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BELONGING TO T- OR L-PROFESSION? ABOUT PROFESSIONAL AND ORGANIZATIONAL CHALLENGES FOR KNOWLEDGE MANAGEMENT

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Abstract

Organizations have been even more knowledge-intensive and profession-orientated during the last years. Professional work has generally certain specific properties related to its working context. Professions working in organizations will add another dimensions of organization structure, culture, strategy and organizational effectiveness in creating, managing and sharing of knowledge. Two different case studies have been made, within two different work disciplines; within aircraft maintenance and emergency health care. This paper explores the conditions for knowledge management activities within different types of professions in the time- and life-critical work practices. The types of professions are called T- and L-professions. The aim of this paper is to examine the challenges of different types of professions characteristics on the knowledge creation, management and sharing in organizations dealing with time- and life-critical activities. Different characteristics exist of the T- and L-professions, respectively. The differences relate to different challenges within the knowledge management in organizations.

Keywords: Professions, Knowledge management, Information systems, Organizational performance.

1   Introduction

Professional work has generally certain specific properties related to its working context (Burns et al. 2006). Some professions are working under life- and time-critical conditions, and the work is characterized as complex and knowledge intensive. As organizations have been even more knowledge-intensive and professional during the last years, it is important to analyze the impact of the professionals characteristics. Organizational culture is considered to be a critical factor in the creation, sharing and management of knowledge and also as a main hindrance for a successful knowledge management in organizations (Rai, 2011; Alavi, Leidner, 2001). Hence, professions working in organizations will add another dimension to how knowledge will be created, shared and managed within organizations. In the extant literature it is lacking an explanation on the influences of the professions characteristics on the dimensions of organization structure, culture, strategy and organizational effectiveness in creating, managing and sharing of knowledge.

Professional work is characterized by uncertainty, complexity, instability and uniqueness (Schön, 1991). The work is also related to solving complex problems through creative and innovative solutions (Alvesson, 1993). There is also a rich variety of potentially relevant knowledge conversions available within each profession as well as between different professions (Mathiassen, Robertson, Swan, 2003). In understanding the requirements for creation, management and sharing of knowledge within professional work contexts a deep understanding of the complexity of the work and special problems characterized by different types of professions is required. The use of information systems supporting work activities appears to be more and more important as there is an obvious trend in society that the knowledge-intensity is growing at the same time as the use of information systems are increasing in organizations. The requirements on knowledge, competence and competence development are increasing in society as well as technological innovations as information systems, which have contributed to the increased need of human expertise (Scarbrough, 1995).

This paper explores the conditions for knowledge management activities within different professions in time- and life-critical work practices. In order to understand the work practices within the studied professional work context the concept of profession and its characterization is used (Evetts, 2006). The focus of knowledge management is especially based on the different types of professions; L and T, as it is found that they show different characteristics influencing the knowledge management. T-professions can usually be found within technical fields of work, which provide important materialistic service. L-professions are related to work performed in order to taking care of the welfare and the health of people in society. The analysis in this paper originates from studies of professions, within aircraft maintenance and from emergency health care.

The aim of this paper is to examine the challenges of different types of professions characteristics on the knowledge management in organizations dealing with time- and life-critical activities. This will be made from an analysis of the knowledge management enablers and knowledge processes in the professional work practices. This study then attempts to highlight the capabilities and procedures in these work practices and explain the challenges from a perspective of mobilizing higher levels of organizational effectiveness and quality and to consider the time- and life-critical aspects. The examination is aimed to shed light on the implications for information systems design supporting knowledge work, especially for the different types of professions.

2   Theoretical framework

In order to understand the work context within the professional work studied and to be able to understand the work there is first a need to understand the concept of profession and its characteristics. In order to analyse and interpret the management of knowledge within the two types of professions; L and T; the characteristics of professions together with a conceptual framework for the analysis is presented.

