WORK SYSTEM METHOD AS A POTENTIAL FRAMEWORK FOR DESIGNING KNOWLEDGE MOBILIZATION SYSTEMS

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Abstract— Could the Work System Approach (WSA) function as a framework for designing high-impact knowledge mobilization systems? This paper put forward arguments in favor of the applicability of WSA for knowledge mobilization design based on evidences from a practical research. Normative approaches for practitioners are highly needed especially in the field of knowledge management (KM), given the abysmal rate of disappointment and failure of KM projects. The paper contrasts knowledge management and knowledge mobilization, presents the WSA and showed how the WSA's concepts and ideas fit with the approach adopted by a multinational company in designing a successful knowledge mobilization initiative.

Index Terms— Knowledge Management, Knowledge Mobilizations, Work System Method.

I. INTRODUCTION

"You can't manage knowledge…..Knowledge is between two ears, and only between two ears. It's really about what individual workers do with the knowledge they have." *(Drucker, 2003)*

The above visionary insight has been confirmed in the larger number of studies on knowledge management (KM) failure (see for example Keen, 2006, Braganza and Möllenkrame, 2002, Storey and Barnett2000, Kalling, 2003, McKinlay, 2002). Those studies showed how a number of KM initiatives failed to achieve the objective that triggered their implementation, which is enabling action. In recent years KM initiatives are frequently implemented by companies to achieve the promised benefits in terms of increasing responsiveness and innovation, saving costs, supporting decision making, facilitating collaboration and enhancing overall competitive position. This has lead to a sustained growth in demand for KM tools. In 2007, knowledge management software was $73 billion market, and KM spending is expected to grow nearly 16 percent to an average of $1,224 per employee in 2008, according to AMR Research (2007). Yet, despite the promised benefits and the growth in the multi-billion dollar industry, KM seems to be fraught with pitfalls. Anecdotal evidence from the field suggests that 84 percent of KM projects fail (Lucier &Torsilleri, 1997). For instance in the area of KM systems to support the sales force, it has been documented that around 70% of KM projects have been unsuccessful (Buehrer et al., 2005; Gohmann et al., 2005). In addition successes that are reported in KM projects must be viewed with some degree with caution. Some researchers found that there is a systematic lack of evidence for the claims put forth about the alleged knowledge management success stories (Ekibia and Hara, 2008). Other authors observed that the knowledge management literature focuses on the bright side of KM; it barely mentions failure stories of KM projects (Alter,

2006). Given the size of KM market, the magnitude of KM failure and the strategic importance of knowledge for modern organizations, the issue of distilling real value from KM investments has become an important concern for managers and researchers. Davenport and Glaser (2002) sum up the problem best *"…Knowledge management, which was all the rage in the mid-to late 1990s, is still a good idea, but it needs a new approach…"*

To mobilize means "to make or become ready for action". Keen and Tan (2007) argued that a major current limitation to progress in KM application and impact is that there is a very clear difference between the fundamental dynamics of knowledge management and of knowledge mobilization. KM addresses the supply side of information organization, creation of environments for communication and collaboration. Knowledge mobilization, reflects the demand side that is dominated by knowledge being part of individual identity and hence personal choice of whether, where, why, and with whom to share knowledge and expertise.

Keen-MacKintosh (2001) describe and define the contrast between mobilisation and management: (i) information management: the transaction processing and data base era: organize data to turn it into information; (ii) information mobilisation: the Web and its prodigies, bar coding: create mechanisms for access to and distribution of information; "google" as a verb; (iii) knowledge management: a spectrum of information resources and communication facilitators: supply-driven; (iv) knowledge mobilisation: activation of information and communication as needed, where needed, when relevant and to whom; demand-driven (Carlsson, 2007). In other words Knowledge mobilization views information and knowledge in terms of situational needs—"what do I need to know now?"; while knowledge management tends to focus more on "what knowledge can we provide to our employees and what mechanisms can we put in place for them to make most effective use of it?"(Keen and Tan, 2007). According to (Keen and Mackintosh, 2001) knowledge mobilization is turning knowledge into action. Otherwise it is just being well informed. (Keen and Tan, 2007) thus suggest that the added-value of KM would rest on linking the corporate supply side of knowledge, i.e. knowledge management with the demand side, knowledge mobilization.

Keen and Tan (2007) and Keen and Mackintosh' (2001) contributions on knowledge mobilizations enhanced our understanding as to the mechanisms of augmenting the impact of KM projects. However it remains the unsolved problem of

how to design successful knowledge mobilization systems that would turn knowledge into action; as recommended by (Keen and Mackintosh, 2001). This is rather a priority given the high failure rate in KM projects. Additionally as Benbasat and Zmud (1999) advocated, understanding alone is insufficient if the IS-research field should contribute to practice. They argued in favor of a discipline direction where IS research could collaborate with the world of practice for joint benefits. *"…We must make a concerted effort to communicate to practitioners how our research would be relevant to them". (Benbassat and Zmud, 1999, p13).* This would involve among other things providing practitioners with explicit guidelines and "say how to do something" (Gregor, 2006). They also encouraged researchers to exploit the rich insights and cues offered by practitioners and assess their validity. This has been acknowledge by Keen and Tan (2007) when they claimed that that thought leadership wherever it originates, plus research excellence would be a powerful combination of a mission rather than a discipline-driven field of KM.

