

## CREATING A STRUCTURED MEETING ARENA FOR KNOWLEDGE SHARING

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**Abstract:** This paper aims to describe how to create and structure a meeting arena by combining organisation structure and information structure; this will be used in order to create an innovative and creative arena for knowledge sharing and problem solving within the company. The model is exemplified by four industrial case-studies. Results reveal that most of the companies do not have any standards for information- or knowledge sharing, most improvement potentials are seen in structuring and storing the right information (IS), aiming from tacit towards explicit knowledge (OS) and this could be done by structuring the questions in the OS-M-IS model and by creating innovative and creative meeting arenas.

**Keywords:** Organization system (OS), MEET, Meeting, Information system (IS), Knowledge sharing, Production, learning organization

### 1. INTRODUCTION

Knowledge sharing is defined as activities involved in disseminating or transferring knowledge among individuals, groups or organizations (Lee, 2001), where individuals exchange their tacit and explicit knowledge and create new knowledge (Hooff & Ridder, 2004). The effectiveness of knowledge-driven work relies on the creation of new knowledge and the sharing of useful existing knowledge through the interaction of tacit and explicit knowledge (Nonaka & Takeuchi, 1995).

This paper aims to describe needs and gaps in Organisation system (OS) and Information System (IS) for creating structured meeting arenas for enabling knowledge sharing. This could be related to (Nonaka and Takeuchi, 1995) view of what knowledge sharing is; “*the capability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems*”. This will be done by using a model developed in (Gullander et al., 2014).

Results from four industrial case studies shows that there are three main areas to focus related to the model

1. New ways of working within the organisation i.e. standardised work or meeting structures
2. Creating a learning organisation where tacit knowledge is increasingly transformed to explicit knowledge
3. Introduction of smart and innovative information and communication technologies (ICTs) i.e. finding tools to transfer and share the data-information and knowledge through both the IS and OS.

Standardised work in terms of meeting structures could be increasingly efficient in terms of knowledge sharing at the moment, the problem is to transfer the information and knowledge from for example whiteboards to digital storage to be able to create trends and statistics that could be used for planning and management. This is exemplified in one of the cases (Case A) where morning meetings and preventive maintenance are observed and discussed. Tacit knowledge in particular is impossible to share by definition, so, a question discussed in this paper is if it could be possible to not only share this knowledge but to also be able to store the knowledge and information into the IS and OS. The relation between Data-Information-Knowledge-Wisdom (DIKW) Hierarchy, tacit knowledge and knowledge sharing will be discussed in relation to all case studies to some extent. Smart and innovative ICT-tools should be implemented after the vision, strategy, and structure of IS and OS have been created. This area will be discussed particularly in two of the cases (Case C and D) where new technology has been bought before the structure of OS and IS has been finalised. The discussion will also be about over automating of cognitive support for the operator and the differences between mature and innovative

technology i.e. ‘A ‘mature technology’ is one with which workers have become comfortable and which they perceive as an integral part of their work environment (Oz, 2005). In a similar way, we can speak of the economic maturity of technology, which occur when it moves from a novelty to a necessity, as well as organizational maturity regarding human resources, structures and support.

## 2. A STRUCTURE MEETING ARENA

Most of the theory used in this paper is referred to as methods, but the main theory used is within this concept model conducted from (Gullander et al., 2014), illustrated in figure 1. The figure describe the different areas within each system and in (Gullander et al., 2014), each box is described more in depth.

