The Workarounds Process as a Source of Knowledge Creation and Management

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Abstract

The dynamics of the actual global context create a growing need for creation of better knowledge management in organizations. More than ever global markets exercise a bottom-up pressure (market dynamics and daily practices) and a top-down pressure (standardization) on employees who must constantly create, acquire and disseminate new knowledge. Due to this, employees engage sometimes in workarounds that defy the standardization of expected performance. However, given that workarounds are deliberate actions in contrast with the prescribed practices, they are marginalized by organizations that perceive them as detrimental. In this paper, we propose a theoretical framework that is based on the idea that the integration of workarounds in the workplace represents a process of knowledge management. It also suggests that the use of a socio-technological tool that allows the building and sharing of workarounds by employees will help foster the creation and updating of knowledge in the organizational memory.

1. Introduction

In today's global context, organizations that want to remain competitive must listen to the new trends and needs of their respective markets. Consequently, they will often restructure and reorganize internal tasks. For example, the reduction of hierarchical levels and new business processes. For the employees of these organizations, these changes demand more responsibilities and constant improvements to their efficiency and performance. To attempt to rectify this problem, knowledge management (KM) is a multidisciplinary field that offers management strategies and technological solutions for the creation, retention, and sharing of knowledge.

Workplace workarounds are described as gaps in predefined work processes that defy the normalization of expected performance [1]. For some authors, the workarounds in the workplace are inevitable [2, 3]. On the one hand, normalization exerts top-down pressures. And on the other, the organizational context exerts bottom-up pressures which require workers to constantly create, acquire and disseminate new knowledge [4]. Additionally, following bottom-up pressure (daily tasks) and top-down pressure (organizational/regulatory processes) [5], the employees are often required to execute workarounds in the workplace to obtain better results. However, in spite of workarounds that are sometimes tolerated by low level management (team leaders, supervisors, other) in highly formalized workplaces [5, 6], organizations will generally perceive workarounds as unwanted processes [5].

We adopt the view that workarounds in the workplace contain useful yet unknown knowledge that can assist organizations in their analyses, learning and improvements of work routines [7, 8]. This perspective motivated us to engage in a research, still in its early stages. We suggest that integration of workarounds in a knowledge management process and the use of a socio-technological tool by employees will promote the creation and updating of knowledge of the organizational memory. The idea is to create a virtual environment conducive to a knowledge management process with the creation and sharing of workarounds. This space will become a mechanism for creating and updating organizational knowledge and it will allow employees to continually position themselves during their work tasks.

The main objective of our current research is to enable organizations to create, share, search and review workarounds in the workplace in order to promote knowledge creation and updates for the organizational memory. We seek to enable organizations to elicit unknown knowledge that would permit analyses, learning and improvement of work routines. Furthermore, we want to offer a technological tool that can support workers in their job duties when top-down and bottom-up pressures are high. To do this, our specific objectives are to:

- Propose a theoretical framework to analyze various types of workarounds based on Alter's [8] workarounds theory and McElroy's [25] model of knowledge cycles
- Integrate our theoretical framework on workarounds using a methodology of the various cycles of knowledge management (create, search, disseminate and revise).
- Develop a prototype to support users from the conceptual model and the methodology of knowledge management.
- Validate the workaround model and the prototype via an implementation in an organization in order

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to support users by allowing them to solve workaround problems that they are facing.

At the time of the writing of this article we completed the first two objectives and we were starting the development of the prototype. The rest of the article is structured as follows, in the next section we present the literature review followed by the description of the theoretical framework. We then provide explanations on how we will integrate the theoretical framework in a prototype and discuss the benefits of our proposed model. Finally, we offer conclusions.

2. Literature Review

2.1. Workarounds

Several authors view *workarounds* in the workplace as an understudied topic of research [1, 5, 9]. A workaround represents a goal-driven change to an existing work system in order to overcome a technical or an organizational constraint [8]. In the literature, workarounds are analyzed through various theoretical lenses, ranging from business process reengineering to organizational policy [1, 10]. Alter [8] proposes a theory of workarounds that includes different perspectives on situations in which actors will either enable or intentionally perform actions going against one or more routines, instructions, expectations, prerequisites, specifications or organizational regulations. This theory attempts to address two types of workarounds [8]. The first takes place during a work process, when one or more actors face an obstacle that prevents the execution of an optimal performance during a work assignment. Barriers may be a result of anomalies, exceptions, lack of information, knowledge and skills on the part of the actor, or lack of technological capacities. The second represents a misalignment between objectives and incentives of actors, principles and stakeholders (e.g., lack of understanding, inadequate communication, confusion or inattention).

