

Towards an approach for modeling organizational ignorance

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Abstract

Knowledge Management encounters difficulties related to the speed and spread of information production during the modern era of digitization. This results in missing and unprocessed organizational information, which, naturally, leads to missing organizational knowledge, in other words, organizational ignorance. Managing organizational ignorance has been scarcely addressed. This paper suggests a combination of ignorance management with Enterprise Modeling, as a path towards the development of an approach for modeling organizational ignorance. A juxtaposition of knowledge states resulted in two introduced parts. The first part is a StateMachine diagram that introduces a model of the types of ignorance and the transitions among them, and the second part is a meta-model that introduces an integration of the domains of Knowledge Management and Enterprise Modeling.

Keywords

Ignorance Modeling, Ignorance Management, Knowledge Management, Conceptual Modeling, Enterprise Modeling

1. Introduction

The fastest speed of production and widest spread of information in history is being experienced in the modern era, and this fact has led to the rise of new challenges and difficulties for humanity, both on an individual and collective level. On the collective level, public and private organizations are struggling to survive in highly dynamic contexts, whose pace of change has surpassed the one of the organizations [1]. The information produced in the dynamic contexts is crucial to the changing capabilities of the organizations. Processed organizational information comprises organizational knowledge [2], and during the recent decades, knowledge is gradually being treated as an organizational resource [3]. This fact leads to the importance and value of Knowledge Management (KM) [4].

The value of organizational knowledge is evident on a wide spectrum of applications [4], however, the above mentioned fast pace of information results in increased time, effort and resources required for capturing all that is valuable for an organization. This has naturally led to a lot of information missing or being outdated without the organization being aware of the outdated state of the information it has captured. Even information that is captured, yet not processed, results in value lost for the organization, with an impact on decision-making, efficiency, flexibility and other demanding organizational aspects. The importance of proper

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support for decision-making and any other aspect indicates the need to address the phenomenon of missing knowledge, also known as ignorance, and provide appropriate methodologies for its management. Therefore, the problem addressed in this paper is the difficulty in effectively managing organizational knowledge and ignorance in the light of the fast information flow, impacting the organization's decision-making and efficiency. Hitherto, the management of ignorance has been scarcely addressed, and these efforts have been focused on the managerial aspect of KM, as in [5]. In this paper, we motivate the introduction of a more structured approach based on the combination of Enterprise Modeling (EM) and KM.

EM is a discipline that has the potential to support an organization not only by capturing relevant knowledge, but also by providing motivation and input for the design of Information Systems (IS) [6]. IS are often defined as "any systematic arrangement for providing a defined group of people with information for purposeful action" [7]. IS and IT in general, are integrated in the modern digitalized society with business, including business operations, so any approach with the goal of supporting organizations should include an IT aspect. ISs are highly important for any type of organization since they help, not only in the enablement, but also the simplification of the organization's activities and procedures and have become integrated with almost every aspect of the business [8], reaching a point where business and IT can be considered "fused" into one [9].

The aim of this paper is to identify and model the transitions between various states of knowledge and ignorance, along with a suggestion for a model for integrating KM and EM.

The rest of the paper is structured as follows. Section 2 provides a brief overview of the related literature and Section 3 describes the applied methods. Section 4 presents the identified dimensions of organizational ignorance and section 5 introduces a model for the states of ignorance. Sections 6 and 7 present a model for integrating KM and EM and an illustrative example. Section 8 discusses the introduced concepts and Section 9 provides concluding remarks.

2. Background

This section includes a brief summary of the KM and CM theories that are relevant to this study.

2.1. Knowledge Management

According to literature definitions, KM is "the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation." [10] and concerns "identifying and leveraging the collective knowledge in an organization to help the organization compete." [3]. Both sources treat KM as an action but, regarding its goal, they mention "to help the organization compete" [3], and "to add value through reuse and innovation" [10]. The most important terms derived from these definitions are collective knowledge, people, technology, processes, and organizational structure.

