



SARI MÄKINEN

Records Management in Mobile Work



ACADEMIC DISSERTATION

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Abstract

Over the last decade, mobile information technology has developed rapidly and enabled a wide range of mobile work outside standard office environments. The increasing number of records created in a mobile context raises new challenges for organisational and personal records management.

This research concentrates on mobile work and records management. The objective of the thesis is to explore the challenges of organisational records management in the framework of changing information technology. The main research question is this: what are the features and challenges of mobile work with respect to records management, and how have these challenges been taken into account in organisational records management? This question was explored through three distinct perspectives on mobile work: those of the mobile worker's motives in management of records, mobile workers coping with personal information management (PIM), and the organisation managing the information repository created in mobile work.

This study is a documented, explorative, and qualitative case study. The data collection, conducted in three Finnish organisations, included interviews of 25 people and a selection of organisational documents. The interview and document data were analysed qualitatively by means of a cross-case approach. Organisational memory was used as a framing concept for the analysis.

The research was conducted in four sub-studies, and the findings were published in refereed journals. The first sub-study indicated that organisational memory is a concept that refers to information used in work-related settings and therefore is a useful concept for the study of records as an explicit form of organisational information. Three empirical sub-studies revealed that mobile workers were motivated to manage records if it facilitated their work and that of associates. The core functions of the organisation and tightly controlled and scheduled work processes affected the users' motivation to manage records. The findings also suggest that mobile workers' personal information management was complicated and corporate records management was not perceived as giving effective support. Mobile workers in the case organisations were not aware of the role of records management professionals.

Overall, the study provides new information about mobile workers' records management practices and how organisational policies support mobile work. There is no indication that mobile information technology is taken into consideration in records management practices and policies. The findings suggest that records management professionals should consider mobile and other unconventional ways of working in greater depth, especially in light of the changing requirements for information management. The findings revealed valuable knowledge of the needs related to development of records management practices, methods, and tools.

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Sari Mäkinen

Papinsaari, Turku, on 25 August 2013

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Mäkinen, S., Huotari, M.-L. (2004), Organizational Memory: Knowledge As a Process or Information As an Entity. In Khosrow-Pour, M. (ed.), *Innovations through Information Technology*, Volume 2. 2004 Information Resources Management Association International Conference, New Orleans, Louisiana, USA, 23–26 May 2004. Hershey, Pennsylvania, USA: Idea Group Publishing, 751–754.

Mäkinen, S., Henttonen, P. (2011), Motivations for Records Management in Mobile Work. *Records Management Journal*, 21 (3), 188–204.

Mäkinen, S. (2012), Mobile Work and Its Challenges to Personal and Collective Information Management. *Information Research*, 17 (3). Available at: [http://informationr.net/ir/17-3/paper522.html#.USeA7_LxTG9].

Mäkinen, S. (2013), ‘Some Records Manager Will Take Care of It’ – Records Management in the Context of Mobile Work. *Journal of Information Science*, 39 (3), 384–396.

1. Introduction

Mobile devices have become an essential part of modern work. Documents can be created and processed outside the office via mobile devices wherever we work. All documentation of organisational and personal activities is records if it serves as evidence of those activities. Documents produced in work tasks carry information that is important to the organisation. Mobile devices are instruments for creating digital content, not just devices for accessing that content.

Records management and records management professionals are responsible for the systematic control of records in the organisation. This includes setting policies, assigning responsibilities, establishing guidelines, providing services, designing systems for management of records, and merging records management into business processes (International Organization for Standardization ISO 15489, 2001, 3). It means introducing objectives and information management strategies, tools, and practices. The outcome is an organised collection of records that is deliberately built and maintained. In this sense, the objective is to capture organisational memory (OM), which serves both corporate needs and research. As a function, records management should meet the needs of individual users who create and use records, since the use of mobile devices constantly increases the challenges associated with conventional records management tools.

The focus of the records management and archival-theory research field as a branch of information studies has been mostly on the organisational viewpoint and archival resources and on discussion about the nature of a record. Emphasis on conceptualising the function of archives has been prevalent. In the last few years, user-centred studies of the use of electronic document and records management systems (EDRMSs) have emerged (see Gilliland-Swetland, 2005; Borglund and Öberg, 2008; Sundqvist, 2009). However, we still do not know what the users expect from records management as an organisational function. In addition, the effects a mobile setting has on conventional records management practices remain unknown.

Traditionally, capturing organisational memory has been tied to office-bounded information technology (IT), which means desktop computers, local area networks, and information systems available in the office only. Bailey (2008) suggests that the function of traditional records management is changing. At the turn of the century, the local area network provided an infrastructure to organisational information management, but as the number of records has grown, various kinds of document management systems have been developed. Employees were encouraged to save their files in centralised systems since this would help to enforce the records management policies. However, at the same time, the means of work changed and the proportion of work performed outside the office started to increase. Warland (2010) supports this view of change: information will no longer be stored or presented in predefined office-bound collections modelled on the classification structures of the paper-based world. Information has to be browsed dynamically, ‘on the fly’, fitted to a user’s profile and interests. In addition, all types of information are created, received, or stored on all types of devices.