One theoretical perspective that has the potential to help dealing with the above problem is the Work System Approach (WSA). The work system approach (also called work systems theory) is a contemporary IS-theory with an objective to bridge the gap between research and practice when it comes to information systems design and analysis. *"Business and IT professionals can apply this theory for understanding and analyzing information systems. Academic researchers can apply it for gaining a deeper appreciation of past research and for developing future research projects* (Alter, 1999, p.2). The focus of WSA is contextual use of information systems (Petersson, J, 2008). Therefore it uses the concept of work system as a unit of analysis. A work system is a system in which human participants and/or machines perform work using information, technology, and other resources to produce and/or services for internal or external customer (Alter, 2005, p.8). (Alter, 2008) define an IS as a work system whose processes and activities are devoted to processing information, that is capturing, transmitting, storing, retrieving, manipulating and displaying information". In addition, he introduced the concept of IT-reliant work system, to reflect the case where IS may produce intermediate products and services that are meaning full and useful primarily in context of a larger work system that involve activities beyond processing information (Alter, 2008).

WSA has a prescribing orientation. Its explicit goal is to provide business people with an approach that they can use to attain a good understanding of a work system, how well it performs, and how it might be improved. One major purpose is to facilitate the collaboration between IT people and end-users so that implemented IS would meet the expectations that triggered its implementation, e.g. supporting the work system.

The purpose of this paper is to continue Keen and Tan (2007) and Keen and Mackintosh' (2001) work on knowledge mobilization by investigating whether or not the work systems approach could function as a framework for implementing knowledge mobilization systems. This is done by examining to what extent the insights offered by two knowledge mobilization success cases fit with the concepts and ideas advocated by WSA. The idea is to analyze the two case studies through a "lens" of a reference theory, i.e. work system theory. The point of departure in this paper was the impression that the key

concepts and ideas presented as the work system constituents are highly relevant to knowledge mobilization's core mission. For instance both WSA and knowledge mobilization share the pragmatic scope of designing an IS that enables action, i.e. an IS that users will want to use and from which the business can gain an effective and efficient work. Additionally, both theories advocated that the starting point for any IS design should be end-users everyday life routines. Alter (2002) suggests that the best way to avoid IT people-end-users mis-communication problem is to hold a structured dialogue that focuses on how users' everyday work processes. That is concentrating on how users do their work—be it hiring people, producing products, selling to customers or generating financial statements. Similarly when it comes to knowledge mobilization, (Keen and Mackintosh, 2001) argue that Knowledge mobilization does not really mean anything independent of people who use it. Otherwise it is just information.

The rest of the paper proceeds as follows. In the next section we present brief overview of WSA. Then we introduce our methodology. This will be followed by a presentation of the case studies. Finally an analysis of the case studies in the light of WSA is presented. The paper concludes with some remarks and avenues for future research

II WORK SYSTEM APPROACH- DESCRIBING WORK AND INFORMING DESIGN

The following outline of the work system approach is not intended to be exhaustive. The space limitation dictates focusing solely on the elements needed for achieving the objective of the paper.

A. Elements of work system

The work system framework is the central model in the WSA. The framework has a pragmatic objective, which is the creation of the so-called work system snapshot. A work system snapshot aims at enhancing collaboration between IT people and end-users. According to [5], often IT people focus on the technology rather than how the technology can help users perform their work. Users may then become overwhelmed by technical details and grow unwilling or unable to express their business needs clearly. The result: unrealistic expectations, poor communication and frustration, all of which lead to failed projects, poorly re-engineered business processes and ineffectual information systems. [5] thus suggests that the best way to avoid IT people-end-users mis-communication problem is to hold a structured dialogue that focuses on users' everyday work processes. That is concentrating on how users do their work. By emphasizing the work system rather than just the information system, IT people can collaborate more effectively with their business counterparts, and users can better organize and clarify their concerns. The result is a mutual understanding of the planned changes and the creation of an information system that truly meets the needs of the business [5].

According to Alter [5], the work systems framework (the view of a current or proposed work system) does not guarantee the quality of the codes or the completeness of the requirements, but it does increase the likelihood of genuine communication, realistic system requirements and reasonable expectations. Moreover, it improves the likelihood that the project will produce an information system that users will want to use, and

from which the business can gain an effective and efficient work system without creating. Indeed a core principle in the WSA is that information system has no meaning without the work system that it is supposed to support. According to WSA, understanding a work system requires at least cursory understanding of six elements customers, product &services, work practices, participants, information and technologies [2].