A variety of frameworks for KM exist in the literature. One of the most popular and influential frameworks, which has been introduced by Nonaka, is based on the classification of knowledge as tacit or explicit [11], and is known as the SECI (Socialization – Externalization – Combination – Internalization) model [12]. Tacit knowledge refers to knowledge which is

embedded in human minds [4] and includes, both cognitive elements, like beliefs, perspectives, and values, and technical elements like skills, crafts, and know-how [12] and is, therefore, hard to transmit or communicate to other individuals. Explicit knowledge refers to knowledge that is expressed, articulated or coded and, therefore, can be easily transmitted among individuals. This transmission can occur via the use of electronic media and tools [4].

The focal point of the SECI model are the transitions between the tacit and explicit knowledge. According to Nonaka and the SECI model, knowledge can be converted not only from explicit to tacit and vice versa, but also from tacit to tacit and explicit to explicit. In this way, four distinguished processes are identified. Socialization refers to the conversion of tacit knowledge to tacit, Externalization is the process of converting tacit knowledge to explicit, Combination concerns the conversion from explicit knowledge to explicit, and Internalization refers to the conversion of explicit knowledge to tacit. Various distinguished activities and procedures, both on the practical and cognitive level are associated to each process of the SECI model.

Another approach for the management of knowledge that has been an essential factor for the development of the area of Information Systems is Karl Popper's Third World Theory [13, 14, 15]. Derived from Plato and Aristotle's work, Popper provides an elaborate evolution of the viewpoint that the world consists not only of the physical and the cognitive world, but also the information world, comprised of statements themselves. The main notions that can be described via Popper's framework are Concept, Domain, Data, Information, Knowledge, and Ontology. For the given study, the descriptions of Data and Knowledge are noteworthy. Data is defined as a "kind of statement with specific structure" [13]. Knowledge is described as the ability or capacity to process information, however, it must be mentioned that while information belongs to the third world, knowledge belongs to the cognitive world [13].

An important aspect of KM is the actor responsible for the KM activities. The term Knowledge worker refers to actors that perform knowledge work, and, in return, the term knowledge work refers to any work that requires specialized knowledge [16].

2.1.1. Ignorance management

The absence of knowledge, in terms of complete absence of or unprocessed information, has been addressed from different perspectives in the literature, however, no approach has combined in with conceptual modeling.

Ignorance is a discrete phenomenon that is often classified between natural or rational ignorance [17]. The term natural ignorance refers to natural state of an individual or organizational entity that is missing knowledge about a phenomenon entirely, including the existence of the phenomenon that the knowledge concerns. This is also referred to by using the terms "unknown unknowns" or nescience [18]. This is considered as the initial state of every entity, and while knowledge is accumulated, natural ignorance is replaced by rational ignorance. The latter refers to the case of ignorance where an entity is aware of a phenomenon, however, chooses not to acquire any knowledge about it. In other words, the existence of knowledge is acknowledged but no effort is put into obtaining it [17].

A very thorough literature review about ignorance in organizations has been recently published in [19]. The results are focused on three main categories; the causes, the characteristics and the consequences of the phenomenon. The causes consist of personal motives, interpersonal

relations, managerial practices, and organizational factors. The characteristics consist of use of power, flawed practices, fallible people, limited resources, and cultural habits. Finally, the identified consequences of organizational ignorance consist of lack of innovation and creativity, organizational inattentiveness, emotional stress, inertia and decay, and knowledge manipulation [19].

One approach that suggests addressing the phenomenon of missing organizational knowledge is known as the “Knowledge audit” [20]. The approach suggests specific steps towards the (i) identification of missing tacit and explicit knowledge in a specific domain, which includes identifying the sources, constraints and other factors which are relevant with a given knowledge area, (ii) identification of the missing knowledge in the given area, by performing a gap analysis and also determining the roles that are missing the specific pieces of knowledge, and (iii) provide recommendations for improvements in the knowledge activities of the given area.

Another approach that has been suggested for ignorance management has been presented in [21, 5]. The authors have provided an elaborate analysis of the states of knowledge existence and awareness, from a managerial perspective. They have focused on the juxtaposition of these states, which led to the development of a conceptual framework in the form of a quadrant where knowledge exists and the organization is aware of it, to a state of nescience where the knowledge is absent and the organization is oblivious to its absence. This model accommodates all intermediary stages between these two extreme states. The authors provide a detailed analysis of the transitions and guidelines for the facilitation towards more favorable states of knowledge existence and awareness within an organization.