Although mobile work has received a great deal of research attention in the last decade (see, for example, the work of Bardram and Bossen, 2005; Vartiainen, 2007; Perotti, Wall, and McLaughlin, 2010), on-site office work is still seen as the norm (Weilenmann, 2003, 23–25). In the office, the employee has access to fax and telephone lines and to a desktop computer with calendars, contact information, etc., and, in addition, employees are considered to have a static base: their desk, their office, or a centre of co-ordination of some other sort. However, the mobile setting presents a number of challenges that the traditional office does not. Mobile space obviously entails limited device capabilities, but the types of information management problems that arise are likely to be affected also by changes in contexts such as a need to adapt to multiple workplaces (see Vartiainen, 2007, 30–31), unexpected tasks and demands, limited access to the office’s data network, and carrying of multiple devices. Moreover, access to information sources such as colleagues, papers, EDRMSs, and other information systems is limited in mobile work (Church and Smyth, 2009).

Mobile work is not a new phenomenon, but its consequences for records management remain uninvestigated. Regardless of the emergence of electronic records and record-keeping systems, the practices of this function continue to be

office-linked and paper-based. Mobile devices and online connections have enabled the creation of records outside the office context, on other premises. The variety in formats of information generated poses challenges for preservation, hence the term ‘digital archaeology’ (see Reside, 2012).

The focus of this thesis is on the issues that appear in the mobile worker’s, the corporate entity’s, and records management’s perspectives in collection of organisational memory. To gain a wider view of the mobile setting, the study concentrates on four main questions. Firstly, interest is turned to what is organisational memory generated in institutions where mobile work is commonplace. Secondly, what are mobile workers’ motives in managing records, and how do these motives manifest themselves in various organisations? Thirdly, what are the mobile workers’ experiences of their personal information management (PIM), and how do they perceive the organisation’s collective aims in records management? In this context, mobile workers’ solutions to problems faced with devices are analysed. Finally, how does the organisation’s records management respond to the challenges of a mobile environment and the needs of mobile workers? The answers to the questions listed above outline a picture of the position of records management in relation to mobile work.

These questions were examined in three Finnish organisations. The work was conducted as a documented, explorative, and qualitative case study including interviews of 25 people and a set of organisational documents. The questions were examined through analysis of the interviews with mobile workers and records management professionals and of the case organisations’ documents on records management.

The thesis has the following structure: The theoretical framework and core concepts of the study are introduced in Chapter 2. Then, Chapter 3 presents the research questions and the motivation behind them in more depth. In Chapter 4, the methods of data collection and analysis are described, and the findings of the thesis project that have been published in the four articles appended to the thesis work and forming an integral part of the project are summarised in Chapter 5. Finally, the main findings are discussed and conclusions drawn, in Chapter 6.

2. Records management in the mobility and information management context

In this chapter, the concepts and fields of research related to records management are discussed. In addition, the conventions of the records management profession are examined through the lens of research literature and recent professional discussions in the field. Section 2.1 presents a review of the organisational memory literature relevant to the thesis. That section also introduces the reader to various forms of memory and the mandates governing records management. After Section 2.2, concentrating on changing modes of records management, Section 2.3 discusses records management and its contact points with corporate and personal information management. Section 2.4 ties in the context of mobile work and its core concepts. Furthermore, recent themes in research into mobile settings are presented and perspectives on the digital office and unconventional ways of performing traditionally office-based work are explained.

2.1 Records and organisational memory

Records management researchers often illuminate the role of records through the term ‘organisational memory’. Organisational memory has explicit and implicit forms and can be retained in several places, such as databases and filing systems, but also in organisational culture, processes, and structures (Walsh and Ungson, 1991; Ackerman, 1996). Megill (1997) specifies organisational memory as including all the active and historical information in an organisation that is worth sharing, managing, and preserving for later use. Alvarado, Bañares-Alcántara, and Trujilloa (2005) see organisational memory as a repository of valuable knowledge generated by an organisation through its continuous activity – including documents,

workflow, and the structure of this organisation composed of workers. In addition, organisational memory includes both a technical and a social system and therefore is an important asset encompassing all types of information – documented and undocumented – that an organisation requires if it is to perform effectively. Koskinen (2010) sums up organisational memory as maintaining an organisation's capacity for daily functioning by providing access to prior knowledge and experiences.

Memory takes several distinct forms in organisations. As a part of organisational memory, records contain information that is 'created, received, and maintained as evidence and information by an organisation or person, in pursuance of legal obligations or in the transaction of business' (International Organization for Standardization ISO 15489, 2001, 3). Further, records include information that is a valuable resource and an important business asset (ibid., 4).

Star and Griesemer (1989) have referred to the analytical concept of the boundary object inhabiting several intersecting social worlds of scientific enquiry. Boundary objects have different meanings in different social worlds, but their structure is common enough to make them recognisable and useful in translation. Star and Griesemer suggest that a boundary object is a useful tool for making differences in meaning become coherent; therefore, the concept we apply should be general enough to satisfy the information requirements of each individual. One of the key concepts in this research is that of the record, as a general description of one form of organisational memory. It is considered a boundary object in investigation of organisational information management. The structure of a record is ordinary enough to allow transfer of organisational memory.

Records are evidence of actions, so a systematic approach to records' management is important for protection and preservation of this organisational evidence. Gorpe (1984) states that an organisation consists of a set of people working for a common goal and an organisation expects work distribution, connections, and information exchange among its members. In the associated processes, people create records when interacting with each other. McKemish, Acland, Ward, and Reed (2006) state that in the course of an organisation's business, records capture and store the business actions that have been carried out. Furthermore, business in its various contexts is governed by external mandates (e.g.,

laws, regulations, standards, codes of practice, and professional-ethics codes) and internal mandates (e.g., corporate culture, policies, administrative instructions, delegation of authority, and authorisation). These mandates influence the creation and use of a record: they appear in individual-level and organisational activity and behaviour.