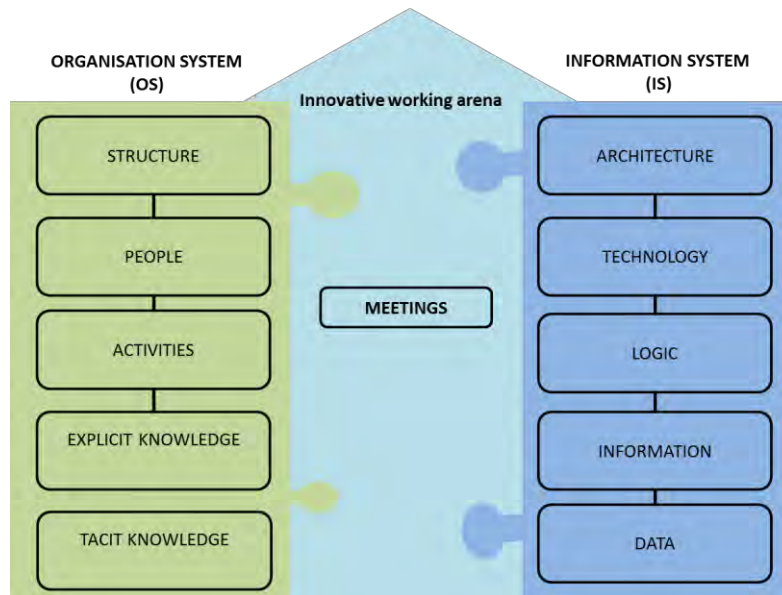


Fig. 1. The OS-M-IS model adopted from (Gullander et al., 2014).

This model will be used to describe the current state for the companies regarding structure of OS, IS and Meetings, in section 5.

## 3. METHODS USED

Within the project MEET there is also an internal agenda of testing different meeting methods for gathering information (a deeper analysis about these methods will be dealt with in another paper). There has been case studies at each company, were observations, semi-structured interviews and in some cases work-shops were performed. There has also been a lunch-lunch work-shop were two meeting-methods were performed: SWOT-analysis and Post-IT mingling, both these later methods were inspired by the Open Space technique. The sections below will describe the different methods shortly and the result from each method and company will be presented in the result chapter.

### 3.1. Observations

The approach in all case studies has been outside observation (Flynn, Sakakibara, Schroeder, Bates, & Flynn, 1990; Sekaran, 2000) i.e. uses a neutral observer to collect data (in the cases there were always at least two researcher, performing the observation).

### 3.2. Interviews

Structured interviews has been performed with specific questions to be used, the relevant questions and the order in which they are posed were decided in advance. Structured interviews permit comparisons between interviewees, without sacrificing the depth of the personal interview (Merriam, 1994).

### 3.3. Work-shops

There were a workshop taking place at one of the case companies (Case A) and then it were a bigger workshop were participants from all companies were invited and participating.

This bigger workshop was inspired by the open space structure i.e. the four basic principles were considered when conducting the meeting. The Four Principles of an open space meeting are (Owen, 1993):

- 1) Whoever comes is the right people  
*it is not how many people come, or even who comes (in the sense of status or position) that counts, rather it is the quality of the interaction and conversation that make the difference. For good conversation you only need one other person who shares your passion.*
- 2) Whatever happens is the only thing that could have.  
*Real learning and real progress will only take place when we all move beyond our original agendas and convention-bound expectations*
- 3) Whenever it starts is the right time.  
*The real impact of this principle is to serve important notice about the nature of creativity and spirit. Both are essential and neither pays much attention to the clock. They appear (or not) in their own time, which by definition means it is the right time.*
- 4) When it is over it is over.  
*An important thing to think about is to not stretch a meeting just because it was scheduled for a certain time. As it turns out, all of the useful business is conducted in the first 20 minutes.*

### 3.4. SWOT analysis and Post-It mingling

To methods were used in the work shop in order to get some structure of the collection of thoughts and experiences; A SWOT analysis and a Post-It mingling session.