B. Work system life cycle (WSLC)

The work system life cycle model (cf. Fig 1) describes how persistent work systems change over time through a combination of planned change (explicit projects with initiation, development, and implementation phases) and unplanned change (adaptations and experimentations). The WSLC thus present a picture of punctuated change whereby work systems operates in a fairly stable configuration for extended periods of time, during which work system's participants may make minor tweaks and adjustments without changing the fundamental structure or operation of the work system [4] (Alter, 2008). [4] Stresses the fact that WSLC is fundamentally different from system development life cycle (SDLC) model in a number of aspects. One difference is that the term system in the acronym SDLC is basically a technical artifact that is being programmed. In contrast the system in WSLC is a work system that evolved over time through multiple iterations.

III. METHODOLOGY

As expressed earlier, the aim of this paper is to investigate the applicability of the WSA for designing successful knowledge mobilization systems. Towards this end, we adopted a two-stage methodology. Firstly we selected from the literature a case study documenting successful implementation of a knowledge mobilization initiative. The case was filtered based on three criteria, namely (i) the case documents a successful implementation of a knowledge mobilization initiative, (ii) the case satisfies a certain level of quality, and (iii) the case provides sufficient details as to the implementation approach followed. Secondly, we analyzed the design approach described in the case material according the WSA's main components discussed in the previous section, namely (i) whether or not the approach described in the case treated the work system as the core of the design process, (ii) whether or not the case's approach addressed the elements of work system, e.g. customer, work practice, participants, and (iii) how the case' approach addressed the different phases of the WSLC.
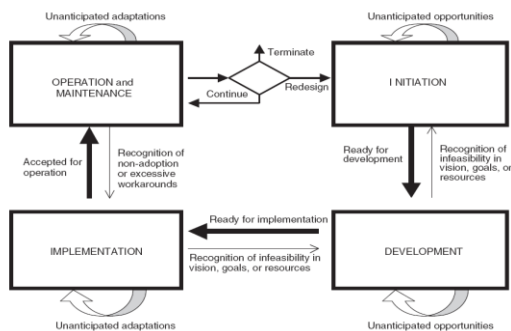

Figure 1 Work system life cycle (Alter, 2008)

The case study selected is reported in both [13] and [24]. It involves a multinational telecommunication company (Siemnes ICN) and documents the implementation of ShareNet; which is an interactive system implemented to provide salespeople worldwide with relevant knowledge about solutions and applications, sales processes and projects. It covers both explicit and tacit knowledge of the sales value-creation process, including project know-how, technical and functional-solutions components, and knowledge about business environment, e.g. customer, competitor, market, technology, etc. ShareNet also involves tacit knowledge such as the field experience of sales people and real-life tested pros and cons of a solution. Additionally ShareNet provides spaces for less structured interaction such as chat rooms, community news, discussion groups on special issues, and so called urgent requests. Urgent requests are basically forums for asking all kinds of urgent questions such as, "My customer needs a business case for implementing a new technology X by next Monday", who can help me?"; Does anybody have a list of recent network projects by competitor Y". In many cases the right answers are "harvested" and made available for later use in FAQ (Frequently Asked Questions) section [13].

One may ask whether the ShareNet initiative could be described as knowledge mobilization. We believe that it is a knowledge mobilization initiative as its goal is to support users', i.e. salespersons' action rather than mainly storing knowledge in repositories; as shows the following situation described by one ShareNet's manager *"One ICN project manager in South America was trying to find out how dangerous it was to lay cable in the Amazon rain forest. He wanted advice on the type of insurance his project needed. The manager sent out an urgent request asking whether or anyone had experience with this specific challenge and environment. A project manager in Senegal who had* encountered a similar situation responded within several hours. Getting the right information before the cables went underground ended up saving millions of dollars. Plus next time this manager has similar problem, he knows who to consult first [24, p.5].

A. Dimensions of ShareNet's success

SharenNet has become an integral part of the strategy of Siemens. Within its first year of existence, it has developed into a tool of practical knowledge management, enabling sales and marketing processes, faster action in marketplace, and knowledge-enabled competition. Since its first year of implementation, ShareNet attracted a community of 7000 users. According to the vice president of Siemens ICN, Share Net has an even greater potential to realize a measurable business impact through the creation of new business opportunities. As a next step the company is envisaging expanding the Share Net to other processes [13].

IV. WORK SYSTEM ANALYSIS OF THE CASE

This section analyses the ShareNet case in the light of the work system approach. This means that the case is analyzed according to subsets of WSA, namely treating work system as the core of the design process, work system elements, and work system life cycle. Each subset is described using citation (highlighted in italic) from original sources, i.e. constituents of

the work system theory. Then follows a "translation" that relates the subset to evidences from the case.

B. Treating work system as the core of the design process

According to [2, p.30] an information system exists in order to serve one or more work systems". From a business viewpoint…, the primary goal is not producing a better information system. Rather, it is producing a better work system by identifying and implementing improvements in the information system and in aspects of the work system that may not be touched directly by the information system [5].