Finally, an approach for ignorance management has been suggested in [22] and other relevant works of the same authors. It is employing mathematical models to address ignorance. With the term ignorance, the authors are referring to types of knowledge that do not include nescience, on the contrary, their work tackles problems concerning existing knowledge. The existing knowledge that they refer to as ignorance includes uncertain, inaccurate, inconsistent, contradicting, fuzzy and other states of expert knowledge in organizations. Their mathematical models contribute towards the identification and mitigation of such knowledge states.

2.2. Conceptual and Enterprise Modeling

Diagrammatic conceptual modeling is an abstraction effort which involves specific means for its realization, in terms of diagrams, specific goals that justify its existence, in terms of supporting humans and machines, and a meta-modeling approach, to which the result model needs to comply [23].

EM, which is a specialization of conceptual modeling, takes into consideration a variety of organizational aspects, for example, goals, concepts, processes, or business rules [24]. The modeling procedure usually involves the creation of several models which are interconnected, each of them being created under the lens of one specific viewpoint, depending, of course, on a clearly specified modeling goal.

Enterprise models can be helpful for an organization that needs a better understanding of how their work becomes integrated in “the big picture” and how information systems are interacting with organizational action patterns [25]. The value of enterprise models is usually delivered to (i) modelers, because of their interest to understand and apply the approach, (ii) researchers, who

are interested in evaluation and adaptation of an approach, for example, in a domain-specific version, and (iii) tool vendors, who are interested in developing approach-specific tools [26]. In this study, we focus on the role of the conceptual and enterprise modeler, whom we consider a knowledge worker, since the act of creating a model requires specialized knowledge, both tacit and explicit, and allows the production of value for the given organization.

An attempt to integrate CM and KM has been published in [23]. The authors suggest an extension to SECI by considering it as an additional step in the model. In particular, they specifically argue that beyond the Externalization step of transitioning from tacit to explicit knowledge, CM serves as a diagrammatic form of Externalization. This enables not only raw, but also structured communication of tacit knowledge using diagrammatic CM.

3. Methodology

Methodologically, it has been suggested that modeling information in relation to knowledge does not require new techniques [27]. However, any project combining KM and EM principles should focus on the “soft” activities like strategic planning and decision-making, and furthermore, on defining what we know or not, and what we can know and what we cannot know [27]. As a result, the methodological decision for this project concern data collection about organizational ignorance and EM, and modeling activities for structuring the collected information.

For the collection of data, a literature search has been performed in two main databases, the dblp (<https://dblp.org/>) scientific database which is specialized in Computer Science and Google Scholar (<https://scholar.google.com/>), that includes every scientific domain.

The main search terms have been “conceptual modeling OR enterprise modeling” and “ignorance model OR ignorance management”. While getting no results related to ignorance modeling sources, ignorance management and CM and EM sources have been taken into consideration and screened for utilization according to the aim of this study and research project in general.

The inclusion of different states of knowledge in a supporting system and the identification, capture and analysis of the transitions among different states implies the suitability of UML StateMachine diagrams [28], because the specific notation is optimal for such cases.

In a similar way, the operational integration of CM/EM and KM comprises a domain on its own, therefore, the inclusion of a domain model naturally became the selected method for depicting the results. Regarding the language used, UML Class diagrams [28] provided a complete toolset that enabled representing the entire selected concept set, their attributes, and the association among the included concepts.

4. Dimensions of organizational ignorance

In this section, the dimensions of organizational ignorance are considered by taking into consideration the organizational dimensions and the dimensions of ignorance.

4.1. Organizational dimensions

In order to identify organizational dimensions, we rely on the specific viewpoints that have been used over the time in Enterprise modeling as focal points for the integrated models. The most common ones are Domain, Business process, Context, Goal, Role, Capability, Resource, and Change [29, 24, 30]. These aspects can be utilized as knowledge areas for the approach that is being introduced in this study and any other study that aims to take into consideration the various perspectives that should be monitored while capturing the information that is relevant for any organization or organizational unit.