SWOT analysis aims to identify the Strengths and Weaknesses of an organisation and the Opportunities and Threats in the external environment (Dyson, 2004). The SWOT-analysis were performed within three discussion areas connected to the theory of the meeting arena, illustrated in figure 1:

1. Meeting structures (OS)
2. Use and introduction of new technology (IS)
3. Information handling (production memory) (Meeting)

There were also three questions discussed within these areas that were a result of the current state analysis

- a) New ways of working in the organisation
- b) Competence development
- c) Smart Information and Communication Technology (ICT)-solutions

The time for each discussion areas were twenty minutes (five minutes for each 'letter' in the SWOT for example: for five minutes the companies were supposed to only talk about *Strength* within the organisation concerning *Meeting structures (1)* in terms of *Competence development (b)*, then only Weaknesses and so on...). All and all this exercise took one hour to and Post-It: s were used as a documentation tool, illustrated in figure 2. The following day all the SWOTs had been summarised by one leader (researcher) and was discussed in order to see if something were missing, results is shown in chapter 4.

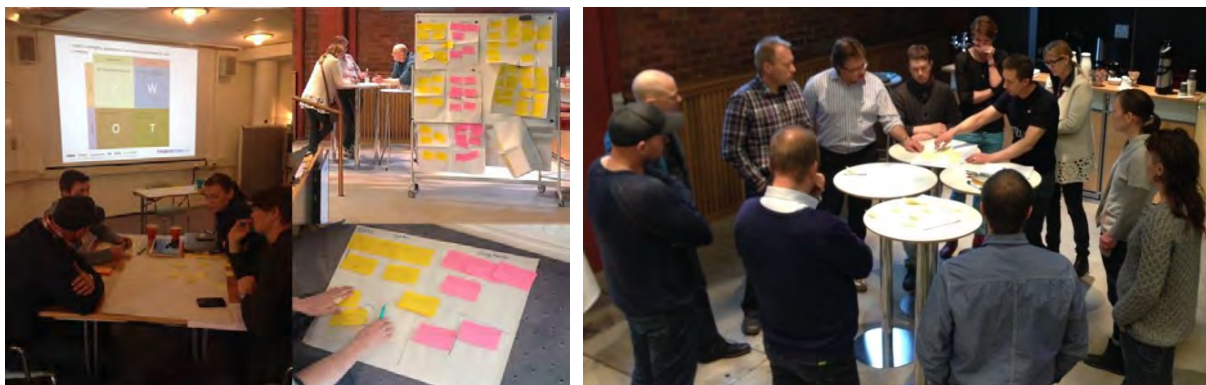


Fig. 2. Results from the SWOT analysis (Pictures to the left) and Post-It mingling (right picture).

The workshop also included a Post-it exercise were the companies brainstormed about 'what they would like to know more about' and 'our company are good at', illustrated in figure 2. The topics were combined together with the companies into groups of depth topics; the result is discussed in section 6.

The SWOT analysis and the post-IT mingling was conducted in order to get a common view of their problem areas and to see the next step regarding depth studies at the companies.

#### 4. RESULT – CASE STUDIES

Four companies participated in the case study where two companies were SMEs within surface treatment (Case A and Case B) and two companies were global within the automotive industry (Case C and Case D). Initially crucial work processes were identified, where new ways of development of meeting arenas were needed in a short- and long term perspective. Further, development needs for information, collaboration, and knowledge sharing were identified, table 1.

Table 1. Summary of the Participating companies.

Cases	Type of Company	Crucial work processes	Development needs recency
Case A SkeLack	SME Surface treatment	Daily control of production/order management, management/control of the delivery of products in/out, visualization	Continuous improvements Meeting and planning structure
Case B LaRay	SME Surface treatment	Work meetings, efficient collaboration between supplier and customer, visualization	Diversion handling Production memory
Case C Volvo Penta	Global Marine Engines	Work processes supporting production teams, order management, and product introductions	Support department Meeting and planning structure
Case D VCC	Global Automotive	Cross-organizational learning in improvement and development work, Product-development and introduction	Global communication Structure and standards

The following sections will describe each case's development need in more detail. Furthermore, these will be put in the context of information and communication systems, and how the meeting arena could improve these needs.

The results will also present a SWOT analysis for each case. Finally a summary of the cases will be done.