As presented in Figure 1, Alter [8] uses the five voices of loose coupling theory [11] to identify the five voices of workarounds. The voice of the phenomena associated with workarounds covers different causalities associated with workarounds (e.g.: perceived barriers or routines as ineffective by the employees). The voice of the types of workarounds provides a structure to classify the workarounds depending on the operational objectives (e.g., an employee overcomes a feature of the information system). The voice of the direct effects of workarounds corresponds to the effect of circumvention of the set of a system (e.g., an employee can continue working on a task despite an obstacle, an error or a failure). The voice of perspectives is used to assemble the different perspectives on workarounds. In the literature, perspectives are favorable or unfavorable according to the degree of organizational formalities. The formalization allows for more control resulting in less variation in the end results. Thus, when the degree of formalization is low, workarounds are associated with creative processes [1].

The persistence of workarounds in a work environment is explained by the need for balance between bottom-up constraints (operationalization of the daily tasks) and top-down pressures (regulatory entities, physical constraints) [5]. There is a dichotomy between the negative perceptions and the need for workarounds that deepens in highly standardized work environments. Indeed, lower level management in these environments will often tolerate workarounds [1, 6, 12, 13]. Organizational challenges and dilemmas are due to a combination of different perspectives on workarounds. These perspectives are comprised of the ability to operate despite the obstacles, adopt an interpretative flexibility, balance between personal, group, organizational and authorized interests and learning emerging changes.

Workarounds in the workplace are studied as favorable or unfavorable phenomena.

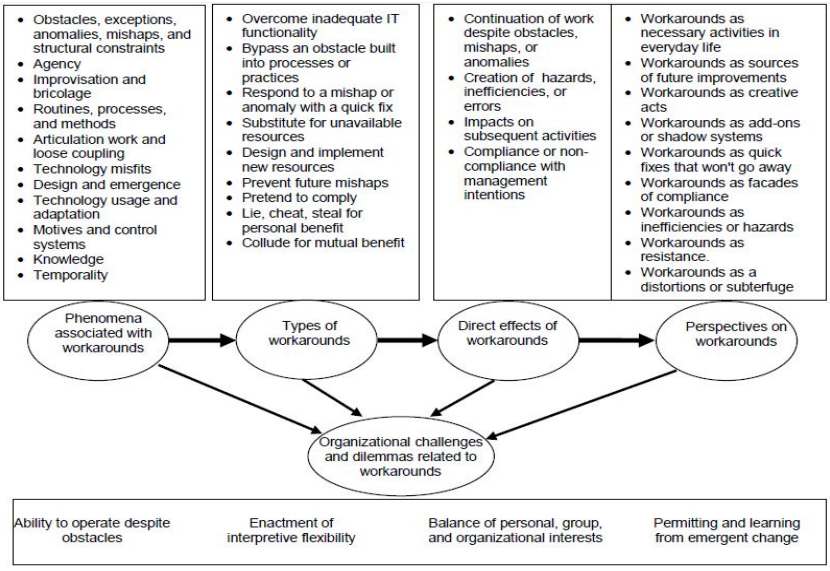

Figure 1. Five Voices of Workarounds [8]

On one hand, the unfavorable camp perceives workarounds as violating and resisting the intentions, managerial expectations [8] and business process activities [7, 14, 15]. The main assumption of this perspective is that employees tend to resist top-down pressure due to conflicting goals [16]. Researchers are interested in the organizational factors that will contribute to resistance (e.g., lack of liability, loss of control) [5, 7]. Moreover, even if some workarounds may be effective for certain tasks or quality of work the negative outlook seeks the adverse effects of these same workarounds, such as the generation of latent future errors [8] and the costs in terms of time, loss of opportunity and operations (e.g., maintaining ghost systems, non-reliable sources of information) [17].

On the other hand, the favorable camp suggests the workarounds represent a problem-solving strategy [18] inspired by external sources (e.g., social networking, website) or discoveries (e.g., index, trial-and-error) [19]. In this perspective, workarounds are presented as creative acts and sources of future improvements. For example, workarounds can be essential sources to analyze and learn policies, procedures and issues [13], or necessary for generic information systems (IS) and as a part of the daily tasks [20]. Workarounds can also enable positive resistance by ensuring the continuity of a work task [7]. During a study on the implementation of an electronic medical records system, Safadi and Faraj [9] used Nonaka and Takeuchi's [21] SECI model to integrate the workarounds in the processes of creation and sharing of knowledge. Based on the assumption that workarounds are knowledge about the use of an IS, in order to obtain better assessment of the work context, the authors perceived workarounds as a source of knowledge creation due to a missing property or a drawback of the current IS. They used the knowledge spiral to capture the knowledge of workarounds [21, 22]. During the learning phase, users encountered features and properties of the IS. The learning process took place in different forms (training sessions, personal experiences and testing). The study shows that workarounds surfaced when a user failed to satisfy IS requirements or failed to understand the features of the system. Users discovered new opportunities or captured missing knowledge through workarounds that were eventually consolidated and disseminated to others through socialization. Nonaka and Takeuchi's [21] study suggests that workarounds are representations (explicit and collective knowledge) about the needs of users and the reactions towards the IS and constitute a new form of communication and feedback from users. Using workarounds as a source of knowledge creation will offer new opportunities for efficient knowledge management.