Since the beginning, ShareNet's goal was to seamlessly dovetailing with employees' ways of work, instead of functioning as an infrastructure that exists alongside people's actual work [13]. One project team member noted "….We were anxious to avoid becoming another typical "knowledge management" tool failure-just a document repository. And we did not want it to be brochureware…"[24]. "We knew that knowledge sharing between local projects within a country-focusing on the same market, with the same competitors-would lead to advantages. But we also wanted to work out how this knowledge could be leveraged globally. We positioned each country on a two-dimensional graph based on its stage of economic development and the development of its telecom landscape-its regulatory environment. We realized that countries in the same market stage would have similar telecom needs. And of course, as each market developed, we could leverage solutions from the next market stage-from more economically developed country to a developing country" [24,p.4] another member explained.

Hence the goal for initiating the ShareNet system was not to build a knowledge management application, but rather to improve solution-based selling through globally networked flow of knowledge. As one ShareNet team member explained "The purpose is that "an ICN sales and marketing team in one part in the world that was facing the challenge of winning a lucrative new contract could speed its bid, and strengthen its proposal, by tapping into the experience of an ICN team that had already successfully won (or attempted to win) a similar contract in another part of the world [24, p.9].

C. Addressing the elements of the work system in the design process

According to [2], a work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and resources to produce specific products and/or services for specific internal or external customers [4, p.451]. Understanding a work system requires an understanding of at least six elements of work system: customers, product & services, process and activities, participants, information, and technologies.

In the following we will show how the design approach followed by the case addressed the above systems elements. Again each work system element is described using citation (highlighted in italic) from original sources, i.e. constituents of the work system theory. Then follows a "translation" that relates the work system element to evidences from the case.

4.2.1Customers. *A customer is whoever receives and uses the product of the work system. This may be an external customer, a customer for the organization's product, or it may be an internal customer inside the organization* [4, 4, p.466].

ShareNet's customers' were Siemens ICN's (ICN) salespeople and marketing staff worldwide.

4.2.2 Product & services. *They are what the work system produces for the customers. A work system's products and services may take various forms, including physical products, information products, service, intangibles.*[4, p.466]

ShareNet was not a tool, but rather an IT-reliant work system for embedding knowledge into the ways of salespeople's work. The services that the ShareNet system provides to users include:

- Convenient access to a knowledge library; which contained both explicit and experience-based knowledge learned worldwide in projects underway or completed. The knowledge objects were divided into separate categories, "solution objects" and "environment objects". Solution objects described technical or functional solutions to problems, whereas environment objects included data on specific markets, projects, partners, competitors, and customers [24].

- An urgent request hotline. This was where an urgent question could be posted for anyone and responds to, the idea being that users would check the list regularly to see if there was a problem that they could help with. Examples included questions such as "My customer needs a business case for implementing this new router technology by next Monday. Can anybody help? [24].

- A forum for interactive exchange. A user can contribute an idea, and have many people view it and comment on it via the ShareNet system. One manager explained "….With a tool like ShareNet, we add dynamism. We leverage the Internet, not only as a one-way publishing thing, but in having everybody contribute, on a democratic basis, a truly interactive exchange. You can put an idea and have many people view it-you start hearing from people who never would have been involved, who you never knew had any experience or knowledge about the topic" [24, p.6].

- Possibility for users, i.e. salespeople worldwide to input and explain experiences gained in the field and describe the solution he/she invented,

4.2.3 Processes and activities. *They include everything that happens within the work system. The term processes and activities is used instead of the term business process because many work systems do not contain highly structured business processes involving a prescribed sequence of steps, each of which is triggered in a pre-defined manner. Such processes are sometimes described as "artful processes" whose sequence and content "depend on the skills, experience, and judgment of the primary actor.". In effect, business process is but one of a number of different perspectives for analyzing the activities within a work system. Other perspectives with their own valuable concepts and terminology include decision-making, communication, coordination, control, and information processing* [2, p.18].

The project team recognized that the concept of ShareNet is more concerned about managerial processes than about the technical platform itself. The managerial processes have been

managed carefully from the first emergence of SharaNet through a set of activities including:

- Mapping sales processes. To ensure that ShareNet would be relevant to the day-to-day work of the salespeople, the team started by assembling a selection of the company's most successful salespeople in a hand-on, knowledge mapping process. Members of this team included sales representatives and local company heads from market around the world, covering the full spectrum of business situations faced by the company. The question that this team addressed was "How do we sell?" [13].
- Identifying knowledge areas where ShareNet could create value. A core team of salespeople from all over the world team up with marketing people and identified areas for ShareNet intervention. The areas indentified, included cognitive knowledge, or know what; skills or know how; systems understanding or know why; self-motivated creativity or care-why.
- Creating a viable business case for the ShareNet system. The IT system, the motivation and reward system and the change of organizational structure and culture all contributed to making ICN ShareNet expensive. The project team therefore had to illustrate the system's benefits with a realistic business case. Examples of quantifiable ShareNet benefits included, cost saving, increased revenues and alignment with customer needs.
- Planning the IT platform for the ShareNet system.
- Designing an incentive system aimed at getting people to contribute rather than lurk in the midst of others' solutions and getting people to rely on the system for solutions.
- Creating an organizational structure for ShareNet. This involved creating new ShareNet dedicated roles such as ShareNet managers, ShareNet consultants, global editors, IT support, telephone, and email hotline staff.
- Developing a quality control system for content. The system is based on the feedback from several knowledge re-users. Based on this feedback, knowledge of inferior quality can be removed from ICN ShareNet, whereas high-quality knowledge can be identified and developed further.