As an organisational function, records management is responsible for the systematic control of records in every phase of their life cycle, especially for capture of evidential and accountable records. In an organisation, authentic records provide evidence of the activity, and records describe the exercise of mandates. The role and nature of the mandates mentioned above guide the way in which records management appears in each organisation, and the core business frames the records management policies and practices. For example, in the public sector, legal mandates tightly control operations while internal mandates have a more significant position in private organisations.

The picture on which Figure 1 is based was developed by McKemmish and colleagues (2006) to provide a conceptual framework for standardising and specifying record-keeping metadata. It also offers a wider perspective on records as part of organisational memory and on relationships with various actors, such as records' users, organisations, and legislative bodies.

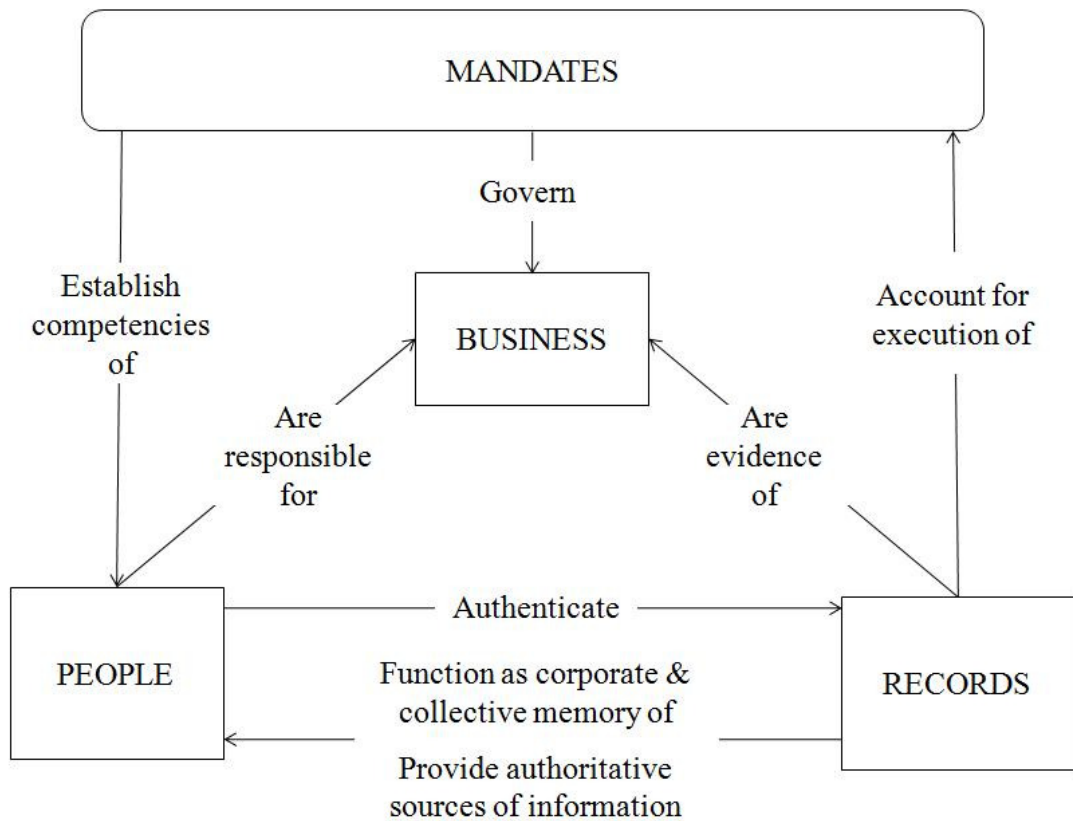


Figure 1. The business context, adapted from the work of McKemmish et al. (2006, 13).

McKemmish et al. (2006) describe the framework in terms of three concepts: business, people, and records. They use the term ‘business’ in a broad sense, including all kinds of social and organisational activity under their definition. Records management in the public sector is ruled by a wide range of mandates that drive and control the methods and tools used and the available resources, and records are part of accountability and documentation systems in government. According to the international records management standard, every organisation shall identify the regulatory environment that affects its activities and the requirements for documentation of those activities (International Organization for Standardization ISO 15489, 2001, 4–5). The most important regulatory elements are statutes and the case law and regulations governing the relevant sector’s environment. After the legislation come standards, codes of practice, and the expectations of the community (ibid.).

According to the laws and regulations, it makes a difference whether the organisation in question operates in the public or the private sector. In Finland, for

example, public-sector records management is governed by legislative mandates and the directions of the National Archives Service. According to the Act on the Openness of Government Activities (1999), official documents shall be in the public domain, unless specifically otherwise provided in that act or another act. In Finland, the main objective is the right of access, and the authorities have a duty to promote openness and good practice in information management in government; therefore, there are specific provisions related to those documents that are not in the public domain. This affects how a public organisation arranges its information management. The National Archives Service has statutory authority to issue regulations that are binding for the Finnish authorities, and the Archives Act (1994) makes provision only for the permanent preservation of records of public organisations.