2.2. Theory of Knowledge Cycles

Although it is a relatively new discipline, several authors affirm that we are currently in the third generation of knowledge management [23]. The first generation of knowledge management was designed to create knowledge containers. Focusing on the use of technologies, it adopts a top-down approach in finding and sharing knowledge held within an organization (intranet, knowledge engineering, etc.). The contents are often limited to stagnant and unused information. The second generation focuses on the social aspect of knowledge and developed management strategies allowing humans to share their knowledge. Here, the objective is to promote innovation and knowledge sharing trough bottom-up approaches, such as communities of practice.

Thus, the first generation attempted to support the collection, organization, refinement, analysis and dissemination of knowledge through various formal systems. The second generation focused on human social practices. The third generation tries to develop hybrid technological tools [24] that can bridge the gap between the first and the second generation of knowledge management (e.g., the use of communicational tools (web 2.0) or formal models (web ontologies).

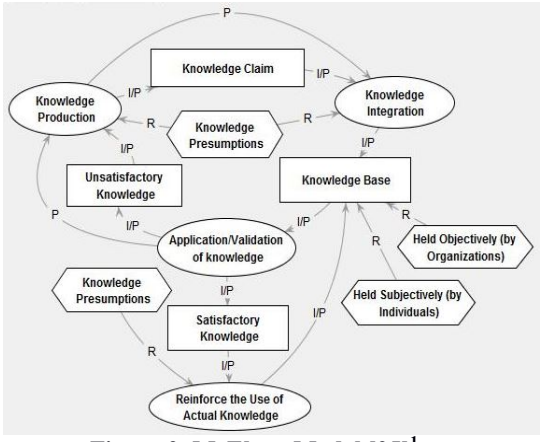

Figure 2. McElroy Model [25][1]

McElroy [25] influenced the second generation of knowledge management. He developed a theory of knowledge cycles, which is composed of two main processes: knowledge production and knowledge integration. During a business process (Figure 2), employees use and validate existing knowledge that is subjectively owned by individuals and objectively by the organization. Thus, the use of existing knowledge will respond positively or negatively to the current employee's needs. When current knowledge is satisfactory, the presumption and belief of the usefulness of this knowledge increases and encourages its re-use. Otherwise, individuals will formulate a presumption that there is a problem with the current knowledge and will initiate the knowledge

[1] We use here the Modeling Object Types (MOT) language [33]: ovals represent tasks, rectangles represent concepts, and hexagons are rules or principles. We also use ruling (R), precedence (P), input-product (I/P) and component (C) links between these knowledge units.

production process.

This knowledge production process consists of four sub-processes (Figure 3): a) individual or group learning promoting an information input that can help formulate a presumption of knowledge; b) the acquisition of external information; and c) the formulation of a presumption of knowledge to be evaluated. The result of the evaluation of the presumption of knowledge can be unsatisfactory (it does not meet the organization's criteria).

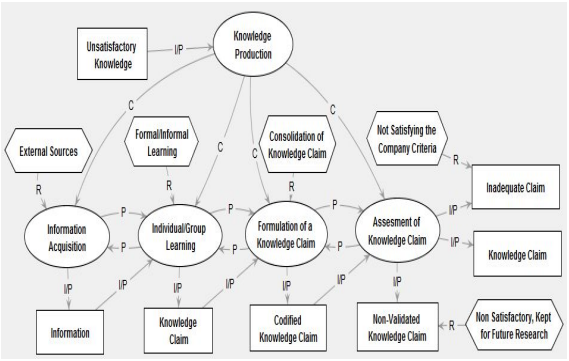

Figure 3. Knowledge Production Process [25]

The result can also offer less value than the existing knowledge and may be uncommitted due to the fact that it does not meet the requirements but it is retained for future research. Subsequently, the result can also be validated and becomes integrated knowledge for the organizational knowledge base. New knowledge will be disseminated through different activities, such as social actions and formal or informal training that will help renew and/or replace existing knowledge. One of the strengths of this theory is that it introduces a decision-making process for the integration of new knowledge. Moreover, the process of assessment of knowledge demonstrates that the life cycle of knowledge is composed of processes that attempt to identify content that can add value to the organization, communities and individuals.