4.2. Dimensions of ignorance

The analysis of the dimensions of knowledge and ignorance needs to take into consideration two main aspects. First, the existence or the absence of knowledge, and, second, the degree of awareness of the knowledge's existence (Israilidis et al., 2012).

According to [21], combining the two aspects results in four main areas of organizational knowledge status. Initially, the first area concerns knowledge that exists and the organization is aware of it. There is also knowledge that the organization possesses without being aware of it, and this is the second area. The third area is the knowledge that the organization is missing and is aware of its absence. Finally, there is nescience, where the organization not only is missing knowledge, but is also unaware of the absence, which is the fourth and last area.

This study also adopts the perspective that in a simplified way, knowledge is considered as processed information and information as processed data [2].

5. Structure between knowledge and ignorance

The inclusion of different perspectives and classifications about organizational knowledge is resulting in a complex viewpoint that requires considering various states of knowledge in parallel. The result is depicted in a StateMachine diagram, as shown in Fig. 1. The diagram has the potential to depict the transitions of any piece of knowledge and not the entire existing organizational knowledge.

Initially, organizational knowledge can be managed or not. Not being managed is a simple state, while being managed is a complex state that requires taking into consideration both its existence and awareness of. For this reason, the Managed state is modeled as a Composite state and divided in two sub-states, since the existence and awareness of knowledge are active in parallel. In other words, an organization can be aware or unaware of both existing and missing knowledge.

Within the Existence area, knowledge can be Missing or Existing. If the initial knowledge is identified as existing, or at some point captured information is processed and converted to knowledge, the Missing state transitions to the Existing state, while in case of an event where existing information becomes outdated, it transitions back to Missing. The Missing state is complex on its own, which resulted in it being modeled as a Composite state. Within the Missing state, knowledge can be Missing information or Unprocessed information. The entry point in the Missing state is a decision between having adequate information or not. When in

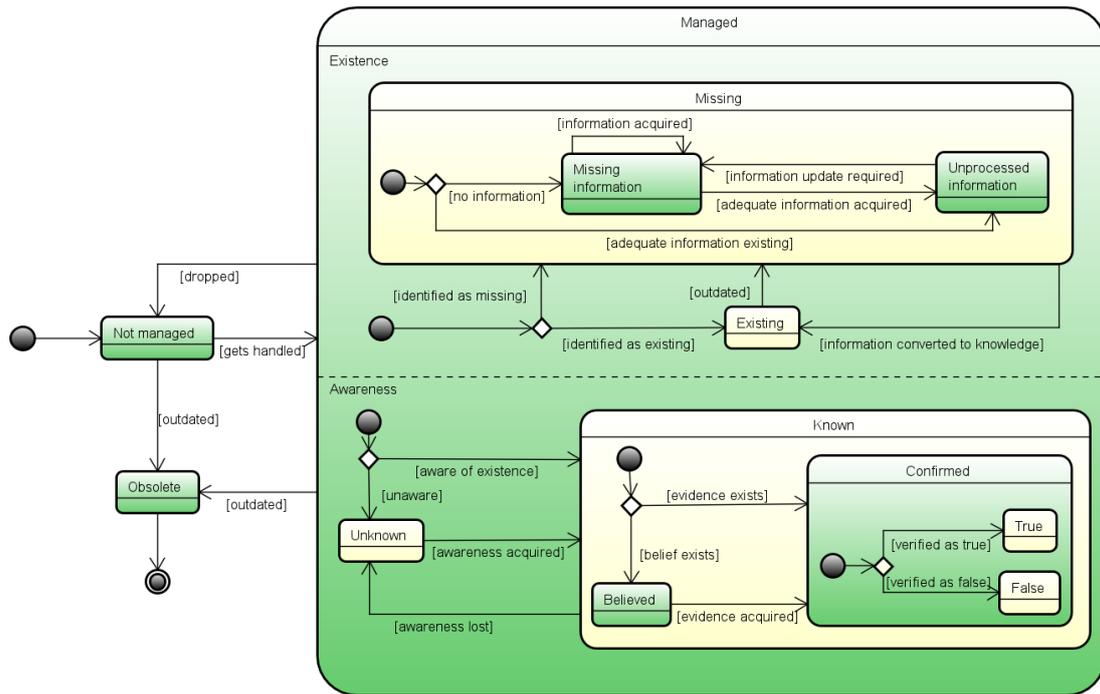


Figure 1: The StateMachine diagram depicting the states and transitions of organizational knowledge and ignorance.

the Missing information state, the acquisition of inadequate information leads to a recursive transition within the same state. However, obtaining adequate information triggers a transition to the Unprocessed Information state. The event where the Unprocessed information requires an update, triggers the transition to Missing information.