2.1 Professional characteristics

Different phenomena and events in the society affect professions and their characteristics. Professions can both be strengthened and weakened, depending on the different external impacts from society (Evetts, 2006). Information systems are used in many different ways within professions in order to support the work being performed. The information systems are continually changing in different ways and this will also have a constant impact on the professions.

Professional work is intrinsically characterized by uncertainty, complexity and instability and it is uniquely (Schön, 1991). The professional work is at least as much about finding the problem as it is about solving the problem. Information systems supporting the complex work have to be designed to not impede the effectiveness in quickly solving complex and critical problems. The work is about solving complex problems through creative and innovative solutions (Alvesson, 1993).

In complex knowledge work a kind of territorial thinking often arises between different collaborating professions. A professional culture represents a shared experience that others do not have (Starbuck, 1992). Professions' specific cultures can be interpreted as hindering other people to work within these areas and competence (Alvesson, 1993).

This will also have implications for the knowledge management and the use of information systems in collaborating on complex knowledge work. In this work also different cultures in different professions have an impact. This will sometimes create barriers against knowledge within one's own profession and in collaborating with other professions with the same conditions. The complex and the professional work related problems are sometimes unintentionally forgotten.

Hellberg, Saks and Benoit (1999) make a distinction between two different types of professions; T(thing)-professions and L(life)-professions. These two types differ from each other. T-professions are usually found within a context characterized by usage. This usage stands for providing important materialistic service for everyone. Tansley (1996) claims that the culture within the more technical professions tries to provide the best, or the highest satisfaction, for as many as possible and that they have the responsibility for the welfare and the security of society. T-professions related to professional work practices are devoted to producing, organizing and administrating goods and services and they do not have any close dealings with individuals. T-professions can then be said to support the interest of the general public with technological and economic development in the society.

The characteristics of L-professions are related to the welfare and the health of people in society. L-professions claim to take care of the fundamental human rights in a civilized society. Griew et al (1999) emphasize that L-professions have an ethical approach. L-professions do not have any difficulties in upholding their own rights in society. All of the members in a society are potentially dependent on L-professions. L-professions are considered as altruistic, which means that they are unselfish in their nature (Hellberg et al, (1999).

2.2 A framework for knowledge management analysis

As knowledge can be seen from different perspectives, the process perspective is acknowledged in this paper. The process perspective involves a simultaneous knowing and acting of humans (Carlsson, et al., 1996), and focus especially on application of expertise (Zack, 1999).

Lee and Choi (2003) suggest an integrative conceptual framework, when studying knowledge management (KM) processes related to performance of organizations. The framework can be used to investigate the relationship between KM processes and KM enablers such as organizational structure, culture, and information systems in order to enhance performance of work activities. The integrative conceptual framework is based on four components, that can be applied on empirical data to characterize the result.

- KM enablers - consist of influencing factors seen from a social-technical perspective. The social system is concerned with attributes of people, relationships among people, reward systems,

authority structures as well as organizational structure and culture. The technical system is concerned with processes, tasks and technology. Thus, information systems are considered as technical systems.

- KM processes – consist of activities such as creation, modelling, sharing, store, distribution, transfer and use of knowledge in organizations.

- The KM intermediate outcome - refers to knowledge worker capability, specific processes, innovation, and organizational creativity. Organizational creativity is defined as the creation of a valuable, useful product, service, idea, procedure, or process by individuals working together in a complex social system.

- Organizational performance - related to the organizations studied it can be seen as effective use of resources and optimizing the quality of the work in the time- and life-critical contexts.