Customers	Products & Services
*Salespeople worldwide *Marketing employees worldwide	*Access to a knowledge library *Posting an urgent request. i.e. a question and receiving a quick feedback *Initiating an open discussion worldwide about a new idea

Major Activities or Processes		
* Mapping sales processes * Identifying knowledge areas where ShareNet could create value * Creating of a viable business case for the ShareNet system * Planning ShareNet system's IT platform * Designing an incentive system * Creating an organizational structure for ShareNet * Developing quality control system for ShareNet's content		

Participants	Information	Technologies
*Sales and marketing people *Top management *Users/contributors *ShareNet Committee *ShareNet managers * Global editors *Support people	*Knowledge -sharing processes *Areas of ShareNet's interventions *Type of IT platform *Type of Motivation and rewards system	*Knowledge database *live chat rooms *Urgent request hotline *Community news board *Questionnaire models for guiding the sharing of an experience *Telephone, e-mail hotline

Table 1 Work system snapshot for ShareNet system, based on (Alter, 2006)

4.2.4 Participants. *They are people who perform the work. Some may use computers and IT extensively, whereas others may use little or no technology. When analyzing a work system the more encompassing role of work system participant is more important than the more limited role of technology user (whether or not particular participants happen to be technology user* [4,p.466].

Participants in developing ShareNet system included:

- A select of ICN's best salespeople. They were part of the ShareNet team and included sales representatives and local companies' heads from markets around the world, covering the full spectrum of business situations faced by the company. Their task was to develop a map of solutions-selling process and identify broad categories of business relevant knowledge for each aspect of this process.
- Sales and marketing people from all the subsidiaries. They contributed in identifying areas where ShareNet could add value and solve problems in users' every day ´work.
- Top management. They helped communicate the idea of ShareNet across the organizational and functional departments and to ensure its added value was understood and appreciated. In addition they sent a signal to channel organizational resources and individual commitment
- ShareNet Committee: it was responsible for the strategic development of ShareNet worldwide. The majority of the members were local company representatives. This guaranteed that the opinions of the local users of ShareNet would be heard and that they would be involved in the initiative.
- ShareNet managers. They support contributors in capturing the project experiences and marketing know-how, and ensure the roll-out and support of the ShareNet system.
- Global editors. They support ShareNet managers and ensure the global synthesis of knowledge.
- Users/contributors. They are sales and marketing people worldwide. They bring their project experiences, methods, and key learning into the ShareNet database.
- Support people. They include country consultants, IT support and user hotline employees. They provide answers and help for all users worldwide.

4.2.5 Information. *It includes codified and non-codified information used and created as participants perform their work. Information may or may not be computerized. Data not related to the work system is not directly relevant, making the distinction between data and information is secondary when describing or analyzing a work system. Knowledge can be viewed as a special case of information* [4, p.466].

Information created and used by the ShareNet participants for the purpose of developing the system included the following.

- Knowledge-sharing processes. Based on sales process mapping, a selection of ICN' s best salespeople identified three processes for knowledge sharing (i) knowledge sharing between the local project teams within a country-focusing on the same market, facing the same competitors (process 1), (ii) knowledge sharing among countries at the same market stage, forming a so-called peer group (process 2), and (iii) leveraging knowledge, i.e. solutions of higher market stages to those of the lower stages in order to allow customers in the low market stage to develop ahead of competition (process 3)

- Areas of ShareNet's interventions. Sales and marketing staff worldwide identified areas of intervention where ShareNet could create an authentic added value. Those areas included (i) cognitive knowledge- or know what, i.e. technical knowledge in the form of pricing concepts, (ii) skills- or know how, i.e. feedback given by sales professionals in de-briefing projects, (iii) systems understanding or know why, i.e. making it possible for an experienced key account manager to instinctively know which components of a solution can be developed further, be leveraged and re-deployed in other countries, or even re-invented to suit different requirements, (iv) self-motivated creativity or care why; i.e. systematically identifying and promoting highly motivated and creative groups of employees who outperform others with greater resources.
- Type of IT platform. The ShareNet team selected an IT platform comprising multiple elements: "knowledge library", a way to field urgent requests, and forums for sharing knowledge,
- Motivation and rewards system. The project team agreed on an incentive program where ShareNet users could collect points, similar to frequent-flyer miles. Users earn shares for entering knowledge objects into the library, answering urgent requests, reusing knowledge, and rating one another's contributions. Depending on the number of shares accumulated during a year, employees were awarded with several incentives, such as conference participation, or telecommunication equipment. The higher the usefulness of the knowledge, the higher the reward is.