Within the Awareness area, the initial state is determined by whether there is awareness of the existence of the organizational knowledge or not, which leads to the Known or Unknown states respectively. The Unknown state is a simple one, however, the Known state needs to take into consideration beliefs and confirmations, therefore, it has been modeled as a composite state. At any point, acquiring or losing awareness of the known knowledge triggers the transition to the respective state. Using the initial decision as an entry point, the state transitions to the state Believed or Confirmed, depending on whether the condition that the knowledge is believed to be known or it is actually based on evidence. The Believed state is simple, while the Confirmed one is complex, thus, it has been modeled as a composite state. The Believed state can change to Confirmed at any moment in time where evidence is acquired. Within the composite state, Confirmed can be True or False, depending in what the acquired evidence has confirmed. It should be mentioned that both the True and False states bear value because even knowing that a piece of knowledge is false is knowledge itself.

Finally, regarding the whole Managed state, if at any moment the knowledge has become outdated, a transition is triggered to the Obsolete state.

6. Integrating Knowledge Management and Enterprise Modeling

The semantics of the integration of KM, and in particular, Ignorance Management and Enterprise Modeling are presented in Table 1, as a way to explain the concepts that have been used for the integration of Conceptual and Enterprise Modeling with Knowledge Management and Ignorance Management. Table 1 also provides example instances of the class concepts, whenever applicable. For classes that refer to very specific objects, like a specific employee that has been assigned specific responsibilities in a KM/EM project, we avoided including fictitious names, and resorted to brief descriptions.

An aspect that needs to be taken into consideration is the responsibility for the ignorance modeling tasks. From a certain perspective, a conceptual modeler can be perceived as a knowledge worker, as also suggested in [23], however, the required skillset for ignorance modeling requires an integration of both roles.

Concept	Description/Definition	Example instances
Knowledge	Information that has been processed in the mind of individuals, can be understood and can be made actionable [2].	Knowledge about competitors, Social trends
Piece of Knowledge	A minimum fragment of knowledge with worth for the organization.	Competitor product, Customer preference
Evidence	Knowledge used to determines the state of awareness of a piece of knowledge	Documentation, Sales report
Knowledge type	A description and classification of the piece of knowledge.	Social, Legal
Information	Data that has been processed and, thereby, has meaning, purpose and context [2].	Competitor product price
Information type	A description and classification of information.	Economic, Social
Monitored type	An information type that is being monitored by the organization.	(Same as Information type)
Concept	A notion in human minds.	Income, Pollution
Conceptual model	A diagrammatic abstraction effort with means and goals that complies with a formal approach [23].	Any Business process model, Context model etc.
Conceptual modeling task	An activity of creating a conceptual model.	Any modeling assignment/session.
Organizational activity	A task or a series of tasks performed within the organization.	Documentation of organizational information.
Activity	A task or a series of tasks.	Documentation of Information.
Organization	An owner of knowledge.	Any specific organization.