The structure of an organization is the primary mechanism available for implementing, executing and controlling knowledge management activities. Formalization and centralization are the two most common dimensions of structural frameworks of organizations. To be more adaptable when unforeseen problems arise an organization has to support variations in process and structure (Chen, Huang, 2007)

The degree to which decision and working relationships are governed by formal rules, standard policies and procedures is referred to the formalization. The formalization is likely to impede the spontaneity and flexibility needed for innovation and creativity and to decrease the possibility that people engage in alternative behaviour and the willingness for people to discuss and consider alternatives (Robbins, Decenzo, 2001). The locus of decision authority and control within an organization is referred to the centralization (Tsai, 2002). Formalization facilitates cooperation and collaboration among people in an organization. Formalization supports knowledge management because it can shape the structure and scope of interactions (Kern, 2006). Moreover, formalization permit to ease the circulation of the knowledge produced in different parts of the organization, and in this way improve inter-functional transfer of explicit and codified knowledge, by means of rules (Cohender, et al., 2004). By providing specific directives for people in the organization to follow the explicit knowledge can be used more effectively.

Centralization refers to which degree the decision-making is concentrated. Decentralization, on the contrary, distributes the decision-making in organizations (Pertusa-Ortega, et al., 2010). A high degree of centralization creates a non-participatory environment that reduces communication, commitment, and involvement with activities in the organization. Also, centralization can reduce the production of creative solutions and hinder communication as well as sharing of ideas. Decentralization can enhance the knowledge creation, as the more people become involved in the decision-making process, the more creativity, variety and ideas will arise and it is more likely that these ideas will be taken into account and improve knowledge performance. People in the organization can be more flexible when acquiring and interpreting knowledge and this encourages people to create new knowledge. Decentralization is seen as the lifeblood of knowledge creation because the increased level of involvement of the people in the organization (Lee, Choi, 2003).

Organizational culture is referred to shared assumptions, values and norms among people in an organization (Schein, 1985). Kunda (1992) also stress that cultures within organizations can be seen as common rules, which control cognitive and affective aspects. In building and reinforcing KM in organizations organizational culture is a critical factor (Rai, 2011). Organizational culture has an important impact on KM as it supports and have incentives to promote interpersonal interaction, collaboration and communication (Alavi, Leidner, 2001). The sense-making process when people in an organization render meaning to new data and information and share alternative meanings is coupled to the organizational culture. Moreover, the restructuring of shared new meanings and decisions on courses of actions based on new understandings is conditioned by organizational cultures (Zheng, et al., 2010, Weick, 1995).

The strategic capabilities in organization, learning and innovation, allow the creation of increased organizational performance (García-Morales, et al., 2006). Strategy is about focusing on static efficiency and dynamic efficiency. Static efficiency is concerned about the refinement of existing products, processes and capabilities and dynamic efficiency is concerned about the development of new ones. In an organization the management has to make a trade-off on the need to exploit existing capabilities and to search for new ones (Raisch, Birkinshaw, 2008). The strategic management has to be based on competence and dynamic capability in order to facilitate KM. A strategy that facilitates KM also seeks to diminish boundaries between different people and groups within an organization (Baskerville, Dulipovici, 2006).

Knowledge creation and codification do not necessarily lead to performance improvement or value creation (Alavi, Leidner, 2001). Value is created only when knowledge is shared throughout an organization and is applied where it is needed (Teece, 2000).

3   Research method

Two different case studies have been made, within two different work disciplines. Both of the disciplines are performed within publicly financed areas. The first study is based on a case study with ethnographical influence performed within the Swedish Airforce. The work in maintaining the military aircraft JAS 39 Gripen and its information handling has been studied at the Skaraborgs Air Base in Såtenäs, as well as at Volvo Aero Corporation (VAC), the developer of the engine in this aircraft. The second study is an ethnographical study performed within a health care organization in Sweden, the NU health care. Both of the different disciplines can be characterized by their quite similar work processes.