##### 4.1. Case A – Current state; SME Surface treatment

The company is a SME with 10 employees, and was established in 2009. They are suppliers of powder and wet painted and surface treated components using one of the leading technologies within their segment. Recently the company has started to work in a more structured and planned way. This was done by having more structured morning meetings every day were yesterdays and today's work is gone through, they have also started with 5S and joined a Lean-network. Some of the main aims with this work are to decrease the stress level of the operators, to increase and simplify the information paths and to implement a new and somewhat different organisation structure. Parallel with the implementation of the new organisation system, new information ways in the information system is introduced as a touch screen and whiteboard in the production.

##### 4.2. Case B – Current state; SME Surface treatment

This case company is a SME with about 30 employees. They are suppliers of powder coated, wet painted, and surface treated components. They strive for more efficient work processes, from order to production and delivery, by adopting both technical solutions and changes in the work processes. Today, much product and process information is stored but never used. This hidden information is considered to offer a high potential of improvement. A flat organization with few people means short ways for communication, but also critical dependency on few persons with key competence and vital information. They are now working towards Lean production and have identified a need to establish a meetings structure suitable for the small company size. Also, they wish to provide better support for work in production, e.g. error handling, by developing methods for storing and making relevant information accessible from one situation to another. This would increase efficiency and knowledge, improve communication, thus sustaining work towards a learning organization.

##### 4.3. Case C - Current state analysis; Global Marine engines

The case company is part of a global organisation, but the factory itself has ~140 employees. They have somewhat their own culture with a set organisation. In this case well-structured meetings were held every day with a clear chain of command. Teams met first and handled issues possible at team level, and the team leaders sent this information and other issues up to the next level, and so on up to a meeting with the factory manager. Then feedback was given backwards in the same structure and this procedure was all done before lunch. Within the teams and following the organization up in a straight line this way of meeting was found very effective. Further development of the meeting procedures in daily operations was to identify what information and knowledge in the white-boards which is critical and useful in other situations, and how to transfer it in the IS and OS-system. The need for improvements was also related to information sharing between different support functions in tactical and proactive activities. The extremely fixed meeting structure, received some critique from the teams, like the fact that it sometimes wasn't adjusted to production time requirements.

#### *4.4. Case D - Current state analysis; Global Automotive*

This global company have recently started production in China and Malaysia. Experts from Sweden share knowledge about machines, production systems and product knowledge. A business case was developed to ensure the cost effectiveness of a communication tool (less travelling) but no strategies, work methods or standards are defined or available for how it should and can be used in the organisation. A tool is at present used for complex problem solving i.e. problems that cannot be solved by communicating by emails or phone. In general the video tool improves the interaction in the meeting by gestures and the information transfer is more safe then before (the operator is more self-confident and the expert is calm due to that everything is done in real-time). Although many work methods exists at the company this technology is new and there is little knowledge about it. New work methods are needed and also knowledge about the tool needs to be spread in order to capture the full potential with the tool. If data should be stored, which is possible with the tool, it is not certain how it should be stored, what amount and how it can be searchable. Other issues concerns confidentiality and fear of using the tool has also been brought up. The tool does however has the potential to stimulate new ways of social interaction and understanding in cross-boundary global collaboration, knowledge sharing between users and suppliers, and training.

### *5. THE OS-M-IS MODEL PUT IN PRACTISE*

This chapter will illustrate how to use OS-M-IS model to describe the different cases in a structured way. First there will be a summary of their recently development needs and how they are connected to the different levels in the model. Finally there will be a picture from one of the cases describing the different levels.

#### *5.1. Summary of the different cases put in the OS-M-IS model*

Figure 3 illustrates the different areas within the model. Result from each case is documented in each box; the results are based on the case studies, observations and interviews at each company. The result is also limited to the development needs in Table 1.