Records constitute evidence of the core business, and they account for the execution of various mandates. In a business organisation, on the other hand, records management is not driven by legislation, but the policy must still be justified, in terms of the business activity and appropriate information management practices. Records also form a collective memory of customer cases, which may be a source of innovation and new business. As McKemmish et al. (2006) put it: 'Optimally, recordkeeping forms an integral part of any business activity.' In private organisations, the protection of confidential information and privacy depends on the business interests. Finnish legislation declares that documents containing information on any business or professional secret of a public or other corporation shall remain secret if access would cause economic loss to that corporation and other relevant institutions (Act on the Openness of Government Activities, 1999). Therefore, the legislation affects private corporations too if they are in the service of an authority (e.g., an enterprise providing IT services to a government agency).

Figure 1 also illustrates that people produce records in order to create evidence of the business. Understanding the challenges mobile work imposes from a records management point of view requires research from the mobile-user perspective. There are only a few studies of how users work with records, and these have focused mainly on the use of archival resources (see Goggin, 1986; Miller, 1986; Duff and Johnson, 2002; Yakel and Torres, 2003). Recently, some empirical research findings on the purpose of records' use in organisations have been reported

(see Gunnlaugsdottir, 2006). A study by Borglund and Öberg (2008) indicated that there are two temporal structures, the primary and secondary purposes for which records are used in organisations. A record's primary purpose involves support for the operations activity for which said record was created. The secondary purpose is for use as memory, as evidence of the transaction that resulted in the record. One can know the primary purpose in advance, but the secondary purpose is partially unknown and may be difficult to define. Borglund and Öberg's (2008) results suggest that the importance of collection of organisational memory is quite evident at the level of organisations but that recognising the secondary purpose is demanding for an individual worker.

2.2 The new challenges for records management

One of the research interests for this thesis is to study mobile workers' needs for organisational records management. Users' opinions on records management and its support for users in their work practices have not been subject to study. In one of the few studies of record-users' information behaviour in organisational settings, Sundqvist (2009) pointed out that the needs for records were generated by a task or accomplishment of any kind with the purpose of achieving something. Those needs motivated the use of records: material, operational, accountability seeking or knowledge enhancing purposes. Users seek to obtain records with the aid of various means of mediation – e.g., instrumental intermediaries such as journal and archives inventories. These could be defined as representational systems, for reaching a certain outcome: fact-finding, reconstruction of past actions and events, regaining experience and knowledge, verifying status, or illustrating and exemplifying.

Joseph, Debowski, and Goldschmidt (2013) have described the information-seeking behaviour of EDRMS users and compared the results with earlier information-search models for library-users. They found a number of similarities and differences between the library and EDRMS search behaviour. The EDRMS users engaged in the same stages of a linear search process as in a library environment. However, the accuracy of the content influenced the quality of the search outcome. In addition, the quality and accuracy of registered content influenced whether the user's search experience was categorised as simple or

difficult. When trained librarians have registered the content in library catalogues and online databases, it is likely to be more accurate and of good quality. Typically, in the case of EDRMSs, content is registered both by information professionals and by employees. The authors, therefore, recommend that EDRMS training emphasise document naming and consistent entry of important metadata fields in registration of new documents.

Current methods and practices of records management have been criticised by Foscarini (2010) as showing inadequate understanding of ‘human activity systems’, meaning that records managers are truly operating as ‘mediators’ among several complex and interacting factors. The records managers’ critical task is to gain adequate understanding of what is going on in terms of business activities. Foscarini (2010) has also posited a need for alternative, ‘softer’ approaches to the analysis of organisational functions, structures, agents, and artefacts. These may fruitfully complement the ‘hard’, engineering-like approaches typically drawn upon by information and records specialists.

It has been suggested that records management as an organisational function is, in general, at a turning point (see Palmer, 2009; Lappin, 2010; Kallberg, 2012; Harries, 2012, 8–11). The foundation of records management practices lies mostly in existing records management standards, such as ISO 15489 (International Organization for Standardization, 2001) and Modular Requirements for Records Systems (MoReq, 2010). Records management is a strongly regulated field. It has generally been recognised that its policies and systems have been built to meet many legislative requirements related to accountability and reliability, while the user perspective has remained unnoticed. Bailey (2008) has stated that, paradoxically, at the same time as records managers are struggling to get the users of their systems to add the merest and the simplest of metadata from a predefined list, there exist servers that categorise and tag the interesting information and make their choices known to the users. This leads to the question of how conventional means of records management fit the needs of today’s workforce, who have become accustomed to the relative usability of social-media applications.

Lappin (2010) puts it this way: records management is at a crossroads. In 2000, records managers seemed to have an opportunity to design applications that traditionally had been designed and built by others. In the first few years of the

twenty-first century, the records management community agreed on an international records management standard (ISO 15489-1, 2001) and had EDRMS implementations in place, expressing an optimistic view of these. Additionally, Lappin (2010) argues that various jurisdictions, around the world, gave records management professionals real influence over decisions on acquisition of information management systems. A decade later, we find a different picture: records management requirements have lost power again; EDRMSs lost their value to more comprehensive and usable systems.

This may indicate that the position of records management professionals is being challenged. Ismail and Jamaludin (2011) argue that qualified records professionals are not recognized and other professionals are given the tasks and responsibilities of managing the records in an organisation. They also state that records and archival competencies are required and, in fact, crucial for effective delivery of records management programs. Records professionals are being challenged by changing technology, which transforms the way records are created and stored. In addition to records management competency, professional information-system analysis and design and business and management skills are required. Cunningham (2010) wonders whether records managers have fallen several years behind in information technology. According to him, they seem to focus on the tactics that won the last war; for example, they require that e-mail be printed out and filed as in the old days or that end users classify records with a thousand-line retention schedule.