The case study of the aircraft maintenance comprised have been performed in different phases since 1997. Initially the study was of an exploratory character with interviews, open-ended observations and studies of internal documents in the field of work, where the work of the flight engineers and control engineers was performed at the wing of Såtenäs. There were also regular discussions with the service engineers and the developing engineers of support systems at VAC. The first phase was followed by a phase with interviews, collection of some secondary material and attendance of meetings in both organizations. Another phase included some more observations and more structured and focused interviews.. In total 25 persons were interviewed. During this case study, extended in a quite long period of time, there has been frequent visits to the field sites. Material from the maintenance work process has been acquired by qualitative empirical studies, especially qualitative interviews with both different maintenance professions and executives at the wing of Såtenäs and at VAC. Notes were taken during the interviews. During the observations of the maintenance work field notes also have been taken. Other sources due to the empirical findings were attending in courses on the construction and maintenance of the aircraft as well as in project meetings of the product support system project group at VAC.

Within the NU health care the case study comprised of different phases, since 1999. This study included 21 interviews with doctors, nurses, IT-personnel and ambulance personnel as well as observations at five separate times. The interviews were tape-recorded and transcribed and notes were taken during the observations. This phase of the case study was rather broad in its character and gave a thorough insight into the field of work. During the last phase three follow-up interviews were done. The interviews in the last phase was particularly devoted to the aim of this specific paper (McCracken, 1988). A thorough analysis was done, when all the transcribed material from the interviews was read two to three times, in order to develop a deep understanding of the discussions in the interviews.

4   Results

Professions within two different work disciplines have been studied; aircraft maintenance and emergency health care, each with its own organizational characteristics. The use of IS are increasing in

these organizations where professional work is going on. This section will describe the ideal situation as well as the current situation within both of the work disciplines.

4.1   Case one: Aircraft maintenance

Aircraft maintenance is aimed at using the condition-based maintenance approach as much as possible, as it is within many other areas concerning technical maintenance. There has been a change in the concept of maintenance of military aircraft when the aircraft JAS 39 Gripen was introduced in October 1997, in Sweden. The condition-based approach is proactive, and means that the aircraft is maintained according to the current condition. When a component in the aircraft begins to fail or not function successfully the system of sensors will recognize that. This information can be seen by the pilot during the flight or by the flight engineer within the trouble-shooting process, by built-in monitoring systems. This condition-based approach is rule-based and should increase the availability of the aircraft, which implies that the aircraft could be up in the air flying as much as possible. The intention is also to decrease maintenance costs and increase the quality of the aircraft in operation, and at the same time an active way of preventing catastrophes and accidents. However, it is accepted to use time-based and fault-based maintenance approaches to a certain degree in parallel with the condition-based maintenance approach. Each aircraft can be regarded as an individual, with its own characteristics.

The maintenance work is then very flexible and mobile in its character and at the same time it is complex and knowledge intensive. The place for landing could be located at the airbase, but it could also be somewhere else, or even in the middle of nowhere. Different people, both within the flight engineer profession, but also people between different professions, as control engineers, service engineers and developing engineers, have to collaborate in the work processes of trouble-shooting, fault localization and repair. Also, the information and knowledge needed for trouble-shooting, service and maintenance has to be accessible. All activities within the military aircraft maintenance are a kind of training, in case of war.

The profession of flight engineers is responsible for the daily operations of the aircraft and the supporting maintenance according to the maintenance handbook. There is built-in condition-based maintenance systems in the aircraft that have to be checked. The flight engineers make overall inspections of an aircraft each time the aircraft has landed. The inspections involve looking over the aircraft, checking some places on the aircraft manually, using the sense of smell in finding anything suspicious on the aircraft, though their work is based on tacit as well as explicit knowledge. Finding faults or not, the flight engineer has to decide if the aircraft can take off within ten minutes. If any fault is hard to identify, or if the trouble-shooting process is complex the flight engineer needs to discuss this problem with other flight engineers.

