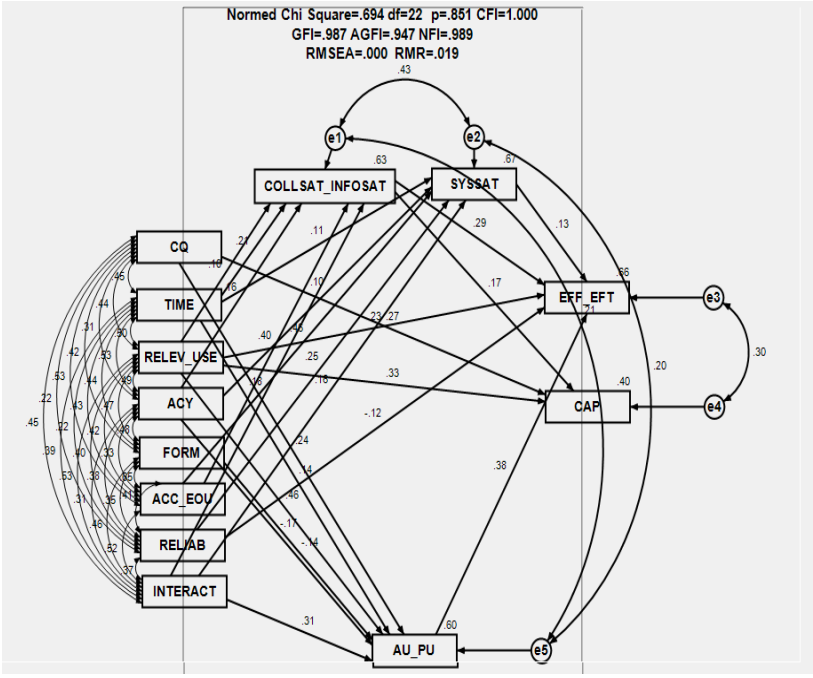

Figure 4: Optimal model of causal relations

Relation	Estimate (βi)	σ (βi)	T	P
AU_PU ← CQ	.236	.057	4.176	***
COLLSAT_INFOSAT ← TIME	.207	.059	3.526	***
SYSSAT ← TIME	.108	.054	1.987	**.047**
AU_PU ← RELEV_USE	.464	.063	7.342	***
AU_PU ← ACY	-.173	.061	-2.827	**.005**
AU_PU ← FORM	-.138	.059	-2.330	**.020**
AU_PU ← INTERACT	.311	.060	5.174	***
COLLSAT_INFOSAT ← RELEV_USE	.098	.055	1.789	**.074**
SYSSAT ← ACY	.104	.053	1.959	**.050**
SYSSAT ← ACC_EOU	.460	.053	8.633	***
SYSAT ← RELIAB	.250	.045	5.559	***
SYSSAT ← INTERACT	.159	.052	3.056	**.002**
COLLSAT_INFOSAT ← ACY	.164	.056	2.921	**.003**
COLLSAT_INFOSAT ← ACC_EOU	.398	.055	7.197	***
COLLSAT_INFOSAT ← INTERACT	.181	.058	3.134	**.002**
AU_PU ← TIME	.140	.062	2.255	**.024**
CAP ← CQ	.270	.065	4.141	***
EFF_EFT ← RELEV_USE	.232	.061	3.791	***
CAP ← RELEV_USE	.330	.071	4.626	***
EFF_EFT ← RELIAB	-.122	.052	-2.346	**.019**
EFF_EFT ← SYSSAT	.126	.074	1.705	**.088**
EFF_EFT ← COLLSAT_INFOSAT	.287	.072	4.016	***
EFF_EFT ← AU_PU	.382	.058	6.571	***
CAP ← COLLSAT_INFOSAT	.166	.073	2.274	**.083**
***** P<0.01**				

Table 3: Regression analysis results

The comparison of standardized path coefficients (βi) based on t-test significance (See Table 3) which shows only the retained significant paths) carried out with structural equation modeling allows to remove the insignificant paths of variables within the structure of causalities to attain an optimal model with just the significant paths. This model, described by the diagram of causal relationships, simplifies the study of interdependencies leading to the underlying adjacent hypotheses testing of direct and indirect relationships.