We will use this theory in the proposed theoretical framework because it includes a decision-making mechanism that can add organizational value and organizational knowledge-based updates.

2.3. Knowledge Management Technology (KMT)

In the literature, knowledge management technology (KMT) is often divided into two categories [26, 27]. The first is the product perspective inspired by the first generation of KM and implies that knowledge is perceived as an independent object that can be located and manipulated [28]. This perspective uses a techno-centric approach to KMT to consolidate, organize, search, analyze and disseminate knowledge in a form of data [24]. The central points of this approach are the repositories of knowledge, taxonomies and ontologies.

The second category represents the process perspective inspired by the second generation of the KM [29]. It does not attempt to capture or distribute knowledge, rather it focuses on methods that promote, motivate, encourage, nurture and guide the process of knowledge through shared environments. This perspective focuses on the technologies that take into account the social and psychological factors. Thus, the role of the KMT is to support the social and communicational networks [24] such as environments to locate experts, communications between individuals and social interactions [30].

In practice, the technological solutions of KM will generally form an integrating framework between these two perspectives (products, processes). Indeed, KMT is composed of technological tools, applications, and infrastructure that can respond to the various phases of knowledge, capture, codification, sharing, dissemination, application and reuse of knowledge [23]. Information systems influence the process of creation of knowledge identified in the SECI [31]. Socialization is established by the facility to promote interactions between individuals. Outsourcing is done through electronic discussions. Combination supports the addition, classification, combination and categorization of existing information by individuals. Internalization is facilitated by the discussions and informal conversations, not to mention that it makes the information available. Thus, IS offers alternative means to bring people together and foster the sharing of knowledge. For example, a video demonstrating the skills for a particular task may have limitations. However, sharing history and practice according to the daily experiences through technology can help in the development of technical discussions [32].

For our study we seek to put in place a system that can bridge the gap between the first and second generation of KM. This system would be able to represent different types of workarounds embedded in work processes. In the following section, we will present the research that we are conducting.

3. Research Project

3.1. Theoretical Framework

As shown in Figures 4, 5 and 6, our theoretical framework incorporates Alter's theory of workarounds [8] with McElroy's model of knowledge management [25]. Assuming that knowledge goes through different stages (activities/processes), McElroy's theory allows us to follow a work community in the different stages of knowledge creation. McElroy's model also includes a process of integration and evaluation of new knowledge that will help identify the knowledge detained in workarounds that can add value to the organization, the community and the individuals.

By integrating Alter's theory of workarounds [8] in our model, we are creating and building the knowledge of workarounds within a community. In the following section, we will present the theoretical framework by proposing eight research questions that represent the various steps that an employee may implement during a

work process, which would yield a different solution. We are interested in the types of workarounds in the workplace that can provide added value to a process or to a customer.

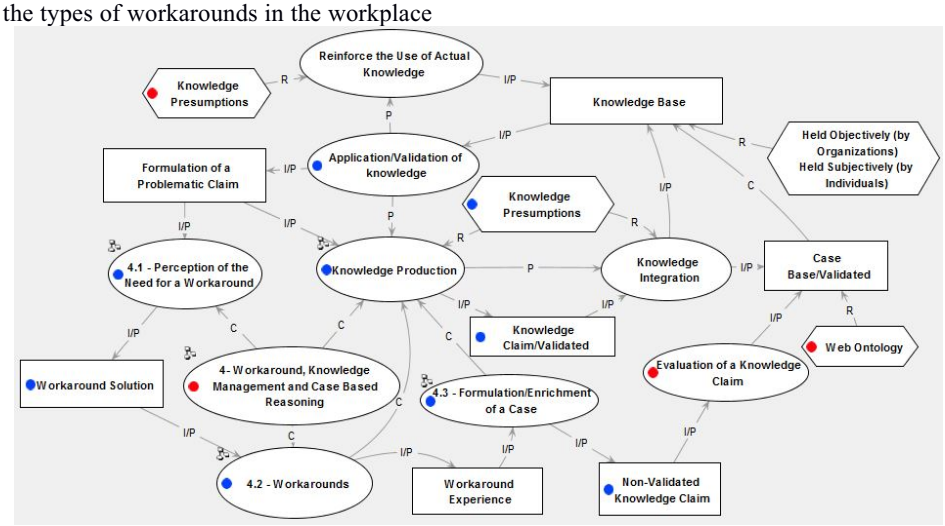

Figure 4. Theoretical framework (part 1/3)

We advance the following eight research propositions:

P1. During the work process an employee will use organizational knowledge to seek, adapt and apply knowledge. This includes knowledge held objectively by the organization and subjectively by individuals.

P2. If the current organizational knowledge meets the requirements of the employee to accomplish a work process, the use of the current knowledge increasingly becomes a belief and the presumption of knowledge is used.