Knowledge Management project	A project that belongs to the area of Knowledge Management.	Improvement of customer preference documentation
Knowledge worker	A human resource whose tasks involve specialized knowledge.	Any individual participating in the project that is assigned the specific role/assignment.
Conceptual modeler	An individual that creates conceptual model(s).	Any individual participating in the project that is assigned the specific role/assignment.
Ignorance worker	A human resource whose tasks concern the absence of specialized knowledge.	Any individual participating in the project that is assigned the specific role/assignment.
Ignorance modeler	Individual that creates ignorance model(s).	Any individual participating in the project that is assigned the specific role/assignment.
Ignorance model	A specialization of Conceptual model, focused on the viewpoint of missing organizational knowledge.	Model of knowledge states regarding ERP sales, customer preferences etc.
Enterprise model	A model that consists of at least one conceptual model with a specific focal point of the organization.	Any specific enterprise model, using languages like 4EM, VDML, or any DSML.
Focal point	A viewpoint that determines the outcome of an Enterprise modeling activity.	As an abstract class, it cannot be instantiated [28].
Business process	A specialization of Focal point that emphasizes on organizational activities.	Sales process, Performance review process
Goal	A specialization of Focal point that emphasizes on organizational intentions.	To increase sales by 20, To improve customer satisfaction
Domain	A specialization of Focal point that emphasizes on the organizational domain.	ERP Sales
Context	A specialization of Focal point emphasizing on external organizational environment(s).	Environmental, Technological
Change	A specialization of Focal point that emphasizes on organizational change(s).	Any organizational change, for example changing a capability, improving a service
Capability	A specialization of Focal point emphasizing on organizational capabilities.	ERP customization, Festival organization
Resource	A specialization of Focal point that emphasizes on organizational assets.	Any specific equipment, any specific employee
Role	A specialization of Focal point that emphasizes on the organization's actors.	Manager, Business analyst
Other	Any other possible specialization of the focal point.	Any other CM and EM perspective.

How the operational integration can be achieved has been described in the meta-model shown in Fig. 2.

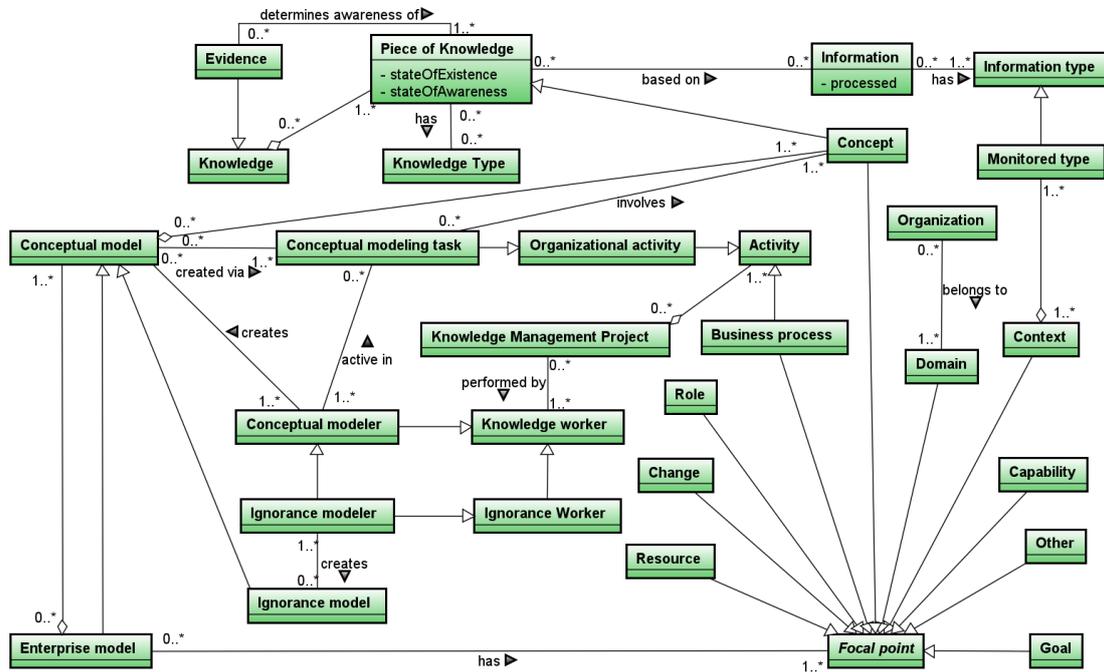


Figure 2: The meta-model for the operational integration of Knowledge Management and Conceptual Modeling.