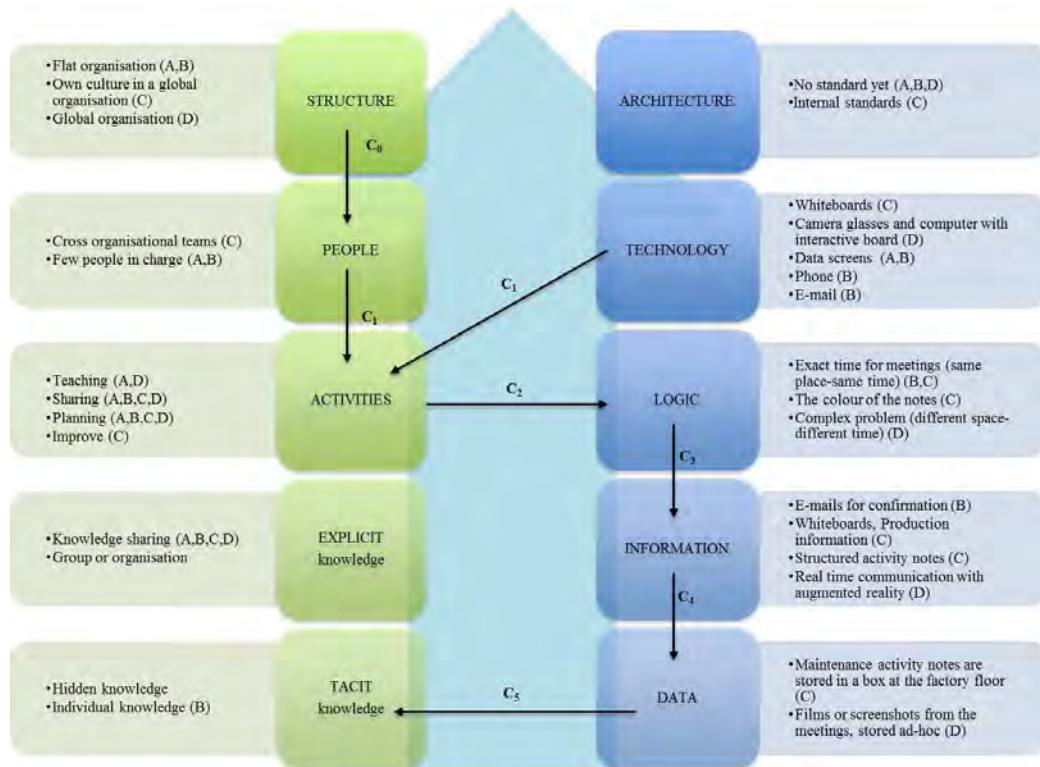


Fig. 3. OS-M-IS model put in practice.

The results reveal that most of the companies do not have a standard for information and knowledge-sharing yet. All companies are sharing or planning activities of some sort, mostly production related issues but also maintenance. Case C will be used as an example of describing the model in more practical way. The arrows (links) in figure 3 will be described in following section.

### 5.2. Case C – Weekly planning meeting for preventative maintenance

Figures 4 illustrate the OS-M-IS model and were the information and organisation structure exist in a normal situation. This situation is a *structured* preventative maintenance meeting ( $C_0$ ). *The people* that gathers are from different functions within the company i.e. production engineers, maintenance, operators, team-leader, service ( $C_1$ ). This cross functional group will meet around the whiteboard (*Technology*) ( $C_1$ ) for two main *activities*; sharing last week's tasks and status by go through the structured notes on the whiteboard and planning next week's activities. The meeting is weekly scheduled about one hour (*Logic*). The personnel are adding new *information* by adding new notes on the board ( $C_3$ ). The finished notes are stored in a box beside the whiteboard ( $C_4$ ), this information is only available if reading the notes directly from the box. *Data* such as trends and statistics are not available just by looking at the box which could be seen as lost/hidden data. This data could also be described as tacit knowledge in the organisation ( $C_5$ ).