The profession of control engineers is responsible for flight security and airworthiness. The control engineers log all faults that the flight engineers report. The control engineer's profession has contacts with another profession, the service engineers at VAC. The control engineers contact the service engineers if the maintenance handbook in case seems to be insufficient. The service engineers investigate deviations from normal functionality for the components and other faults hard to define. They also issue deviations to the maintenance handbook if it is needed. The service engineers are responsible for technical decisions about all components. The last profession within aircraft maintenance is the developing engineers at VAC. They are experts on a specific component of function in the aircraft. This profession investigates faults on an expert level and decides about changes in the maintenance prescriptions. In this profession there are for example people with extensive knowledge about different material and its characteristics and they are experts in anticipating possible consequential damages at different suggestions on measurements.

4.2   Case two: Emergency health care

Within the emergency health care the goal is to take care of patients and their complaints, injuries and diseases in a good way. The health care professions wish that patients will trust in the care taking and that they feel safe. In this work there is a need for efficient access to different information about a

patient, for example appointment times, referrals, lab answers and X-ray pictures. There is a need to make complex diagnoses for the patients, and to pass them through to the right department, for example surgery, medicine or the orthopaedic department.

The work within health care is based on different professions concentrated on different work activities. The professions studied within the emergency health care are nurses and doctors, sometimes specialized within different areas of health care.

Nurses meet patients at the entrance and set a priority based on a patients' estimated condition. In estimating the condition for patients the nurses have access to a decision support system, which have been used to a greater extent during the last few years, but they also use their tacit knowledge. It is the doctors who meet the patients in a later phase. After an examination of the patient the doctor is deciding on medical treatments or actions to take on the patient. The doctor for example decides if the patient needs X-rays, and if the patient needs any other treatments. X-ray pictures sometimes will be used as a basis for decisions by the doctors. Within emergency health care there are also psychologists, welfare officers, physiotherapists and occupational therapists, who will be contacted when patients need them, after decisions from the doctors.

A large amount of information is produced within a health care organization. There will continuously be new routine descriptions, health care plans and other descriptions for different medical examinations and treatments of patients, but they have to be approved by the director of the clinic. Different people within different professions are writing different kinds of descriptions, based on their knowledge and experience. Patient records and treatment reports are also written.

There is a need to have fast access to the information and knowledge needed on a specific occasion, concerning for example basis for decisions about prioritizing of patients. Different IS have been implemented, with various integration, as systems for managing deviations have been implemented in order to support the quality assurance of routines. The documents are often stored in databases and are accessed by web-based systems, which the health care professions sometimes find hard to search. However, sometimes the documents can only be found in files in the clinic directors' room. There also exist a parallel manual system. So if the intranet is not accessible, or if one finds it hard to search in the web-based system, the files in the book-shelf can be used. There is also a feeling of security in using a paper-based system, and it can be hard to break behavioural patterns. However, the support for using information systems in the work is decentralized to the IT department.

5 Challenges in the knowledge work

Knowledge management enablers and processes are identified in the two professional types, respectively. From the cases the knowledge management intermediate outcome refers to the organizational procedures, processes and capabilities that have got different impact out from the two different professional types. Organizational performance will be based on how the resources can be effectively used in optimizing the quality of the work.

People within professions are specialized in a specific area of knowledge and competence. The analysis of the cases has proven that there exist some differences between the T- and L-professions as enablers for knowledge management. Moreover, the challenges within each type of professions are faced with characteristics based on organizational structure, organizational culture as well as organizational strategy in increasing the organizational effectiveness and quality in the life- and time-critical work practices. This, this have an influence on the knowledge management processes in each of the professional types.

5.1 Differences between T- and L-professions

The differences between the characteristics of the T- and L-professions are obvious in the analysed cases. The differences found in the cases can be seen in table 5.1.

T-professions	L-professions
Stronger barriers	Weaker barriers
Soft approach to IS development and use	Hard approach to IS development and use
A system approach	A human approach

Table 5.1.   The different characteristics of the T- and L-professions, respectively.