Initially, Knowledge consists of Pieces of knowledge, which have their own type. For every Piece of knowledge there is a stateOfAwareness attribute, reflecting on the “known knowns” or “known unknowns”. This is also determined by the potential relationships between Pieces of Knowledge and Evidence, the latter being also Knowledge. In this way, a Piece of knowledge also determines the type and awareness level of knowledge overall. Every Piece of knowledge can be based on processed Information, which has its own Type that may also be Monitored. A set of The monitored information types comprise the Context, which is one of the Focal points of Enterprise models, along with Capability, Goal, Resource, Change, Role, Business process, Domain, Concept and any Other organizational viewpoint. The Domain describes the overall area of the organization’s business activities and the Business process describes a collection of interrelated events, activities and decision points that involve a number of actors and objects [31]. A specialization of Activity is the Organizational activity, and a specialization of Organizational activity is the Conceptual modeling task, via which a Conceptual model is created. The task involves Concepts, which are also Pieces of Knowledge. Ignorance model is a Conceptual model and so is Enterprise model, even if it also consists of Conceptual models. Ignorance model is created by an Ignorance modeler, who is a specialization of Conceptual modeler and active in Conceptual modeling task to create a Conceptual model. Ignorance

modeler is also an Ignorance worker, which is a specialization of Knowledge worker. Knowledge worker performs Knowledge management projects, which consist of Activities.

7. An illustrative example

In an attempt to demonstrate potential usage of our suggestion, we use a company in Sweden, specialized in the ERP Sales and Consulting domain. The situation is real, and the authors are familiar with it, yet, no Ignorance modeling case study has been performed, therefore the report is illustrative. The company will be referred to as Digital Innovation (DI). The example concerns a situation in the company where the preferences of their customers regarding their consulting services are shifting. The given concept is part of a domain model, which using the suggested meta-model, can be captured along with the related knowledge aspects. In particular, it concerns the Knowledge about Market tendencies and is part of a Sales improvement project, performed by A.A. using modeling. The captured Information about Consulting services is of Social type, within the context of the company's customers. This is depicted in Fig.3 with the concept in question being shown as an object highlighted in blue.

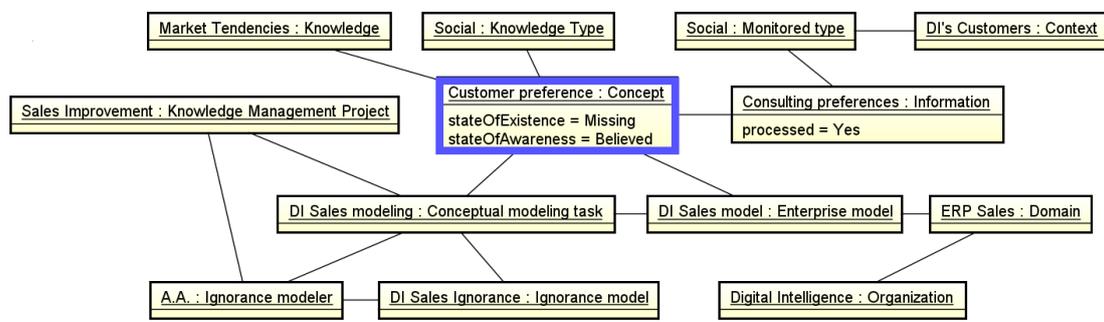


Figure 3: The object diagram of the DI illustrative case.

Identifying Customer preference as a Piece of Knowledge that needs to be assessed using its Knowledge states leads the company to go through the following phases, as depicted in Fig 4., using tokens to depict the transitions, blue for Existence and red for Awareness.

- Phase 1: The Piece of Knowledge is Missing information, yet, there is no confirmation about this, so from an Awareness perspective, this is Believed.
- Phase 2: The company responds by collecting customer feedback, which leads to the knowledge being in a state of Unprocessed information. From the Awareness perspective, it remains on the Believed state.
- Phase 3: The information from the collected feedback is processed, and this confirms that Customer preference has changed, leading to Existing knowledge from the Existence perspective. This finding is also used as evidence for the truth of the knowledge, which makes the company aware of its existence and the state transitions to True.