6.2.2. Test of adjacent hypotheses

This hypotheses test leads to successively analyze the direct effects of dependency (DD), indirect (DI) and total effects (DD+DI) of each exogenous variables on the endogenous variables (See Table 4).Phantom modeling approach developed by Macho and Ledermann(2011) has been used to test the specific mediation effects of each mediating variable. According to Macho and Ledermann(2011; p. 34), "*…the rationale underlying this novel method consists in representing the specific effect to be assessed as a total effect within a separate latent variable model, the phantom model that is added to the main model"*. Phantom model approach was applied to path analysis in order to obtain the specific indirect effects via each mediator, which were not previously possible with the SEM techniques in multiple mediations. Macho &Ledermann(2011) argue that Phantom model approach requires the user to execute a latent variable model that represents the specific effect as a total effect and be executed with the bootstrapping procedure with structural equation modeling (SEM). Following Figure 5, Figure 6, and Figure 7show phantommodeling analysis via each mediating variable (AU_PU, COLLSAT_INFOSAT, and SYSSAT), respectively.

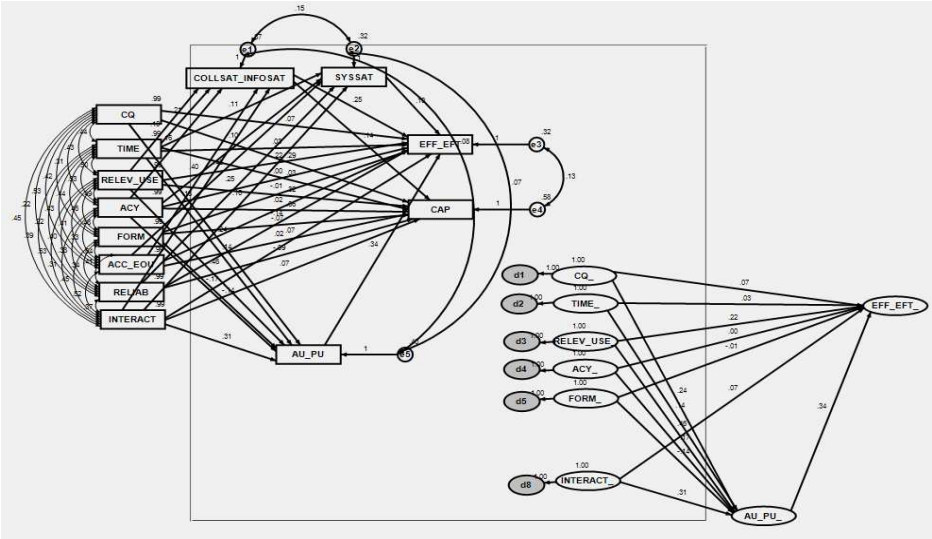

Figure 5: Phantom modeling analysis for mediation effects via AU_PU

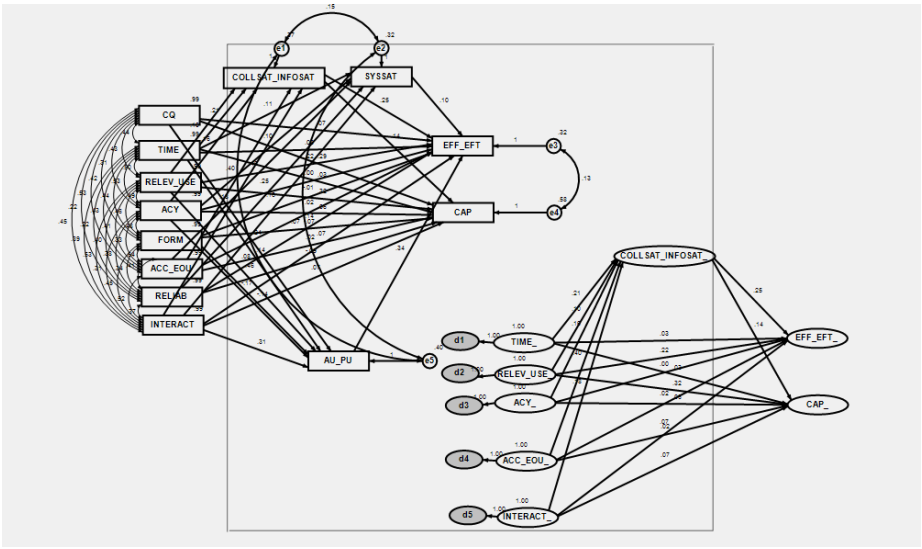

Figure 6: Phantom modeling analysis for mediation effects via COLLSAT_INFOSAT

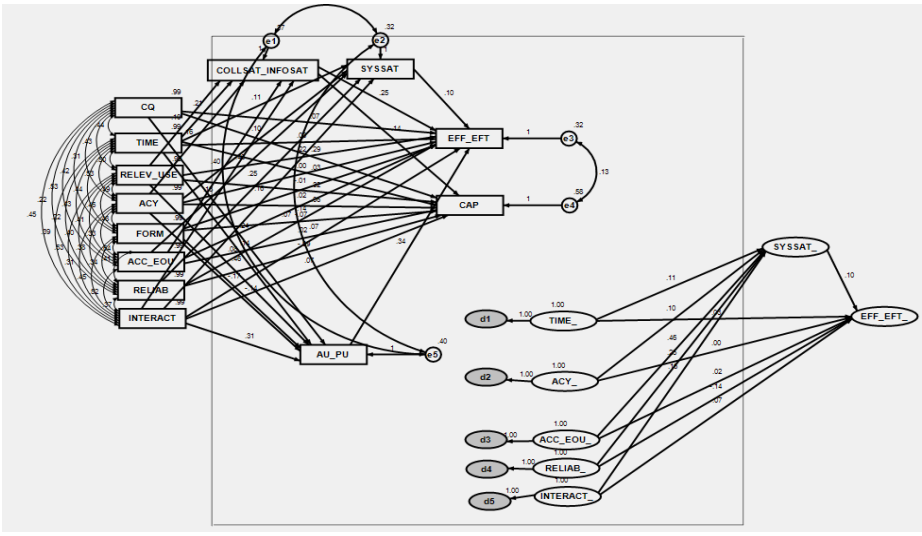

Figure 7: Phantom modeling analysis for mediation effects via SYSSAT

⇨ Testing direct hypothesis concerning EFF_EFT:

Not all the variables of perceived wiki success have a direct effect on EFF_EFT, thus the hypothesis of a direct effect of perceived wiki success on EFF_EFT is partially accepted. CQ, TIME, ACY, FORM, ACC_EOU, and INTERACT were not found to have a significant direct effect on EFF_EFT, whereas, a significant positive effect of RELEV_USE and RELIAB was found on EFF_EFT.

⇨ Testing indirect hypothesis concerning EFF_EFT via AU_PU, COLLSAT_INFOSAT and SYSSAT

The indirect effect on dependent variable EFF_EFT was calculated via the mediating variables, i.e., AU_PU, COLLSAT_INFOSAT and SYSSAT. Results depicted that the

mediation via AU_PU was partially accepted since all of endogenous variables did not have a significant indirect effect on EFF_EFT. Only variables CQ, TIME, RELEV_USE and INTERACT were found to have to a significant indirect effect, while two variables (ACY and FORM) have a negative indirect effect on EFF_EFT via AU_PU.Similarly, the hypothesis of having indirect effects on EFF_EFT via the mediation of COLLSAT_INFOSAT is partially accepted. The variables having a significantly positive indirect effect on EFF_EFT are TIME, RELEV_USE, ACY, ACC_EOU, and INTERACT.Finally, the hypotheses of indirect effects on EFF_EFT via the mediation of SYSSAT is rejected since no exogenous variable has a significant mediation via SYSSAT on EFF_EFT.

⇨ Testing direct hypothesis concerning CAP:

Only two variables measuring perceived wiki success have a direct effect on CAP, thus the hypothesis of a direct effect of perceived wiki success on CAP is partially accepted. The variables CQ and RELEV_USE have a significant positive direct effect on CAP.

⇨ Testing indirect hypothesis concerning CAP via AU_PU, COLLSAT_INFOSAT and SYSSAT :

The hypothesis of indirect effects on CAP via the mediation of AU_PU, COLLSAT_INFOSAT and SYSAT is rejected since no exogenous variable has a significant mediation via AU_PU, COLLSAT_INFOSAT or SYSSAT on CAP.