P3. If the current knowledge does not meet the required knowledge necessary to accomplish a work process, the employee makes a problem presumption. Thus, he will generate new knowledge or perceive the need to perform a workaround.

P4. As shown in Figure 5, the perception of a workaround process demands the employee to produce a workaround solution following some preconditions.

The perception of a need for a workaround is usually due to a combination of factors such as bottom-up and top-down pressures (e.g., stress, obstacles, objectives of the worker) [8]. Subsequently, an employee will have to make an adaptation, an improvisation or a change in a worker process. Finally, to implement a created workaround, the individual will assess the local impacts (e.g., barriers) and general impacts (e.g., distortion of information for the organization.

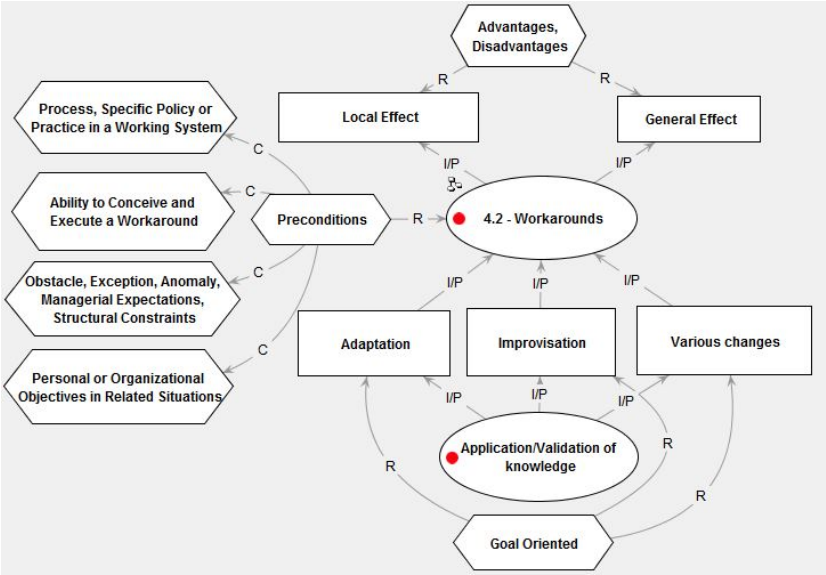

Figure 5. Theoretical framework (part 2/3)

P5. The employee may also do a search in the knowledge management system (KMS) to see if an existing solution can be used and adapted to the present problem.
Once a workaround is identified, employees have the option to not use it, use it, create a new solution or reuse and adapt an existing workaround. The choice will be influenced by costs, benefits, risks and ethical considerations.
P6. A workaround solution on the part of an employee becomes an input for a non-validated knowledge base. Indeed, workarounds selected by the user can produce a result that is associated with a new experience.
P7. The result and the experience of the employee will eventually become a source of knowledge for the formulation and the enrichment of a workaround.
It enriches the non-validated knowledge base and is part of the process of production of knowledge. The employee will explicitly formulate a specific problem that will be associated with a workaround. This knowledge is therefore enriched by the experience of the employee who will share it in a non-validated knowledge base.
P8. The process of formulation of a presumption of knowledge (Figure 6) can produce a codified knowledge, which feeds the knowledge assessment process.
Thus, knowledge can be scattered, kept in a knowledge base for future research or validated. Validated knowledge will be subsequently reintegrated into the organizational/distributed knowledge base.

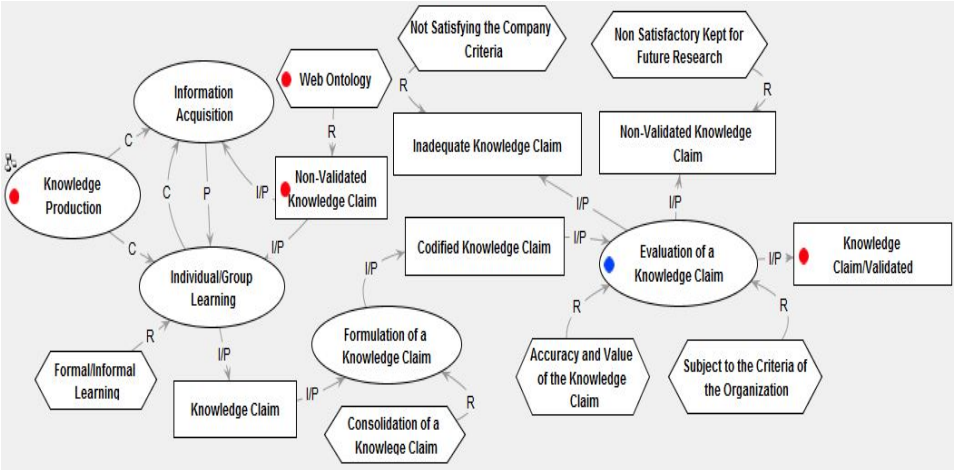

Figure 6. Theoretical framework (part 3/3)

3.2. Prototype

The first step in creating a prototype represents the modeling of high-level workarounds in the workplace (fairly generic in order to be incorporated in several organizations). We believe that it would be appropriate to model six workarounds in order to demonstrate the generality of the proposed research propositions. We seek to model actions, motivations, applications and organizational and personal consequences in relation to workarounds knowledge.