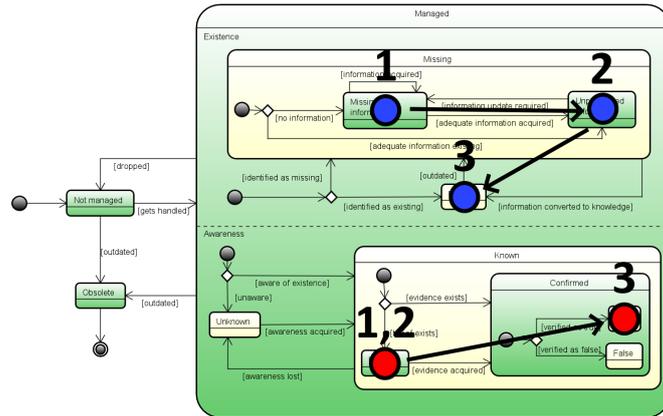


Figure 4: The transitions among the states of knowledge.

8. Discussion

The integration suggested in this study is an attempt to bring together the best of two worlds, CM and KM. Ignorance modeling can be perceived, on the one hand, as a new practice of Ignorance Management, and, on the other hand, as a new perspective for CM and EM.

From the modeling perspective, every modeling approach aims to facilitate the design and analysis of the given domain by pointing to the right directions of information, thus saving time and effort from an analyst that uses the modeling approach by avoiding irrelevant information and monitoring only the relevant aspects. From the KM perspective, ignorance, in terms of missing information, bears crucial value for the activities that require organizational knowledge, since knowing what the organization is missing can potentially be as important as what it already knows. This can be also potentially contributing towards the improvement of the success rates of KM initiatives and projects with an organization or even inter-organizationally.

In order to achieve this status, a structured version of organizational ignorance is required. The main point about modeling a structured version of ignorance is to describe a piece of knowledge with a given state of awareness. In other words, an organization may be aware of this knowledge or not. The fact that this state of awareness, as shown in Fig. 2, has been modeled as an attribute and not a separate class, helps avoid the risk of an endless loop of awareness levels. Modeling it as a class would mean that it also consists of pieces of knowledge, in other words, that awareness is described by its own state of awareness. This would be interpreted as an organization that may be aware of its ignorance or not, but this knowledge would need another assessment of its awareness. On the one hand, on a theoretical level, capturing levels of ignorance stops when the modeling goal that has been set is achieved. This fact applies to every modeling activity, and ignorance modeling cannot be an exception. On the other hand, the feasibility of a modeling activity usually depends on limited resources, therefore, avoiding the risk of an endless loop of awareness levels is deemed as more important.

At the moment, this study is an introduction that suggests a practice for ignorance modeling. The integration concerns a suggestion for applying the practice in an organization where

conceptual modelers and knowledge managers coexist. We are aware that this is not always the case in organizations, therefore, the future steps of this project will also focus on the training side of ignorance modeling, providing guidelines on the required skillset of an ignorance modeler.

Potential areas of application of the suggested models include, but are not restricted to, KM projects related to decision-making and strategic planning, as suggested in [27]. In practice, the two suggested models can facilitate the identification and capture of the specific factors of the domain that is being analyzed in the project. In this way, every piece of knowledge that belongs to the “known knowns” and “known unknowns” categories that is considered in the project can be assessed. This can be achieved, for example, with the use of a context model, where all the relevant context factors and their dimensions are captured. In this way, a set of events that have the potential to trigger changes in knowledge existence and awareness states can be identified and used for a systematic assessment. Additionally, documenting the context of the given KM project may also help address the areas of “unknown knowns” and “unknown unknowns”, which can help expand the organizational knowledge base.

On the theoretical aspect of the project, future steps will include further elaboration of knowledge states based on different ignorance types, and how the different types can affect the transitions among knowledge states. Different starting states also need to be considered.

Regarding the current version, we aspire that the notion of Ignorance modeling provides a solid basis for future work, not only within this project and research team, but also for any interested researcher and third party, regardless of the origin community, CM or KM.

9. Conclusions

This paper attempts to introduce the concept and practice of Ignorance modeling, as an outcome of combining Knowledge Management, and its specialization, Ignorance management, with Conceptual modeling, and its specialization, Enterprise modeling. The dimensions of organizational ignorance are initially analyzed and presented in a set of dichotomies, which are conceptualized in a StateMachine diagram. Moreover, the main concepts of KM and CM have been combined in a meta-model, which aims to support the integration of the two disciplines on an operational level, while in parallel introducing Ignorance modeling as a distinct new area.

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