A synthesis of results concerning adjacent hypotheses is shown in Table 4.

7. Discussions and findings

The theoretical and practical discussion following the results of statistical analysis performed aims to provide an interpretation of these results.

7.1.Discussions related to Collaboration Quality

Results show that *collaboration quality* is one of the only two factors that affect efficiency/effectiveness as well as capacity development of wiki end-users. Collaboration quality has an indirect positive effect mediated via wiki use on efficiency/effectiveness of wiki end-users while the direct effect is found to be insignificant. Therefore, we conclude that if collaborative features of wiki system are used for retrieving and sharing information, this could increase the efficiency and effectiveness in a given task. As employees use wiki to collaborate with their colleagues, they are better able to perform their tasks both in time and quality of the task. This makes sense, since collaboration enables group tasks execution hence consuming less time but better in quality. Urbach*et al.*(2010) found collaboration quality affecting employee portals use and our findings are in consistency with theirs. They however,

found a significant impact of collaboration quality on user satisfaction while our study does not support their findings. Furthermore, collaboration quality also has a positive significant impact on individuals' capacity development. Since, users perceive that a collaborative system would let them have an opportunity to benefit from others' work and skills as well which, this can eventually enhances their professional capacity. A wiki system providing good collaborative features provide a learning environment to its users to improve their skills as many of their colleagues share their thoughts and experiences via the same platform.

7.2.Discussions related to information quality

Information quality is measured with multiple dimensions namely: timeliness, relevance/usefulness, accuracy, and format. *Timeliness* did not directly impact users' perceived efficiency/effectiveness and their capacity. Though, a significant indirect positive effect via wiki use and user's satisfaction was observed. This is in consistency with the findings of Nelson et al., (2005) and Wixom et Todd (2005) who found that timeliness of information positively impacts an IS user's satisfaction level. One of the purposes of wikis is to let people collaborate and make information timely available to other users. We argue that in enterprise wikis, the more the information is up-to-date, the more likely it is to be used for project or knowledge management tasks. This would in turn help users to efficiently perform in their work settings. In a project environment, currency of information is critical as obsolete information could result in financial and performance loss for a firm. Besides, timeliness of information does not play a significant role in the capacity development of users. This shows that timely updating of information results in short time benefits such as efficiency of work but users do not believe it to be beneficial in long term such as their work related capacity development. One way of achieving timeliness of the information is to engage more employees with a wiki system, since a critical mass of the user can help in timely adding and editing information.

Relevance/usefulness of information is described as the significance and goodness of information that is considered useful in one's task. It is found that relevance of information has both direct and indirect positive impact of users' work efficiency. Information relevance is one of the only two factors affecting a user's capacity development.This shows that the information that is relevant and useful in aproject, helps in the development of a user's organizational knowledge and let him/her handle the tasks in an innovative manner. It might

also help the user in knowing things specific to different tasks and hence improve him/her task performance skills, or develop new skills.

	Endogenous Variables									
	EFF_EFT					**CAP**				
Exogenous Variable	**DE**	**IE via (AU_PU)**	**IE via (COLLSAT_INFOSAT)**	**IE via (SYSSAT)**	**TE**	**DE**	**IE via (AU_PU)**	**IE via (COLLSAT_INFOSAT)**	**IE via (SYSSAT)**	**TE**
CQ	0.070	**0.080****	N.S	N.S	0.150	**0.287***	N.S	N.S	N.S	0.287
TIME	0.027	**0.048***	**0.051***	0.009	0.137	0.029	N.S	0.030	N.S	0.059
RELEV_USE	**0.216****	**0.157****	**0.024***	N.S	0.397	**0.316***	N.S	0.014	N.S	0.330
ACY	0.002	**-0.059**$^{+}$	**0.040***	0.012	-0.006	0.062	N.S	0.024	N.S	0.086
FORM	-0.011	**-0.047***	N.S	N.S	-0.058	-0.074	N.S	N.S	N.S	-.074
ACC_EOU	.016	N.S	**0.098***	0.048	0.161	0.023	N.S	0.057	N.S	0.080
RELIAB	**-0.136**$^{+}$	N.S	N.S	0.026	-0.11	-0.094	N.S	N.S	N.S	-.094
INTERACT	0.071	**0.106****	**0.045***	0.017	0.237	0.068	N.S	0.026	N.S	0.094