To do this, we will use the Modeling Object Types (MOT) language used in the previous figures [33]. This language is based on typed objects (concept, procedures, principles, facts) and links for knowledge representation. It was developed at the LICEF/CIRTA research center in Montréal, QC, Canada. The language will help us to create a conceptual model that will allow us to extract concepts related to workarounds from the literature and which will be used in the next steps.

MOT language allows concise, graphical manner representation and the flexibility of expressiveness of a semi-formal language to represent concepts, facts, processes, constraints, standards and rules related to an organization. MOT has been extensively used in instructional design, work process modeling as well as ontology engineering. The advantage of using MOT is that it allows the production of different graphics with a great level of expression regarding the type of knowledge and relationships but with enough formalism to allow automatic coding and sophisticated reasoning [33].

During the second step, we will integrate the conceptual model on workarounds that have been created in a process of knowledge management. To do this, we will rely on the literature to describe the integration of workarounds to the main knowledge management processes (e.g., create, search, use, and disseminate). In addition, this step will complement the theoretical model with MOT scenarios to be used for the creation of a prototype and design of our use cases for the part on the analysis of the results. The theoretical framework that we presented in the previous section is the first version of the model that we will develop.

The third step will consist of testing and validating our research propositions. To do this, we will create a prototype from the conceptual model and the proposed knowledge management methodology. The prototype and the methodology will be tested in two organizations to support the users allowing them to solve workarounds problems that they are facing. The design of the proposed

solution should be generic enough to be able to be built and customized according to the organizational context.

3.3. Technological Requirements

The selection of the technological solution for our KMT was done by following some elements of 'Greco and al.'s [34] framework'. In the first step, we will determine the high-level use cases in order to specify the requirements (Figure 7) of our system. High-level use cases involve: 1. Formulating a problem: employee queries the KMS by formulating the description of a work issue. The system will retrieve the issues, which are similar taking into account the scope and the current problem;

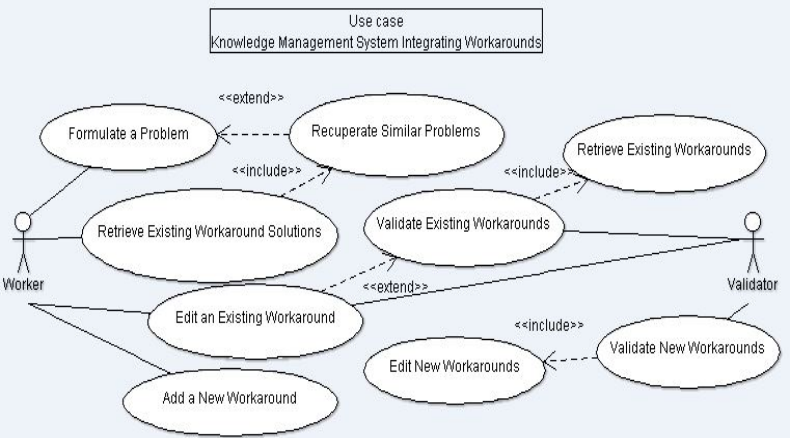

Figure 7. Use Cases

2. Getting solutions of existing workarounds: once the system retrieves similar problems, the worker will get workarounds solutions which are linked to his actual problem. At the system level, recovered solutions must be targeted and relevant to the issue; 3. Revising existing workarounds or validate existing workarounds: for the worker, once he has obtained an existing workaround, he may revise the workaround by sharing his own experience or by making a change. For the validator: he can revise the existing workarounds to modify them according to requirements and organizational implications. He may also remove a workaround that is no longer valid or is detrimental to the organization. To be accomplished, the validator must retrieve existing workarounds by formulating specific requests; 4. Adding a new workaround or validate a new workaround or revise a new workaround: in the context that no circumvention can respond to the formulation of a user's problem. The user can produce a new workaround (new knowledge) that will be added to the KMS. The validator must validate the new workarounds and revise the needs for a new procedure, system, etc.

Based on the high level use cases and the theoretical framework, we have established the requirements of the selected KMS for our current project [34]. The selected KMS will have to support a method for promoting the creation, accumulation, transfer and dissemination of knowledge of workarounds that address issues during work processes. The creation of knowledge allows users to share knowledge that is not present in the knowledge base.