4.2.6 Technologies. *They include tools (such as cell phones, projectors, spreadsheet software, and automobiles) and techniques (such as management by objectives, optimization, and remote tracking) that work system participants use while doing their work* [4, p.466].

ShareNet project team selected an IT platform that conserves the dynamic nature of knowledge by ensuring interactivity. The platform comprised multiple elements a "knowledge library", a way to field "urgent requests", and forums for sharing knowledge, such as live chat rooms, community news boards, and discussion groups on specific issues. The plan was to create a virtual bullpen of ICN sales teams [24]. Other tools included a series of tailored questions that would lead the users through the process of giving their input. In addition an e-mail hotline and telephone were mobilized to provide advice and help, e.g.IT-support for all users worldwide.

As shown in table 1, Siemens ICN's approach for designing ShareNet reflects all the six elements of the work system approach. This would lead us to conclude that ICN's approach treated ShareNet as a work system, as shown in the WSA.

4.3 Addressing the work system life cycle's phases

In the following we will show how the design approach followed by the case addressed the four stages of the work system life cycle model. Again each work system stage is described using citation (highlighted in italic) from original sources, i.e. constituents of the work system theory. Then follows a "translation" that relates the subset to evidences from the case.

As shown in Fig, all the work system life cycle's phases were addressed by Simens ICN's approach, including unplanned adjustments such as designing an incentive system and initiating a cultural change that encourages re-use of a colleague's knowledge, i.e. you are no longer in school, copying in allowed!

4.3.1 Initiation. *The initiation phase is the process of clarifying the reasons for changing the work system, identifying the people and processes that will be affected, describing in general terms what the changes will entail, and allocating the time and other resources necessary to accomplish the change* [2,p.18].

To identify the unique opportunities facing Siemens ICN (ICN) as the industry shifted, an ICN consultancy group, Business Transformation Partners (BTP) teamed with a group from Boston Consulting Group. A member of the BTP team noted "We had poor reuse of customer solutions across our sales regions; best practices sharing in sales was nonexistent, or at best accidental, and what little sharing and solution exchange we has was not institutionalized". We need to build a global community of knowledge and best practices-sharing". The team envisioned that the knowledge management project should focus on Simens ICN's sales marketing staff, since it had the greatest need and opportunity for sharing knowledge. With a well designed knowledge management system, an ICN sales and marketing team in one part of the world that was facing the challenge of winning lucrative new contract could speed it bid, and strengthen its proposal, by tapping into the experience of an ICN team that had already successfully won (or attempted to win) a similar contract in another part of the world. One BTP team member noted "Most knowledge management systems focus on "codified" knowledge, knowledge which can be easily transferred in order for true knowledge sharing to happen. They omit any consideration of "tacit or experience-based knowledge… So we had the goal of designing a system that captures both elements:the codified part and the tacit or personalized part" [24].

4.3.2 Development. *The development phase is the process of defining, creating, or obtaining the tools, documentation, procedures, facilities, and any other physical and information resources that are needed before the change can be implemented successfully in the organization. Key issues in this phase revolve around creating or obtaining all required resources in a cost-effective manner and, if necessary, demonstrating tools and procedures actually meet the requirements* [2, p.18].

Döring, president, ICN group strategy brought together a select group of ICN's most successful salespeople, in a meeting at Frankfurt

iroport and asked "How do sell solutions?" Team members developed a detailed map of the solution selling process, identifying the broad categories of business knowledge relevant to each stage. They also discussed the form that the tool should take. After the network meeting at Frankfurt Airport, ten meetings followed throughout the various regions, with a final meeting in Garmisch, Germany. During that time Döring began to select the members of his core ShareNet Team. The team began mapping out the details of how the technology and managerial processes around ShareNet should operate. ICN engaged a Web development firm to develop the first version of the system. But the initial version was not successful. So the overall version was redefined; content would be kept as simple

as possible. The ShareNet teams also choose a new technology partner. After much discussion and refinement, the pilot teams had checked and vetted the general concepts for the system, while Döring started to make headways on getting buy-in for ShareNet on the local level. General rules for ShareNet's use had been defined, such as the use of English as a standard language. As ShareNet went live, responsibility for its strategic direction was handed to a new ShareNet committee [24].

4.3.3 Implementation. *The implementation phase is the process of making the desired changes operational in the organization. This includes planning for the roll out, training work system participants, and converting from the old way of doing things to the new way. Organizational implementation frequently raises issues about how to convert to a different business process with minimum pain and how to deal with political questions and changes in power relationships* [2, p.18].

With the first version of the system up and running, the group faced the challenge of getting people to use it, especially getting managers to populate the database with existing knowledge and documentation of projects under way and completed. "To jumpstart the network, we held two-to three days workshops in local countries to get each local company on board, to get them used to the system and interface, and to convince them of its value", remembered one ShareNet team's member. To support the network, the ShareNet team nominated a number of dedicated ShareNet consultants. They provided support to local country subsidies, running conferences to set up each of them and interfacing with ShareNet managers once a country was up and running. Ultimate control over the quality of contributions lay in the hand of the "global editors", their role was to ensure the clarity and usefulness of contributions, assessing their potential for reuse throughout ICN and checking the ease with which submitted solutions could be understood. Those efforts began to pay off. After each country workshop, the team would see a jump in urgent-request posting from that country, and thereafter, a trickle of knowledge objects would begin to flow [24].