Harries (2012, 13–14) suggests that the world of records management seems to be undergoing a professional crisis. The records management profession is searching for its identity and struggling to gain recognition for the value its members believe they are adding to the organisation. As a result, records managers have been forced to associate themselves with information management and seek alliances with IT professionals. Further, Harries (2012, 13–14) states that records managers' efforts to connect records management to information management implies a shift from a pure archival function and toward a value-adding activity, and effort must be made to shed the label of the function as an 'organisational burden', though as little effort as possible for this end.

This idea that a shift is in progress is supported by Hase and Galt (2011), who conclude that knowledge and records management are strategic issues. They state

that the management of information and records must be systematised and drawn into 'business as usual' for the organisation. Good records management practices are essential for an organisation's effectiveness from, for example, the risk-management and client standpoints. Every organisation must protect its information assets, and good records management can aid in this. Wettenhall (2011) suggests that investing in good record-keeping is an investment in good memory. Useful knowledge may simply disappear if we do not judge its retention to be a significant issue when taking other actions.

2.3 Records management in organisational information management

In recent years, knowledge management (KM) has become a part of strategies in public administration as well, and with this approach has brought records management into the arena of organisational strategic issues (see Wiig, 2000; Chong, Salleh, Ahmad, and Sharifuddin, 2011; Hase and Galt, 2011). Additionally, records management has been recognised by some as part of organisational knowledge management (see Tombs, 2004; Hase and Galt, 2011; Harries, 2012, 13–17). Standardised records management procedures are key to protection of organisational information assets, because poor records management results in practical and strategy-related problems.

Knowledge management is considered an emerging discipline, though firms and information professionals have been applying the concept for some years now. Bouthillier and Shearer (2002) suggest that knowledge management, as it is practised, really means facilitating the sharing of tacit knowledge. Knowledge can be acquired at the individual level but shared by a community, often described as a community of practice. Sharing of knowledge is then crucial, for example, when new employees arrive and others leave. The management of information does not really focus on information sharing; it is oriented more toward the control, preservation, and retention of information. There is no clear distinction among knowledge management, information management, personal information management, and records management. Bouthillier and Shearer (2002) differentiate among these concepts by defining information management (IM) as focusing on the

‘plans and activities that need to be performed to control an organization’s records’. The differences between information management and records management are subtle, so many use all of these terms interchangeably.

Information and communication technology (ICT) infrastructure and software promote the efficient and effective capture of knowledge-including records and support sharing of knowledge in the organisation. Therefore, effective knowledge management depends on people sharing their knowledge via computer facilities throughout the organisation and being able to access the organisation’s knowledge base. Communication networks, electronic mail systems, intranets, and decision-support systems are some of the basic elements of technology infrastructure for knowledge management (Chong et al., 2011; Mills and Smith, 2011). Martin (2000) suggests that technologies that have been designed with knowledge management in mind include workflow and document management systems; advanced knowledge bases; and expert systems and technologies such as groupware, intranets, and the Internet that link organisation to intra- and inter-organisational level and to the outside world.

Knowledge management has been criticised by some for taking on the form of other techniques and tools, including wearing the mantle of records management. Tombs (2004) suggests that if the various observations on knowledge management are considered, primarily with respect to its complexity and cost, records management can be profiled more appropriately for the organisation. Records management is physical, low-cost, and adaptable. Good records management operations have an attractive budget, do not require many staff, and can be easily understood by all. They also can find materials that would probably be lost in other views. Keers (2009) states that the current focus is on corporate investment to develop and enhance records management and return on investment (ROI).

Desire for cost-effectiveness in organisational functions is leading companies to begin addressing the financial implications of managing and preserving records, and economic metrics for estimating the costs of creating, preserving, making available, and using records have emerged, along with tools to demonstrate the impact, benefits, and efficiency of records and information management (JISC Infonet, 2009; DIRKS appendices 10 and 11, 2003). Empirical data on ROI prove that investment in improvements of records management can bring significant and

sustained financial savings. In addition to cost-effectiveness, the benefits expected of records management are legal compliance, improved standards of corporate governance, organisational transparency, and accountability. Bailey (2011) suggests that good records management is an investment in the future for an organisation.

Personal information management is another context in which one can study being mobile. It refers to users' activities in acquiring, organising, retrieving, and processing information in their personal information spaces (Vassileva and Vassileva, 2008). These include finding new information, organising the information found, re-finding information, and maintaining a personal information collection (Elsweiler, Baillie, and Ruthven, 2009). For a mobile worker, one of the most important features of personal information management is ensuring that the right information for the current needs is in the right place and in the right format. A significant factor in this is tools and technologies that help one spend less time on information management. Jones (2007) indicates that personal information management refers to both the practice and the study of the activities a person performs in order to acquire or create, store, organise, maintain, retrieve, use, and distribute the information needed for completing tasks (work-related or not) and fulfilling various roles and responsibilities.

Malone (1982) was one of the first researchers to take an interest in personal information management, examining the difficulties of categorising information in their desk space and offices. Malone classified personal information management activity into two categories: filing and piling. In filing, the papers are categorised into physical files, which are labelled by category. Piling means heaping papers on top of each other in reverse chronological order and without labelling. The piling style was found useful for small collections since the user could remember the location of each paper within the pile and because the paper on top reminded the user to perform the recently generated task. As piles grew, users could not keep track of their papers and tasks and papers became covered by others and lost in the pile. In Malone's study, filers coped with their information management better than pilers when they needed to retrieve a paper. Hardoff-Jaffe, HersHKovitz, Abu-Kishk, Bergman, and Nachimias (2009) noted that in the digital office, the folder hierarchy is standard for management of digital information items (e.g., electronic files and e-mail). Items are filed in directories, or 'folders', with labels describing their

category, and piling is typically done by heaping of the information items in a root directory, such as, for e-mail, the inbox.