In addition, a user can contribute by updating existing knowledge in two different ways. The first is to share an alternate use of a proposed knowledge for a different problem (adaptation of knowledge). The second is the modification of actual knowledge so that it can be updated to reflect the current context. The accumulation of knowledge refers to the organization and accessibility of knowledge. It is important for the KMS to allow users to access the inventory of knowledge. Relevant workarounds knowledge contributes to the improvement of the performance of the users. Also, the KMS will ensure validation and review of new workarounds and existing knowledge by a human validator. Therefore, it will preserve the quality of the knowledge encoded in the organizational knowledge base.

Knowledge transfer requires the use of a KMS that includes metadata. This will allow workers to share high-level knowledge including contextual knowledge. Dissemination of knowledge is the result of sharing knowledge and innovation on the part of workers. To do this, the KMS must be able to encourage the editing and the production of knowledge as well as value-added processes in audiences and projecting activities. At the application level, the technical aspects of the software specifications and platforms of the KMS must be interoperable. We want to ensure that workers who use different platforms and software can communicate and work together. This type of system guarantees the use of standards and standardizes information exchange. Finally, we want the KMT to encourage collaboration, communication and teamwork for the resolution of problems. The system must be able to provide the coordinates of different workers. Furthermore, it must have the capacity to provide references for audiovisual metadata, such as videos, that are associated with specific knowledge.

3.4. Technological Choices

Artificial intelligence research contributed to the developments of KMT by providing intelligent features. Weber and Kaplan [35] make the distinction between applications of traditional systems that use functionality that can support KM and applications of KMT (knowledge management systems) tailored to KM problems. For our current project, we are interested in two technological KMT systems. The first one is case-based reasoning (CBR) systems, which are intimately linked to the KM problem solving methodology. This approach is composed of cases (experience) and a case base, which is the main source for the reasoning. Here reasoning is done by issuing conclusions with a case that can be used to solve a problem. This type of reasoning differs from the deductive logic. Therefore, assuming that similar problems may have different experiences, a true hypothesis does not necessarily lead to a true conclusion. In addition, the solution to a problem can be adapted to a new problem and allows an approximate reasoning. The extended version of the CBR does not compare old problems with new ones, but rather problematic situations with possible solutions. The extended perception considers the relationship and usefulness between problematic situations and possible solutions. To do this, publishers record different experiences and the case research will allow finding close neighbors according to the search criteria and values.

This method allows for comparing a wider range of problematic situations [36]. This is actually done in three steps; the first is to describe a problem in a formal manner that explains the issue in the case. The second is done with a search for a similar case (nearest neighbor). The third allows for adaptation and the use of the found solution.

An important drawback of CBR however, is its limitation to express the context related to the problems in cases. This limitation leads to the second technology we will be using for our KMS solution, ontology web languages (OWL). OWL seems appropriate for our current project because it allows a rich semantic enrichment and it offers a great capacity for reasoning. OWL is a language of the semantic web which is an extension of the web [37]. The Semantic Web is defined by the World Wide Web Consortium (W3C) like the abstract representation of data on the World Wide Web, based on the RDF standards and other standards to be defined. Semantic Web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries. The semantic web is composed of several layers containing different technologies.

The ontology can extend the capabilities of CBR with the enhancements of the case base. In particular, it offers a vocabulary that allows the definition of a case structure and terminology. Thus, it facilitates the assessment of the similarity by establishing a connection between the terminological research and the basis of cases [36]. For our research, we are particularly interested in the OWL language to provide web-computing ontologies that are equivalent to an exhaustive and rigorous conceptualization of a domain formulation. OWL provides the tools needed for interoperability and the consolidation of data from the web. Therefore, web ontologies provide a repository for the construction of a knowledge base and assure the interoperability between software components. Furthermore, ontological knowledge goes beyond the taxonomic knowledge. Not only do ontologies use properties of subsumption (that is, a hierarchy of classes and inheritance between a child and parent class) but they exploit the expressiveness of description logic such as universal restriction, existential restriction and cardinality restrictions [37].

For our current project, the preferred technological method is therefore the CBR with the use of OWL ontology as the case base that will allow a high level of expressiveness and the formality necessary to match the language used by the field in which we will apply our project.

3.5. Discussion

Our workarounds-based model will provide a mechanism for creating and updating organizational knowledge and it will allow employees to continually position themselves during their work tasks. The novelty of this model consists in integrating workarounds in a knowledge management model and providing users with a tool that is based on CBR and OWL.