Professional barriers

A characterizing feature of professions is that they create barriers against other professions. Professions are eager to maintain their positions through different forms of strategies, for example in limiting different kinds of information and limiting knowledge transfer to collaborating professions (diLuzio, 2006). However, the characteristics of the barriers in the two different professional types differ within the profession types. Within the T-professions there are not always clear boundaries between different work activities, which could enable the knowledge management processes. The barriers between different T-professions run the risk of being conflicting and instable. T-professions have more intra-professional knowledge areas, as knowledge areas concern more than one profession, though they are not collaborating to a greater extent. Professions within the very same area of knowledge can have different views on how to perform work and to use information systems (IS). Each profession has its own specialist competence within the field of work, as to say each profession has its own rangers' district. In this way the work is hierarchical and centralized. As an example, the control engineers' profession are protecting their own work, and they are not willing to share knowledge and competence to the flight engineers. The barriers between T-professions are a hindrance for enabling knowledge management.

L-professions have often clear rules about which work activities will be performed by which profession, and how the work activities should be performed, though a high degree of collaboration exists between the L-professions. Thereby competition and thus, barriers, do not arise to a greater extent between the L-professions in their daily work. Within the L-professions the nurses are not considered as having the medical knowledge needed to judge a the patient's condition. It is the doctors' profession who has the medical knowledge it is also the responsibility of the doctor to determine a patients' condition. However, there is a relatively tight collaboration with exchange of knowledge and experience, and discussions often take place between nurses and doctors and between nurses and nurses. This situation is enabling the knowledge management processes. However, the work is not formalized to a great extent, as the professions are not needed to use specific instructions in conducting their work.

The barriers between different L-professions are being visible especially when it comes to discussions about new IS, which is not enabling the knowledge management. Nurses sometimes experience that doctors are neglecting their viewpoints, when discussing questions about IS with personnel at the IT-department. The nurses perceive that the doctors take advantage of their authoritative position as doctors when different IS should be implemented within the health care, when requirements and needs are discussed. Even though, the different professions have different foci on what is important in choosing new systems. The doctors have, in support with their profession, a greater authority and power to influence, even if the nurses use the systems to a greater extent and even if the nurses have the best knowledge about the work activities in question. In this way there is a risk that the IS are not adapted to the work activities as much as they could and the knowledge management intermediate outcome will not be increased.

Approach to information systems

The T-professions face a more soft approach to the development and use of information systems and technologies in their work, that is supporting the knowledge management intermediate outcome. The L-professions have a more hard approach to the development and use of information systems in their work (Checkland, 1993). They are more inclined to the care-taking of people, and to help ill and injured people in the best way.

When the use of IS is planned within the T-professions, flight engineers are often involved. Flight engineers have the knowledge and experience of maintaining, trouble-shooting and taking actions; therefore this profession is seen as competent to be included in decentralized IS developing teams. This is a natural approach for T-professions and this follows the intentions of the soft systems approach (Rose, 2002). This can be seen as a reason for why the T-professions do not perceive any special problems when implementing and using IS and this is enabling the knowledge management. The development is performed with great knowledge about the work activities, which implies that requirements and goals from the organization are obvious for the development team.

When it comes to plans of implementing new IS within health care, the L-professions are allowed to present their requirements and point of views to the IT-department. Thus, the systems development is centralized in the organization. However, they are not included in the development teams, and perceive that the IT-personnel express their requirements in a different, more technical, way (Henfridsson, 1999). Moreover, the process of developing and implementing new IS within the health care is often perceived as very urgent. This situation can be seen as decreasing the organizational creativity and innovation in order to get a decreased knowledge management intermediate outcome.

The L-professions experience large problems in the use of IS, when they do not have any knowledge and competence within the area of IS design. The health care professions think that they are poorly educated when it comes to information technology and use of information systems. The health care professions wish to have a greater influence when to choose an information system, and thereby they could have opportunity to enable the knowledge management to a greater extent. Many people in the professions feel frustrated when facing problems in different use situations of information systems.