4.3.4 Operation and Maintenance. *This final phase involves keeping the work system operating effectively by monitoring its performance and making minor changes that do not require a major project. This phase continues until major changes are required. At that time a new iteration of the four phases starts. Management allocates resources to initiate a project. The initiation phase ends with specific ideas about what should change, the new development phase begins, and so on* [2, p.18].

ShareNet faced two problems as it tried to gain momentum: getting people to contribute, rather than lurk in the midst of others' contributions and getting people to rely on it for solutions. "There were always excuses. People said, "I haven't time to spend on this". Others were reluctant to share. The network consultants, for example, say, "Sure we have knowledge, but it is for sales, it is not for free…", one team member observed. "The core ShareNet's team constantly brainstormed ways to embed the system into Siemens's and the local company's culture" another member noted. The team worked hard to spread the ShareNet message that "unlike in school, copying is not only allowed it is required. Additionally the team soon began to experiment with incentive schemes to motivate ShareNet's use and adoption. A program was launched where ShareNet users could collect points called ShareNet

shares, similar to frequent-flyer mile. Users earned shares for entering knowledge objects into the library, answering urgent requests, reusing knowledge, and rating one another's contributions. ShareNet shares could be redeemed for various gifts and prizes such as text books, computers, PDAs. The scheme prompted significant increase in the quantity of contributions. But quality control problem began to creep. As a result, the team began to examine various measures for providing control, establishing both a rating system and strong editorial board, where contributions would be rated by knowledge users, with a number of stars reflecting their usefulness. Providing feedback was also rewarded with shares, encouraging users to rate contributions once they had been used. Finally, ShareNet put peer pressure to work-details of ShareNet members, including all their contributions and their level of usefulness, could be viewed by everyone on the systems. "The final area where the team decided to create incentives for performance was in the role of ShareNet managers. These managers could earn up to 120 percent of their monthly fixed salary as an annual bonus", note one ShareNet team member. During 2001, the head of R&D division became convinced of ShareNet potential value and worth to his organization. ShareNet team started adapting ShareNet for the R&D organization [24].

As shown in Fig, all the work system life cycle's phases were addressed by Simens ICN's approach, including unplanned adjustments such as designing an incentive system and initiating a cultural change that encourages re-use of a colleague's knowledge, i.e. you are no longer in school, copying in allowed!

IV. CONCLUSION, LIMITATIONS AND AVENUES FOR FUTURE RESEARCH

Knowledge mobilization has the potential to create a profound impact not only on firms' workforce but also on the competitive advantage and the entire strategy. Prior to investing and implementing a knowledge mobilization initiative, a firm needs to contemplate how the initiative will support effective action of users. As Keen, 2006 argued after all Knowledge's need is situational, action is needed for the situation. The ultimate goal of knowledge mobilization is thus to enhance effective action, rather than merely storing knowledge. To enhance effective action through knowledge mobilization, organizations will have to tackle at least three issues (i) organizing and leveraging available knowledge as an asset and, (ii) making the collected knowledge available for use in a form which is adapted to the context of use and to the needs of the user. How to tackle those issues is still a key question facing companies wanting to embark in the cloudy waters of knowledge management in general.

The aim of this paper has been to explore whether or not the work system approach (WSA) could function as a framework for the design of high impact knowledge mobilization systems. Towards that end, we analyzed a successful knowledge mobilization initiative implemented by Siemens ICN through the lens of WSA's concepts and ideas. Perhaps one limitation of this study is that the analysis was based on secondary, i.e., not fresh case material. Therefore the analysis of the cases was limited. Another limitation is that the paper's space requirement precluded discussing theoretically the importance of each elements of the work system framework for knowledge

mobilization design. In spite of these limitations, the analysis showed a clear potential for WSA to function as a framework for the design of knowledge mobilization systems. As the analysis showed, Siemens ICN's design approach addressed the major constituents of WSA. These led us to the conclusion that ICN actually treated the ShareNet as a work system. This is a first attempt and more research has to be done in several areas. One avenue of future research would be to replicate this study and examine other cases of successful knowledge mobilization initiatives through the lens of WSA. Another avenue would be to examine the suitability of WSA for knowledge mobilization by focusing on other aspects of the approach such as the so-called work systems principles. A third avenue of research would be to apply the WSA as a design approach for implementing knowledge mobilization systems.

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Unanticipated adaptation

Unanticipated opportunity

OPERATION AND MAINTENANCE

- Monitoring of ShareNet's performance
  -Identifying low usage problem
- Designing and implementing an incentive system for users
- Designing an incentive system for ShareNet managers
- Initiating a cultural change by encouraging people not to be afraid from copying other's knowledge
- Expanding the reach of ShareNet to the R&D unit

Keeping the work system operating effectively by making minor changes

INITIATION

- ICN has poor records in knowledge reuse and sharing
- There is a need to build a global community of knowledge and best-practices sharing
- The project should focus on sales and marketing staff, since it had the greatest need and opportunity for sharing knowledge
- The project should avoid becoming another knowledge management tool failure
- The goal should be to capture both explicit and tacit knowledge.