Personal information management strategies are dependent on document type, as Boardman and Sasse (2004) have shown. Users often invest more time in organising files than in e-mail messages and bookmarks. Boardman and Sasse (2004) group users into 'total filers' (most files are filed when created), extensive filers (filing is done extensively, yet many items remain unfiled), and occasional filers (filing is done occasionally, leaving most items not filed).

In mobile work, individual workers' capabilities of managing information spread across several devices may become crucial for the capture of organisational memory. In addition, the question of how organisations support personal information management has remained uninvestigated.

2.4 Workers in mobile settings

Mobile work and mobile information technology have been a focus of increasing attention (see, for example, Lilischikis, 2003; Bardram and Bossen, 2005; Bosch-Sijtsema, Ruohomäki, and Vartiainen, 2010; Perotti, Wall, and McLaughlin, 2010). Multi-location, mobile, and distributed work has become more commonplace. Workmates collaborate in virtual workplaces instead of shared physical space. As Vartiainen (2007) suggests, these new types of work mean alternative arrangements with technical equipment and change the boundary between home and traditional office. The quality of the technological infrastructure and the functionality of the devices and tools are among the important features of the future workplace.

A mobile device is defined as an application of wireless communication technologies to process, transmit, and exchange data. Mobile devices include laptops, netbooks, personal digital assistants (PDAs), mobile phones, audio players such as MP3 players, cameras, and other items (e.g., Allen and Shoard, 2004; Weilenmann, 2003, 24; Lippincott, 2010). The present research focuses on those devices used to create and process records: laptops, mobile phones, and PDAs. A mobile device communicates, it is personal, it provides information at any time and anywhere, and its user can be located easily (BenMoussa, 2003).

Smartphones are defined as mobile phones providing advanced features, such as Internet access, Bluetooth, Global Positioning System (GPS) service, and data-exchange capability. They run third-party applications, and modern models feature high-resolution touchscreens and Web browsers that can take advantage of high-speed data access. 'Feature phones', in contrast, are low-end devices that manage simple tasks such as placing a phone call and sending Short Message Service (SMS) messages but are unable to run advanced applications. Lippincott (2010) states that most users tend to prefer to own one device with many functions instead of several devices. Today, the boundaries between feature phones and smartphones are not clear, since all modern mobile phones are able to do much more than complete simple tasks.

Mobile work refers to work requiring travel and, at least temporarily, performance of activities outside a fixed workplace. The work can be defined as mobile when, for example, the person spends more than 20% of his or her work time outside his or her normal office (Yuan, Archer, Connelly, and Zheng, 2010). On the other hand, teleworkers, or remote workers, have been defined as those who work at least 10 hours per week away from both home and their main workplace, on business trips, in field work, travelling, or on customers' premises using online connections (EcaTT, 2000). Kleinrock (1996) presents another perspective on the mobile working environment, that of 'nomadic computing', from which users are seen as nomads, wandering between office, home, aeroplane, hotel, car, conference room, and other locations.

Lilischkis (2003) analysed mobility along two dimensions – space and time – and listed defining characteristics of the classes of mobile work in his typology. 'On-site movers' carry out work that requires movement around a certain place. These persons, who work in various places within an office or campus environment, include security agents, hospital-based doctors, and farmers. 'Yo-yos' are mobile workers who have a solid office desk that they occasionally leave to work in temporary workplaces. Field work, such as interviewing, working while travelling, visiting patients, and working as a fire-fighter, are typical examples. 'Pendulums' refers to people working at two separate fixed locations, which may be in the office, at home, or on customers' premises. The classical form of this is telework, which includes two places of work, with the work results being conveyed by means of

information and communication technology. 'Nomads' include people who constantly work between more than two fixed locations, one of which may be the main workplace. Nomads may include diplomats, circus artists, and travelling salesmen. By 'carriers' Lilischikis means mobile workers who convey either people or objects. The work is inherently done on the move and cannot be carried out in fixed workplaces without a change in location. Conductors of means of transport, cabin crew, sailors, taxi drivers, and bus drivers are examples of carriers.

Mobile workers such as professional experts, among so-called white-collar workers, use office software, and their tasks are varied, complex, and non-structured. In this thesis project, the interest is in this kind of knowledge work and its mobile forms. Work in professions such as conductor and taxi driver, characterised by routines and transactions and utilising dedicated devices and software, is excluded from study here.

Bardram and Bossen (2005) argue that research attention to mobile work arises from two sources. Firstly, mobile workers move over long distances, leading to a focus on developing new technologies that enable this work. Secondly, computer support for collaborative work introduces new problems. Current research interests have two, fairly different foci: the issue of mobility and that of embeddedness. Mobile informatics focuses on the socio-technical use of mobile technologies, while ubiquitous computing focuses more on merging mobile technologies into everyday life.

There are several interesting perspectives related to records management in a mobile context. Mobile devices are the stuff of an important branch of information technology, and mobile knowledge work has become commonplace in organisations (see Allen and Shoard, 2004; Perotti et al. 2010). But how do these devices generate documentation that should be managed through records management procedures? Mobile workers carry out their tasks in unpredictable conditions outside the office context, not under the direct surveillance and control of records management. Mobile technology has made production of records possible wherever an individual works, but it has also made their management, retrieval, and storage more complicated.