DE: Direct Effect; **IE:** Direct Effect; **TE:** Total Effect;;**N.S**; Not Significant

***** Sig.at 0.001 ; * Sig. at 0.05 ;*** $^{+}$ ***Sig. at 0.10***

Table 4: Synthesis of adjacent hypotheses

If the information provided by the wiki system is relevant to their work needs, the users are likely to save time in search of information and utilize the time in performing their tasks. Our findings support past research findings by DeLone et McLean(1992) and McKinney *et al.*(2002), who found out relevance and usefulness as discriminant factors of information quality that affect user's information satisfaction and use ofIS. Other studies also support this finding such as McKinney *et al.*(2002).

As far as the *accuracy* of information is concerned, our findings indicate a negative significant mediation via wiki use on individual efficiency/effectiveness. This implied that as wiki end-user uses the system more, the accuracy of information is likely to reduce his/her work place perceived efficiency/effectiveness. This finding is different from past studies where accuracy of the information provided by the system was found as the one of the most important factors determining IS user satisfaction(Bailey et Pearson, 1983; Wixom et Todd, 2005). This negative mediation through use can be explained by considering the active use of wikis. This implies that as the accuracy of the information is increased, the users do not feel the need of using the system as there is no need of editing or adding the information to the system. At the same time, a wiki user would perceive a negative impact on his performance if he/she is involved in correcting the erroneous information which is a time consuming task. It should be made sure in enterprisewikis that users do not enter wrong and incorrect information in the system; otherwise it might consume time of other users in correcting that information. Anonymity should be reduced in user postings to avoid incorrect information postings in the wiki system.

Format of information is defined as the degree of understandability and interpretability of information to the user for performing his/her tasks. Format of information is also found to negatively influence perceived individual performance via wiki use. Better the format of information, less is the perceived efficiency, while there is no effect whatsoever on perceived capacity/skill development of the wiki end-user. A possible explanation for this unusual relationship is that wiki users feel themselves as active users of the system. There is a high possibility that wiki users believe themselves to be vital players in setting the format of information, which other users have put in a wrong format. Thus, formatting of information can be time consuming, ending up losing time in reformatting information. We propose that a wiki system must have pre-defined formatting styles which would save time for the users and help them in better understanding of their needed information.

7.3.Discussions related to system quality

System quality is also multidimensional and is measured by the accessibility/ease of use, reliability, and interactivity of the wiki system.

Accessibility/ease of use:the accessibility and ease of use of wiki system are perceived as one dimension by respondents. It is defined effort to access and ease with which the system can be utilized by the end-user. The results indicate a significant positive impact of this dimension on an end-user's perceived performance. This shows that a wiki system that is user friendly and which gives quick and easy access to information, helps users in better performing their tasks at work. The ease of the utilization shows the users are able to easily retrieve and publish information for their work needs. By simplifying wiki system's functionality and features, it is possible to engage more users in the collaboration process and hence more information building. As more and more information is shared, users are much likely to be satisfied with that information. However, capacity development was not effected either directly or indirectly by accessibility/ease of use which was also found out in some past studies such as McGill etKlobas(2005), Goodhue et Thompson(1995), and Wu et Wang (2006)who have reported insignificance of this relationship between system quality and perceived individual benefits.

*Reliability*measures the consistency and dependability of a system in terms of its technical operations over time so that it is free of errors and bugs.Interesting results were obtained that showed a negative direct relationship of reliability with the perceived efficiency/effectiveness of the individual.Even though the findings are somewhat difficult to explain for this unusual relationship that as reliability of system increases, the users perceive their work efficiency to be decreased. Similar results were obtained by Goodhue et Thompson (1995) in a study of IS and task-technology fit. They argued that the negative impact of reliability of a system on perceived user performance is may be due to the fact that the individuals who use the IS heavily and are highly dependent on it are more frustrated by the downtime and its impact on performance reduction. They further explain that highly dependent users are more likely to be blocked in their work if the system is down and thus more likely to rate the systems as unreliable. Furthermore, individuals who are more dependent on the system might have poor relations with the IT service personnel due to frequent interactions, and therefore rated low

evaluations of this relationship. We argue that corporate wiki users who are dependent on the systems a great deal might have poorly evaluated the system's reliability relation with their performance impacts.