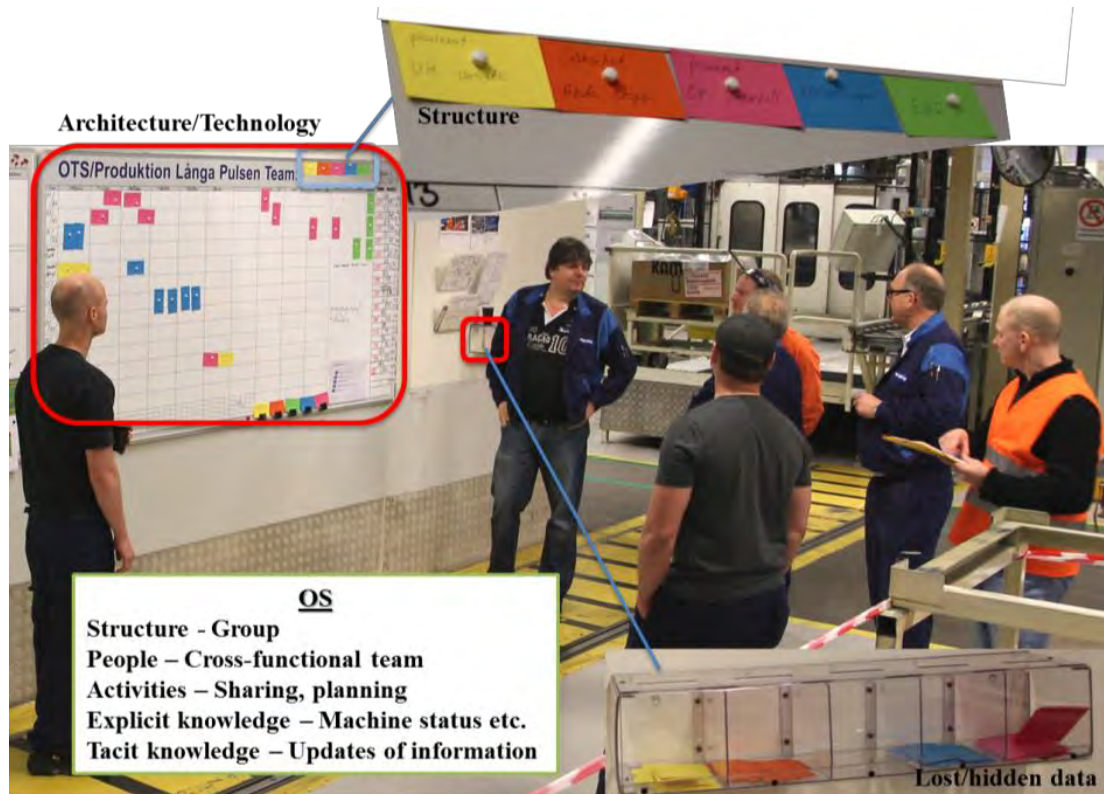


Fig. 4. Preventive Maintenance; weekly planning meeting, Case C.

Improvement potential here is to store the needed information into some data base in order to get statistics and trend. The most important question to ask then is if the information is needed, how to store it so the availability is high, and how to seek for the information.

#### 6. DEFINING FUTURE NEEDS USING SWOT AND POST-IT MINGLING – A SUMMARY

These two methods were used in the work shop after the case studies had been performed. The result will be used for future development of demonstrations.

##### 6.1. SWOT analysis and Post-IT mingling

Table 2 shows a summary of all companies' SWOT analysis with the letter A-D telling what company the information is taken from. It could be seen that, being a flat organisation could also lead to unstructured information and communication pathways, it also seems to be difficult to have a continuity of meetings and a discussion about when to plan and when to produce. The willingness to try new technology seems high, but it is important not to over automate but to have clear goals and use-areas for the technology, which is lacking in some cases. Furthermore, the companies have to adapt standards and routines for using the technology.