Another perspective on mobile work is related to how records are created and used in changing locations. Mobile devices can be tools to create, process, transmit,

disseminate, store, share, use, and dispose of work-related information such as records. Tightly linked to this, changing contexts such as location, activity, and social interactions are likely to influence information needs, and usually the needs emerge while one is on the move (Heimonen, 2009). Mobile work creates challenges in that workers need to move about and must have access to the organisation's information resources while they do so (Bardram and Bossen, 2005). For a mobile worker, the most important features of the technology are ease of access to document services, timely information, user interface, ubiquity, and compliance with security policies (Lamming, Eldridge, Flynn, Jones, and Pendlebury, 2000). Design-oriented research on mobility (e.g., Lamming et al. 2000; Churchill and Munro, 2001; Bardram and Bossen, 2005) is concerned with access to information while one is on the move. It is based on awareness that mobile workers often find themselves missing a document or information, which is back in the office, and therefore need to access this material remotely. Both the devices and their users have created challenges for traditional records management, since information, including records, is often stored on separate technical devices that users consider to be personal devices.

One perspective on records management that is particularly relevant in the mobile context involves capture: the point when a record enters the business context and its life cycle there begins. Capture is a process provided by records management, a framework for taking in, maintaining, and providing access to evidence over time. For example, EDRMSs capture, classify, and identify records to ensure that their content, structure, and context of creation are specified (International Organization for Standardization ISO 15489, 2001, 8). A crucial element is the time gap between a record's creation and its capture. In mobile work, records are created and saved 'on the road', but the capture typically takes place after the worker has returned to the office.

Several approaches from a cluster of related disciplines can be used to study mobile technology and its use in the work. Computer-supported co-operative work (CSCW); social informatics; workplace studies (WPS); human-computer interaction (HCI); and design, user experience, and usability (DUXU) are examples of research that has contributed to this field (see Bellotti and Bly, 1996; Heath, Knoblauch, and Huff, 2000; Garcia, Dawes, Kohnhe, Miller, and Groschwitz, 2007; Ardito, Buono,

Costabile, Lanzilotti, and Piccinno, 2009). Some studies have focused on utilisation of mobile technology (Fagrell, Ljungberg, and Bergqvist, 1999; Churchill and Munro, 2001; Kristofferssen and Ljungberg, 1999; D'Atri, Medaglia, Serbanati, Ceipidor, Panizzi, and D'Atri, 2007; Rosales, 2013), mobile learning (Liaw, Hatala, and Huang, 2010), impacts on commerce (Kalakota, Robinson, and Gundebudi, 2003; Johnstone and Vaghjiani, 2008), or mobile work itself and its requirements (Antunes, 2008; Wiberg, 2009; Bosch-Sijtsema et al. 2010; Lönnblad and Vartiainen, 2012).

Many researchers focus on the idea of developing and implementing services for mobile devices (see Hyppönen, 2009; Sinisalo, 2010). Typically, the aim has been to develop applications that help users exploit their mobile devices more effectively. A mobile device runs a complicated operating system and various applications, such as camera, calendar, text editor, spreadsheet program, and document reader, along with a range of other utility applications. Therefore, there is a need for a personal information management application to integrate services and programs for business and leisure time and to provide users with timely and relevant information (Grønli and Ghinea, 2010).

Information and knowledge management research has given little attention to mobile work. Only a few studies of mobility have focused on the management of information created while one is mobile. For example, users' habits and expectations related to the use of metadata in management of personal content with mobile devices have been examined by Vainio, Väänänen-Vainio-Mattila, Kaakinen, Kärkkäinen, and Lehikoinen (2009). They argue that people working with mobile devices want to use metadata in searching and browsing of content but are not motivated to interact with metadata to the same extent that they want to interact with the actual content. Users are willing to enjoy the content but do not want to enter, modify, and reorganise metadata. Browsing metadata for various purposes at various points in the usage life cycle is an integral part of people's experience of personal content management.

A study by Heimonen (2009) on mobile Internet users and their information needs and practices indicated that mobile Web browsing and search were the dominant methods of information access. The data, collected via diaries and Web forms, revealed that the participants used mobile Web access and personal

information management tools such as mobile or Web-based e-mail and mobile and physical calendars as primary tools, regardless of location or context of use.

Related work by Church and Smyth (2009) focused on the triggers of information needs, the topics users were interested in, and the impact of mobile contexts such as location and time on user needs. Their research indicated that most of the searches were generated when the user was mobile – that is, away from his or her desk, commuting, travelling abroad, or on the go. The most popular search topics were related to local services and to travel and commuting. This suggests that most of the information needs were location-dependent.

These studies provide valuable insight into how mobile users interact with their devices, along with what information they search for, and how. However, that research cannot explain how mobile individuals manage those records they have generated that are valuable for the organisation. Furthermore, the studies were performed with mobile-device-users who were at home, at work, or mobile and not concentrating specifically on professional and work use. Mobile workers' work varies with the work task itself, the environment, and the purpose of the task; for instance, nurses making home visits, salesmen, employees doing maintenance work, and knowledge workers perform different kinds of mobile work. In the research for the present thesis, the interest lay in the expert workers performing mostly in office-like environments with office equipment and generating records for the organisation's memory. The focus is on the mobile workers, on their role as producers of organisational memory who cope with personal information management. In addition, emphasis is placed on organisational records management as a function apparently utilised to guide and support the individuals in coping with their information management.