Interactivity is defined as the level and ease of interaction of a user to share and retrieve information from the wiki system. Interactivity of wiki system is found to indirectly impact perceived efficiency/effectiveness of wiki end users via wiki use and wiki collaboration/information satisfaction. It does not have any direct or indirect influence on the capacity/skill development of the wiki user. The findings suggest that the more interactive a system is; more satisfied are the users with the collaboration/information. This shows that an interactive wiki system does not enhance system satisfaction rather users perceive an interactive wiki system to enable active participation in information sharing and creation and therefore enhances user's satisfaction related to collaboration/information. We argue that integrating more interactive features that would enable users to engage in the system provide them a sense of achievement as they feel being a part of organizational knowledge pool. This might also include an aspect related to one's repute in organization, as sharing knowledge in the wiki system highlights a user's profile to other users. Wiki, unlike traditional IS, enable user participation, which can only be possible through a high level of interaction with the system. Thus, higher the interactivity features are provided in a wiki system, they would lead to more benefits and use. McKinney *et al.*(2002), Palmer (2002), and Jarvenpaa et Todd (1996) found out that interactivity of websites to be an important factor in determining usage of e-commerce websites. Palmer (2002) suggested that these measures should be included frequently for measuring website success. In case of wiki systems, a possible reason for which we have found out that interactivity could be that the interactivity enables the user to add to the existing information and help create good quality information in collaboration with their colleagues.

8. Conclusion : contributions and limitations

The implementation of social tools in firms is growing, wikis being one of them can be beneficial if the technology is deployed smartly. This study undertaken has evaluated the success ofenterprise wiki systems in terms of the end user's efficiency, effectiveness, and capacity development in performing their project tasks. The use of wikis is mainly considered to be an active use by the individuals, in that they it as a system in which they can add and edit information. Therefore, we can say that people have an urge for authoring and be a part of

the corporate knowledge building. From the managerial perspective, companies can use this long tail phenomenon and maximize the use of tacit knowledge residing in employees' brains. This is a great opportunity for firms to capture the hidden knowledge by engaging their employees in the authorship. As collaboration at workplace is very necessary especially in case of team tasks and geographically dispersed teams, enterprise wikis can be very helpful in improving this collaboration at work. Technically, collaborative in nature and based on the phenomenon of getting better as more users use it, wiki collaboration can help firms in better teamwork and reducing the friction among their geographically dispersed teams working on same tasks. More collaborative features can be incorporated in the wiki with time so as to make things much efficient.

The study also has some limitations such as the choice of only the operational dimensions of the perceived wiki success. This limit is due to the nature of assessment and positioning the level of analysis from an end-user's perspective. Another limitation is the treatment of perceived net benefits in terms of individual performance. Self-reported measures increase the likelihood of common method bias (CMB) though Harman's single factor test was conducted to confirm the non-existence of CMB yielding a total explained variance of 39.46%. One of the major limitations of the study is that we have analyzed and discussed wiki end users' perceptions on different platforms. These Wiki systems have been customized according to the professional needs of the company in which they are deployed. Therefore, our analysis is based on the typical corporate wiki systems that are equipped with state-of-the-art technological features.

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Appendix : Measurement Scales, Factor Analysis and Reliability Test Results