The workshop also included a post-it exercise where companies brainstormed what they would like to know more about. The topics were combined together with the companies into groups of depth topics. The following depth topics were found: gather, identify, spread, teach, sort, present and engage. The topics are summarized and described in Table 3.

Table 2. SWOT analysis.

	Strengths	Weaknesses	Opportunities	Threats
Work method (OS)	<p>“Flat” organisation (A, B)</p> <p>Short information and communication pathways (A, B)</p> <p>Strong company culture (C)</p> <p>Existing infrastructure: people, organisation, IT, (D)</p>	<p>The information and communication pathway are not always structured (A, B, D)</p> <p>Difficult to have the meeting-continuity on-going, quality of meetings (A, C)</p> <p>Priority between planning and producing (A, B)</p> <p>Lack of standardised work routines (D, C)</p>	<p>Flexible against customers (A, B)</p> <p>Utilises the opportunity of being part of a larger organisation (C)</p> <p>Take use of modern technology (A, C, D)</p> <p>Full potential of the technology unknown (D)</p>	<p>Stiff competition and Sensitive to economic fluctuations (A)</p> <p>Delivery issues from sub-contractors (B)</p> <p>Cultural differences in the company, factory and office (C, D)</p> <p>Additional work roles are required for both operators and expert (D)</p>
Technology (IS)	<p>Structured and planned investments(A)</p> <p>High technological maturity among the operators, interest in new technology (A,B, C)</p> <p>Available technology: tested and easy to use (C, D)</p>	<p>High stress level (A)</p> <p>Much tacit knowledge information (B)</p> <p>Sometimes overly optimistic of what technology can accomplish(C)</p> <p>Limited accessibility (D)</p>	<p>Minimizing the time pressure and the stress level (A)</p> <p>Better planning (B)</p> <p>Utilises the opportunity of being part of a larger organisation (C)</p> <p>New communication possibilities: social interaction (D)</p>	<p>Too costly solutions might slow down future investments (A,B,C)</p> <p>IRL meetings still needed (D)</p> <p>Only one technology supplier (D)</p>
Information handling (Meeting)	<p>Visualisation of the production (A,B,C)</p> <p>Whiteboard and pulse meetings (A,C)</p> <p>Have written down standards for most important work(C)</p> <p>Technology and support for IT-systems available: similar systems exists. (D)</p>	<p>The production planning is personal depending (A)</p> <p>Documentation is not used (B,C)</p> <p>Too many systems(C)</p> <p>Education and routines for documentation/data storage is missing (D)</p>	<p>Low employee turnover – deep knowledge regarding processes and customers(A,B)</p> <p>Information should follow the actual products; should be good for service organisation(C)</p> <p>Education and external quality assurance for several competencies(D)</p>	<p>Trade secrets and information dissemination (A)</p> <p>It is important to be able to show how things are done, especially improvements(B,C)</p> <p>Format for documentation: video and pictures not optimal for problem-solving(D)</p>

Table 3. Depth studies for future work.

Depth topics	Part of system	Description
Gather	Organisation	Gather information in a smarter way. Develop routines and standards for it
Identify	Organisation	How can we identify what information is needed, by whom, and in what situation? Identify connections between disturbances and improvement work
Spread	Meeting	Share work methods about good improvement work. Make it a standard, implement it. Follow up improvement work. Share technology use geographically.
Teach	Meeting	Share information with rest of the organisation.
Sort	Information system	Sort and categorize information in a smart way so that it is searchable, easy to collect, accessible for people with different experience. Who will do it?
Present	Information system	Exchange information without physical meetings. Present information so that it supports effective support work, different experience levels, is easy to find and can be used for both experienced, novice and temporary personnel.
Engage	Information system	How combine creativity and standards? How to encourage employees to report experiences and problems?