The work approach

Both T- and L-professions are oriented towards the best for society (Pfadenhauer, 2006). However, the approaches differ in that the health care has a human approach and the aircraft maintenance has a more materialistic approach with a system focus. Professional knowledge is important both within L-professions and T-professions. To be able to interpret critical situations within the work is also a great strength within both types of professions. A difference in understanding and analysing the problem areas within the different types of professions is that information and knowledge are managed in different ways, which results in very different knowledge management processes within the work practices.

The T-professions are more disposed to use technical tools compared to L-professions, that enables the knowledge management. People within T-professions have a technical education. This will imply that they are more used to work with technical artefacts and they can often understand and use IS in an efficient way. They are more used to learning about different technical equipment and systems, and they therefore relatively easily familiarize themselves with technical artefacts as IS.

Especially within the L-professions there is a great trust in tacit knowledge, where human knowledge and experience is highly valued. This phenomenon is characteristic for professions according to Dreyfus and Dreyfus (1986), as they are stating that expert knowledge is characterized by holistic assessments, intuition and tacit knowledge. The tacit knowledge is of course more complicated to store in an IT-based system (Walsham, 2001; Mathiassen, et al., 2003). As Wilson and Howcroft (2000) claim, the health care professions connect IS and IT with efficiency and control, which is in conflict with the traditional valuations within health care, which are care and humanity. Professions within the aircraft maintenance are on the other hand used to work with efficiency, control and formalization; thereby the conflict with use of information systems will not be noticeable within these professions. People within T-professions are more likely to see technical solutions in different ways. The use of different technologies and systems is a natural part of their work. The work is somewhat characterized by a materialistic and technical view, and all support of technologies and systems are seen as supporting their work, as can be stated as supporting the knowledge management processes.

5.2   T- and L-professions' impacts on knowledge management

The T- and L-professions have different impacts on knowledge management, that the two cases have proven. These impacts are described in table 5.2.

T-professions	L-professions
Lower integration of knowledge	Higher integration of knowledge
Emphasis on organizational knowledge	Emphasis on individual knowledge
Flexible development and use of IS	Inflexible development and use of IS

Table 5.1.   The impact of the T- and L-professions, respectively, on the knowledge management.

Integration of knowledge

Professional barriers imply a challenge that needs to be taken into account in the knowledge work performed in order to get an increased knowledge management intermediate outcome. Parts of the information and knowledge that are managed within complex and critical activities are related to the knowledge within each profession. This knowledge is gathered through practice in the work and through collaboration with other people within the profession. To make each profession's information accessible for other professions by e. g. IS, means at the same time that the professions run the risk to be deprofessionalized, when the knowledge is no longer unique for each profession (diLuzio, 2006). However, the strategy within the T-professions' organization, the Air Force is to maintain the professions and their areas of knowledge and competence, and this implies that the barriers between the professions will also be maintained. Hence, integration of knowledge between professions are not encouraged to a great extent. Barriers for information and knowledge transference between different professions can therefore occur, when the potential to collaborate is increasing when introducing information systems for knowledge management. The knowledge and competence of the flight engineer profession is deemed important in complex and distributed decision-making situations, within trouble-shooting and maintenance. The professions' culture are supporting the individuals within a profession in standpoints and choices of action strategies in complex situations (Cook & Brown, 1999).

The knowledge integration is performed in the daily work within the L-professions, when for example individuals are discussing x-ray pictures, diseases and injuries. Dialogues exist between individuals in the emergency health care locations, that support the knowledge management processes. A high degree of collaboration is often prevalent within and between the L-professions. Professional collaboration have the notion of the involvement of multiple individuals (Aarts et al., 2006). Though, the rich flora of documents is a challenge for the organization, in order to structure the knowledge integration to increase performance.