Identification of scope, goal, and vision of the project

Accepted for Operation

Ready for Development

Making the work system operational in the organization

IMPLEMENTATION

- Arranging workshops in local countries to convince ShareNet' potential users of its added value
- Building an organizational structure for ShareNet to support and train users
  -nomination of ShareNet consultants, managers, global editors, support staff
- Acceptance testing, i.e. number of urgent request posting

Ready for Implementation

DEVELOPMENT

- Developing a detailed map of solution selling process by a select of ICN's best salespeople
- Identifying knowledge relevant to each stage
- Building ShareNet core team
- Hiring a web development firm to develop the system
- Defining ShareNet's rules

Acquisition, creation, configuration of the resources needed for implementation
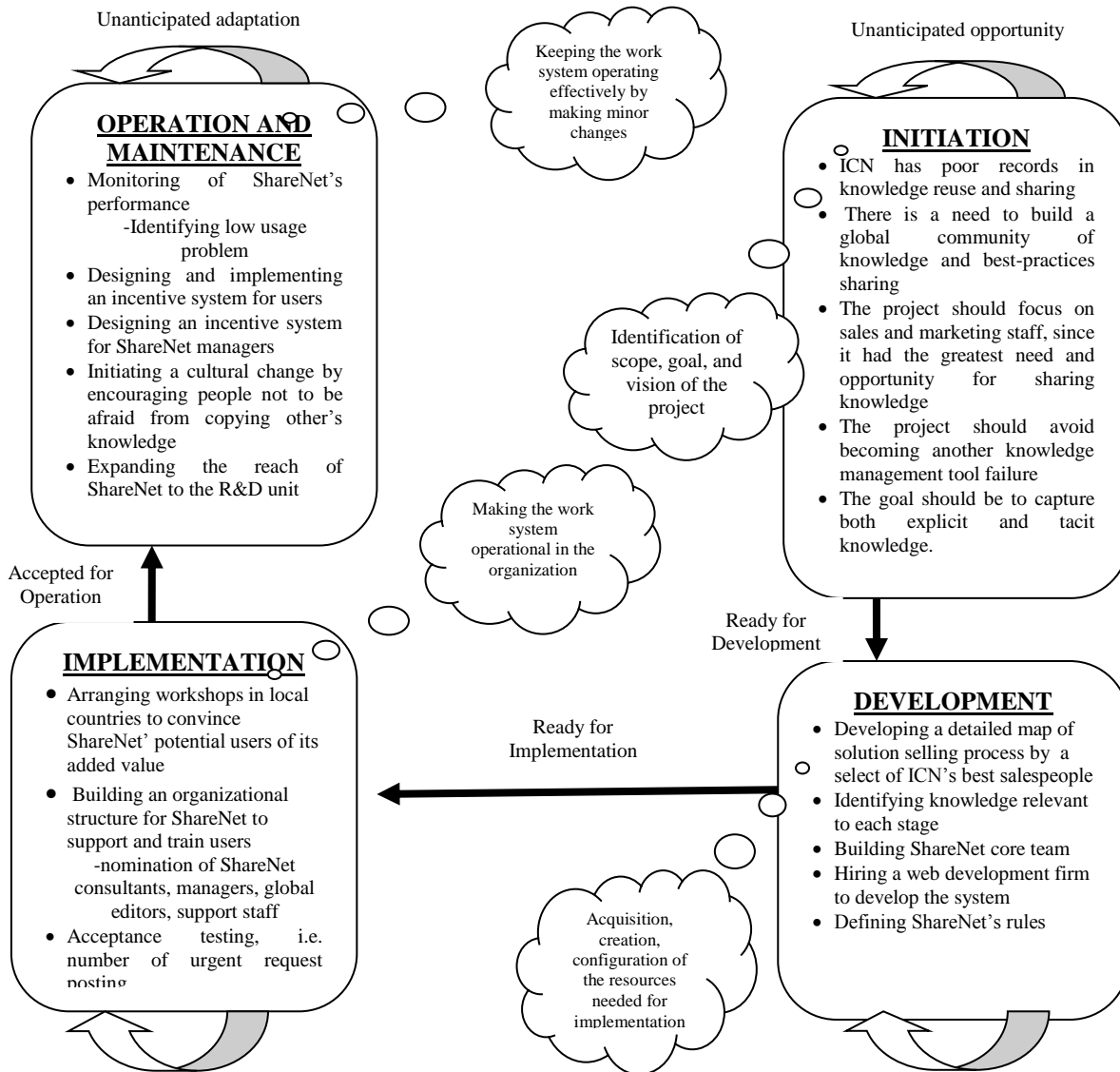
Fig 2 Work system life cycle applied to Share Net system, adapted based on Alter, 2008