The first two topics *gather* and *identify* can be seen connected to the OS. *Gather* specifically concerns how to gather information in a smart way. In this step it is important to develop routines and standards, which was seen as a need for all employees involved in all companies. Then it was seen important to *identify* what information is needed, by whom, and in what situation. Specifically in disturbance handling and improvement work it is important to quickly know what knowledge should be kept and further spread and available in the organisation. The next depth topics concerned the Meeting namely *spread* and *teach*. Companies agreed that it is important that good work standards should be spread within the company. Therefore standards should be developed that support spreading of good methods. *Teach* is connected to spreading in a sense that novice and experienced employees should have use, and have appropriate conditions to learn. To be able to create a good meeting experience it is important that the IS can *sort*, *present* and *engage*. *Sorting* and categorizing information in a smart way is important since today much information is stored, it is not possible to easily find information in multiple sources, and there are difficulties seeing new information or deviations. The information should be easy to access and a standard tool or standardized work is needed. In addition, the information should be presented in an effective manner. The presentation of information should be dependent on situation, on what roles are present and what the goal of the meeting is. An extra feature that was interesting for the companies was that the IS should be useful and *engage* the employees. One problem today is that the systems can be difficult to use and it is easier and quicker to continue working as they always have i.e. the IS will be rarely used. The IS should instead engage the employee so that it will be used for additional things and become an important part of their workday. It may also stimulate creativity. For instance, if the IS main task is reporting disturbances it could also be used for maintenance chatting, communication with other employees, or checking today's lunch menu. Future work will include studying the suggested depth topics further.

## 7. CONCLUSION

Results from the case studies show that the model provides a practical approach to get an overview of the links between OS and IS and possible improvements in the attempt to gain efficient innovative meetings, knowledge sharing, and a sustainable learning organisation. Another important issue is the potential of the innovative glue between these systems and the interaction between these structures, as described in the model. There are challenges of changing both organisation and information systems and both systems need to be considered in parallel. The innovative glue is possible through new ways of analysing and combining the systems, based on individuals and business needs in the context of different work processes. Thus, the model can be used to define the strategy and appropriate conditions needed for efficient knowledge sharing, problem solving and development work where new forms of cross-functional and cross-organizational collaborations need to be developed in an increasing global business environment.

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## REFERENCES

- Dyson, R. G. (2004). Strategic development and SWOT analysis at the University of Warwick. *European Journal of Operational Research*, 152(3), 631-640. doi: [http://dx.doi.org/10.1016/S0377-2217\(03\)00062-6](http://dx.doi.org/10.1016/S0377-2217(03)00062-6)
- Flynn, B. B., Sakakibara, S., Schroeder, R. G., Bates, K. A., & Flynn, E. J. (1990). Empirical research methods in operations management. *Journal of Operations Management*, 9(2), 250-284.
- Gullander, P., Fast-Berglund, Å., Harlin, U., Åkerman, M., Groth, C., Mattsson, S., & Stahre, J. (2014). *MEET – The innovative glue between the Organisation System and Information System* Paper presented at the *Proceedings of the 6th Swedish Production Symposium (SPS)*, Gothenburg, Sweden.
- Hooff, B. v. d., & Ridder, J. A. d. (2004). Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8(6), 117 - 130.
- Lee, J.-N. (2001). The impact of knowledge sharing, organizational capability and partnership quality on IS outsourcing success. *Inf. Manage.*, 38(5), 323-335. doi: 10.1016/s0378-7206(00)00074-4
- Merriam, S. B. (1994). *Fallstudien som forskningsmetod*. Lund: Studentlitteratur.

- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company: how Japanese companies create the dynamics of innovation*. New York.
- Owen, H. (1993). *OPEN SPACE TECHNOLOGY -A User's Guide*.
- Oz, E. (2005). Information technology productivity: in search of a definite observation. *Information & Management*, 42(6), 789-798. doi: <http://dx.doi.org/10.1016/j.im.2004.08.003>
- Sekaran, U. (2000). *Research methods for business - a skill-building approach*.