Variable Name	**PCFA Loading** [***CFA Loading***]	**Construct Items** *Cronbach's Alpha (α)/ Variance explained by factor (VE)* *[Jöreskog Rho/ RhoVc AVE]*
INDEPENDENT VARIABLES – PERCEIVED WIKI SUCCESS		
CQ: COLLABORATION QUALITY (*α = 0.749 / VE = 56.3 %) [ρ = 0.754/ AVE = 44 %]*		
CQ1	.801[*.69*]	The wiki enables an easy and comfortable communication with my colleagues
CQ2	.612 [*.58*]	The wiki supports an effective and efficient sharing of information between the members of a project
CQ3	Item dropped	The wiki enables a comfortable storing and sharing of documents with my colleagues
CQ4	.847 [*.69*]	The wiki supports an effective networking between the members of a project in my organization
CQ5	Item dropped	The wiki enables me to create and update documents collaboratively with my colleagues
CQ6	.721 [*.67*]	Generally, the quality of collaboration of wiki system is good
TIME: TIMELINESS (*α = 0.870 / VE = 79.612 %) [ρ = 0.876/ AVE =70 %]*		
TIME1	.877 [*.79*]	The information provided by wiki is sufficiently current for my work
TIME2	.912 [*.91*]	The information provided by wiki is sufficiently timely
TIME3	.887 [*.81*]	The information provided by wiki is sufficiently up-to-date
RELEV_USE: RELEVANCE/USEFULNESS (*α = 0.917 / VE = 66.8 %) [ρ = 0.911/ AVE =60 %]*		
RELEV1	.851 [*.77*]	The information provided by wiki is applicable to my tasks at work
RELEV2	.841 [*.83*]	The information provided by wiki is related to my tasks at work
RELEV3	.861 [*.87*]	The information provided by wiki is pertinent to my work
RELEV4	.858 [*.86*]	In general, the wiki provides information relevant to my work
USE1	.747 [*.67*]	The information provided by wiki is informative for my professional activities
USE2	.799 [*.69*]	The information provided by wiki is valuable for the accomplishment of my tasks, and my project
USE3	.797 [*.69*]	In general, the information from wiki is useful in my work
ACY: ACCURACY (*α = 0.906 / VE = 84.143 %) [ρ = 0.904/ AVE = 76 %]*		
ACY1	.914 [*.87*]	The information provided by wiki is accurate
ACY2	.929 [*.90*]	The information provided by wiki is reliable
ACY3	.909 [*.84*]	Generally, the information communicated by the wiki is correct and reliable

FORM: FORMAT (*α = 0.888 / VE = 75.121 %) [ρ = 0.903/ AVE = 70]*		
FORM1	.862 [*.88*]	The information provided by wiki is clear in meaning
FORM2	.931 [*.91*]	The information provided by wiki is easy to comprehend
FORM3	.861 [*.82*]	The information provided by wiki is easy to read
FORM4	.809 [*.73*]	In general, the information is understandable for me in making decisions
ACC_EOU: ACCESSIBILITY/EASE OF USE (*α = 0.909/ VE = 65.23 %) [ρ = 0.915/AVE = 61 %]*		
ACC1	.732 [*.66*]	The wiki system is responsive to my requests
ACC2	Item dropped	The wiki system quickly loads the information pages
ACC3	.717 [*.63*]	In general, the wiki provides good access to the information
EOU1	.831 [*.80*]	The wiki system has a simple layout for its contents
EOU2	.810 [*.78*]	The wiki system is easy to use
EOU3	.862 [*.92*]	The wiki system is well organized in terms of its operation
EOU4	.827 [*.79*]	The wiki system has a clear design
EOU5	.862 [*.84*]	In general, the wiki is user-friendly
RELIAB: RELIABILITY (*α = 0.871 / VE = 79.752 %) [ρ = 0.883/ AVE = 72 %]*		
RELIAB1	.830 [*.94*]	The wiki system operates reliably
RELIAB2	.928 [*.82*]	The wiki system is technically free of errors (bugs)
RELIAB3	.918 [*.77*]	The wiki system The operation of the wiki is dependable
INTERACT: INTERACTIVITY (*α = 0.882 / VE = 74.457 %) [ρ = 0.885/ AVE = 66 %]*		
INTERACT1	.865 [*.92*]	The wiki system provides the capability to create content /information
INTERACT2	.868 [*.93*]	The wiki system provides the capability to edit information from an already created content
INTERACT3	.871 [*.66*]	The wiki system enables me to customize information according to my needs
INTERACT4	.848 [*.71*]	In general, the wiki enables an active participation
MEDIATING VARIABLES – PROCESS LEVEL		
AU_PU: ACTIVE USE/PASSIVE USE (*α = 0.901 / VE = 67 %) [ρ = 0.887/ AVE = 57 %]*		
AU1	.861 [*.92*]	I regularly use wiki to share information in my job
AU2	.769 [*.93*]	wiki considerably improves the possibilities of sharing of my data and information
AU3	.845 [*.66*]	In general, the frequency of use of wiki to share knowledge in the exercise of my profession is
PU1	.825 [*.71*]	I often use wiki to retrieve and collect information on the projects for which I work
PU2	.705 [*.71*]	The wiki substantially decreases the time required for the acquisition of data and information relevant to my work
PU3	.890 [*.71*]	Overall, the frequency of using wiki to retrieve knowledge for my work is
COLLSAT_INFOSAT: COLLABORATION SATISFACTION/INFORMATION SATISFACTION (*α = 0.952 / VE = 75.271 %) [ρ = 0.954/ AVE =72 %]*		
COLLSAT1	.857 [*.76*]	Dissatisfied Vs. Satisfied (1 = Highly Dissatisfied, 5 = Highly Satisfied)
COLLSAT2	.873 [*.84*]	Displeased Vs. Pleased (1 = Very Displeased, 5= Very Pleased)
COLLSAT3	.856 [*.83*]	Frustrated Vs. Contented (1= Frustrated, 5= Contented)
COLLSAT4	.873 [*.88*]	Disappointed Vs. Delighted (1= Disappointed, 5= Delighted)
INFOSAT1	.834 [*.85*]	Dissatisfied Vs. Satisfied (1 = Highly Dissatisfied, 5 = Highly Satisfied)
INFOSAT2	.887 [*.84*]	Displeased Vs. Pleased (1 = Very Displeased, 5= Very Pleased)
INFOSAT3	.867 [*.91*]	Frustrated Vs. Contented (1= Frustrated, 5= Contented)
INFOSAT4	.891 [*.88*]	Disappointed Vs. Delighted (1= Disappointed, 5= Delighted)
SYSSAT: SYSTEM SATISFACTION (*α = 0.957 / VE = 79.612 %) [ρ = 0.958/ AVE =85 %]*		