In order to illustrate the validity of our proposed model, we decided to use secondary data. We chose the case study of the 16 hotels located in China that are part of the Ravine global chain [12]. The objective of this case study was to determine how knowledge workers engage in effective knowledge sharing in the context of a restrictive corporate IT policy. The staff Internet bandwidth at each location was limited to 2 or 4 Mbps and several Internet-based applications and social media were blocked. A restrictive IT policy poses a generalized problem to some marketing and communication activities. First, advertisements are often made in multimedia formats based on the transmission of large files that create network bottlenecks. Second, nowadays most communications with customers are performed via social web tools. At Ravine, in order to do their jobs effectively, employees engaged in workarounds. For example, at one of the hotel sites, a manager is using the hotel's guest network because it doesn't have Internet access restrictions. Thus, the manager was able to access a Weibo account (a microblog similar to Twitter) created for the hotel site as a means for a digital marketing channel. Through this account, she was able to setup marketing tools (client fidelity accounts and promotions). The benefits of this initiative were reflected by an increase in restaurant and room bookings. Unfortunately, the knowledge acquired by this particular manager was not shared with other sites of the hotel chain. Employees in restrictive environments tend to ignore

organizational policies prior to attempting to change them [12], so this situation creates two issues. First, as seen in this example, the hotel chain did not acquire any knowledge that has been created by its employees. Second, the hotel chain did not have access to important information regarding the hotel day-to-day operations.

In this context, our theoretical model proposes a twofold benefit. First, it enables organizations to create, share, search and review workarounds to promote knowledge creation and updates for the organizational memory. Second, the model facilitates organizations to elicit unknown knowledge that would permit analyses, learning and improvement of work routines. Using our workarounds-based model the hotel manager would have first sought out an existing workaround that was put in place by another user from the same hotel chain. However, in this example no one had that particular problem before. Therefore, the manager had to produce a solution based on a new workaround. He would then share the knowledge of the workaround with his colleagues from the other sites. They would subsequently capture, adapt and create new solutions for the intended work that they can also share, allowing for an enrichment of the created knowledge. Workarounds selected by the users can produce a result that is associated with a new experience and become the source of knowledge for the formulation and improvement of a workaround. In our model, it enriches the non-validated knowledge base and is part of the process of production of knowledge. The employee will explicitly formulate a specific problem that will be associated with a workaround. For Ravine, this process would produce codified knowledge that could be validated and integrated into the organizational knowledge base and it would also provide the incentive for the hotel to adapt its IT policy.

4. Conclusion

Based on our literature review, we adopt the view that workarounds are not a temporary irregular response or a marginal series of events [5]. The growth of workarounds tends to follow the wider accessibility and diversity of information technology [3]. Thus, access to mobile devices, mobile high speed Internet and the increasing numbers of services deployed over the web both fosters and simplifies the implementation of workarounds. Indeed, such technologies change the dynamics and the roles of users and information systems. Even if opponents of workarounds fear the threat of ghost systems, they are inevitable and often needed. Today, employees can easily circumvent the policies and restrictions of the standardized information systems and make workarounds that meet their needs and desired system functionalities [3]. In highly restrictive environments, employees will always find ways to ignore organizational policies before they attempt to make changes internally [12].

The main objective of our research is to enable organizations to create, share, search and review workarounds in the workplace in order to promote knowledge creation and updates for the organizational memory. To do so, we propose the development of technological tools that will adopt and combine case-based reasoning (CBR) and semantic web ontology (OWL) technologies in order to offer a complete KMT solution.

Our research is in its early stages and we have developed a theoretical framework in order to demonstrate the benefit of using workarounds for knowledge management during a business process. In order to empirically validate our model, the next step will be to implement our model in two different organizations. The first organization we chose is a small to medium-sized enterprise (SME) comprised of 12 employees were the majority are account managers that work over the phone. In response to a high rate of employee turnover, the company applied a highly restrictive IT and corporate policy in order to maintain a level of standardization. The result was different from what the company had anticipated. The owners realized that most account managers execute their work differently and apply continuous workarounds in their daily tasks. The second chosen organization is an online university department. Each course that is offered has different tutors that perform student evaluations and provide student support. When a certain part of a course becomes obsolete or no longer applies, tutors will often find workarounds solutions in order to ensure the continued study of the student. The problem is that tutors do not always give the feedback to the professor in charge of the specific course, who would ensure proper modifications that align with the course. Instead, each tutor develops different or similar solutions that can either be in accordance with or in opposition to the curriculum. By applying our theoretical model in these two different organizational settings, we seek to empirically test our theoretical model.

For future research, it would be interesting to use a quantitative approach in order to seek out a set of repeated workarounds in organizations in organizations from various industries. By identifying and formalizing a set of repeated workarounds, future researchers can focus on the integration of those workarounds during the modeling phase of business routines, processes and technologies.

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