Organizational versus individual knowledge

Despite the rather high degree of formalization of the work of the T-professions, where the work to a great extent is based on knowledge codified into rules, their creativity is rather high (Bhatt, 2001). As knowledge management enablers, many new ideas are flourishing and problems are widely discussed, mainly within each profession, at each site. The process of knowledge sharing is very slow, despite the existing enablers as the professional individuals' knowledge, engagement and creativity are obvious. The quality of the performance of aircraft maintenance has the potential to be improved if innovations could be taken into account to a higher degree, and formally be published as maintenance instructions.

The knowledge work within the L-professions are more based on individual knowledge, knowledge that is internalized by the individuals (Bhatt, 2002). The L-professions is considered themselves as rather autonomous and self-organizing in their work. The individuals within the L-professions take their own decisions, often based on discussions and collaborations between other individuals within the very same profession or within another L-profession, that is supporting the knowledge management intermediate outcome. In this situation many documents, instructions and health care

plans are flourishing. These can be written by both nurses and doctors, but they have to be approved by an operative manager of a department. The documents can be used in its origin version or it can be rewritten into new versions. This will also result in a uncertain situation where not knowing which version is the most recent, and how the original version may have been interpreted and rewritten. However, there are vital ideas on how to use only one original document in different document flows. Many knowledge enablers, the individual professionals, are working together in different situations, and the individuals' creativity has the possibility to be taken into account. However, the performance of the emergency health care have the potential to be improved by bringing order to the information infrastructure.

Development and use of information systems

Communication and interaction are characteristics when it comes to more qualified work (Alvesson, 1993). Speech and conversation are important parts of work and will enable the knowledge management. It is about understanding the social interplay and to understand and explain the human activities performed in relation to the complex work within knowledge-intensive work as within professions. Information and knowledge needed in the maintenance work is spread out in different dispersed places. Especially T-professions are localized in different places. Communication between people at dispersed places and the gathering of information from dispersed places is of great importance within the maintenance work. Difficulties in use and development of IS within different professions can be derived from the complexity within professional work. Both of the cases studied consist of time- and life-critical work, as work in both of the cases can have devastating consequences when and if anything should go wrong (Perrow, 1984).

Complex processes often faced by professions also require coordination of information and knowledge in different work processes. To coordinate work processes, also performed in dispersed places, IS are often used, and are considered as knowledge enablers as technical systems. When IS are introduced as a support for performing different work activities it will influence the professions and their work. In using IS to a greater extent work will be performed as based on intellectual understanding and insight (Woods & Roth, 1988). Moreover, the people in each profession are influenced because IS can be perceived as both a facility and a threat to its own profession. Thereby the professionalization of the professions is influenced.

However, when new ideas about control in organizations are based on the new-public management approach, management has tried to allocate scarce resources efficiently (Lines, 2004). This has led to higher requirements on the economical follow-up of costs related to different areas of the organization. diLuzio (2006) states that result-oriented management tries to increase efficiency by reorganization. This is a fact within the health care organization, where centralization and the information systems knowledge and competence of the IT-coordinators at the health care clinics will disappear. The disadvantage of this organization is that the knowledge management processes will not be supported to a great extent. Instead, all the IS and IT knowledge and competence are accumulated in an IT-department. Hence, this has led to the fact that the L-professions perceive a larger insecurity in the use of IS, that has an influence on the knowledge management intermediate outcome. In a larger perspective this could have an impact on the L-professions' assessments and decisions within their professional work, thus influencing the work performance.

6   Conclusions

This aim of this paper has been to explore the conditions for knowledge management activities within T- and L-professions in time- and life-critical work practices. The contribution of the paper is about considering challenges which have importance on different types of professional work related to enabling knowledge management. The analysis of the cases studied has proven that there is different characteristics of the T- and L-professions, respectively. These differences create different challenges to the knowledge management processes. The challenges relate to the integration of knowledge, the emphasis on organizational versus individual knowledge, and the flexibility to the development and

use of information systems. In considering the knowledge management intermediate outcome the organizational performance could be enhanced.

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