SYSSAT1	.937 [*.92*]	Dissatisfied Vs. Satisfied (1 = Highly Dissatisfied, 5 = Highly Satisfied)
SYSSAT2	.950 [*.93*]	Displeased Vs. Pleased (1 = Very Displeased, 5= Very Pleased)
SYSSAT3	.934 [*.80*]	Frustrated Vs. Contented (1= Frustrated, 5= Contented)
SYSSAT4	.949 [*.94*]	Disappointed Vs. Delighted (1= Disappointed, 5= Delighted)
DEPENDENT VARIABLES – PERCEIVED NET BENEFITS		
EFF_EFT: EFFICIENCY/EFFECTIVENESS (*α = 0.881 / VE = 64 %) [ρ = 0.903/ AVE = 57 %]*)		
EFF1	.796 [*.74*]	The use of wiki system improves the rapidity of execution of my tasks
EFF2	.769 [*.77*]	The use of wiki system facilitates the realization of my professional mission and achievement of my goals
EFF3	.86 [*.83*]	The use of wiki system improves my personal productivity
EFF4	.778 [*.73*]	Globally, I can be more profitable for my organization by using wikis
EFT1	Item dropped	The use of wiki system improves my professional competencies enabling me to develop knowledge necessary for my job
EFT2	.791 [*.73*]	The use of wiki system makes me more independent by emphasizing my role within the enterprise
EFT3	.757 [*.65*]	The use of wiki system helps me to achieve my goals by organizing my work
EFT4	.841 [*.83*]	The use of wiki technology improves the quality of my work
CAP: CAPACITY DEVELOPMENT (*α = 0.905 / VE = 73.75 %) [ρ = 0.881/ AVE =65 %]*)		
CAP1	.842 [*.78*]	The use of wiki system improves my knowledge of enterprise activities
CAP2	.860 [*.81*]	The use of wiki system me to exchange information on business with other functional units
CAP3	.864 [*.81*]	The use of wiki system allows me to communicate within the enterprise and with the partners
CAP4	.869 [*.82*]	The use of wiki system helps me, in general, to see and to deal with problems in a different manner