3. Research questions

This thesis focuses on the records management in mobile work. In recent decades, the rapid development of mobile information technology has enabled a wide range of mobile work outside fixed offices. More and more of corporate records are created outside traditional office infrastructure, and this situation creates new questions for organisational and personal records management. Thus far, this shift has not gained research attention.

The associations related to this new phenomenon need to be better formulated and conceptualised. In addition, there is need to create a solid picture of mobile work, records' creation, and mobile workers' views of information management. At the same time, there is urgent need to examine how organisations and records management professionals deal with mobile work and its challenges.

The focus of this thesis is on the perspectives of the mobile worker and the organisation's records management. Firstly, we aim to reveal how organisational memory is generated in unconventional ways of working. Secondly, we want to uncover the motives of mobile workers in engaging in the organisation's records management and how these motives appear in different organisations. Thirdly, we need to know what challenges mobile workers face in their personal information management and how these are related to the organisation's information management. In this context, mobile workers' solutions to problems encountered with devices are analysed. Fourthly, we are interested in the issues that the mobile working environment entails as challenges for the organisation's records management.

The conceptual framework of the thesis consists of three main entities and their relationships: 1) mobile worker, 2) organisation, and 3) record (see Figure 2). The mobile worker performs work tasks, using mobile equipment, and creates, uses, and manages records. Organisations develop and manage corporate information resources by guiding and controlling mobile workers via records management policies and instructions. Records are part of organisational memory, which forms

the conceptual background of records. Organisational memory includes the information that is worth sharing, managing, and preserving for use in the organisation, and records are fundamental constructs of the memory. All of these components of the framework are influenced by changing IT, and they all affect each other.

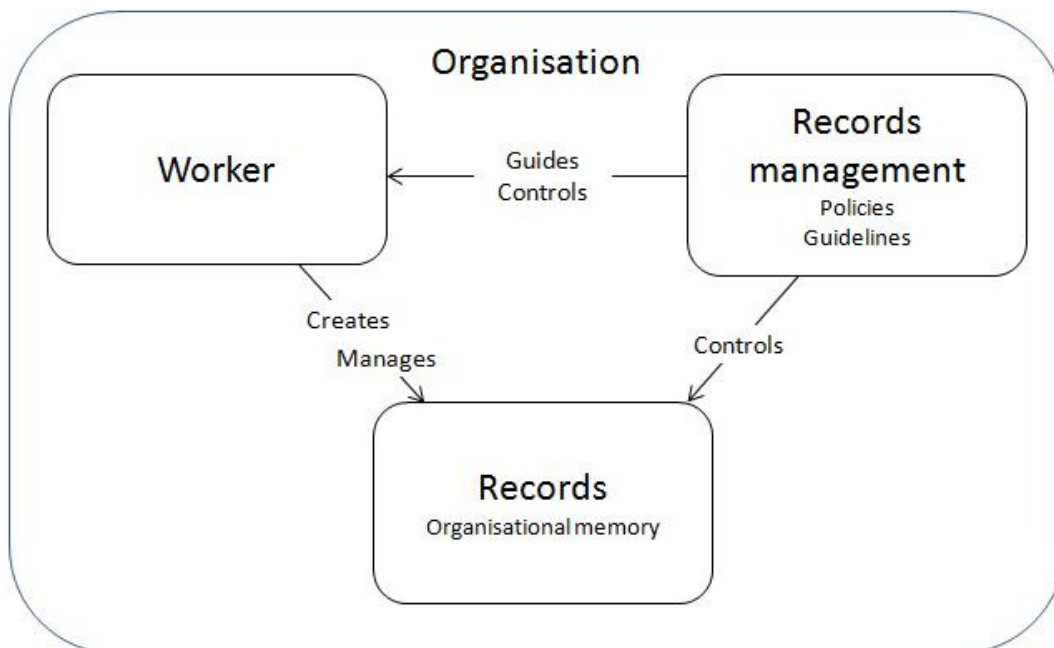


Figure 2. Context and relationships of mobile workplaces and records management in a changing IT context.

The research questions of the study are the following:

What is organisational memory?

What motivates mobile workers to manage records?

What are mobile workers' experiences of personal information management, and how do they perceive the organisation's collective aims in records management?

How does records management respond to the challenges of a mobile environment and the needs of mobile workers?

The first research question leads us to strengthen the associated conceptual foundation for the phenomenon. The second question helps us understand mobile

workers' engagement in records management and why they manage records. The third helps us understand mobile work and the related record creation and use from two perspectives – those of the individual and of records management – and the final question helps to reveal how mobile work has been recognised in organisational records management policies.

4. Methods and data

In this part of the thesis, the methods of the research and datasets are further presented. Section 4.1 outlines and justifies the case-study strategy applied in the research. Section 4.2 characterises the case organisations, describes their features and fields of business, and provides justification for the sampling of the case organisations in this research. Section 4.3 describes the two phases of data collection and the datasets, in addition to which the informants and documentary data are introduced. The methods of concept analysis and cross-case analysis are presented in Section 4.4. Finally, the reliability and validity issues related to the study are presented in Section 4.5.

4.1 Research strategy

The study is exploratory and draws a picture of a less researched field. Patton (1990, 131–132) argues that in a new field of research, the phenomenon in question is new and no hypotheses exist. The research is qualitative, and, in general, qualitative research utilises multiple methods, including an interpretive approach to its subject. Qualitative researchers investigate phenomena in natural settings, attempting to make sense of and interpret them. According to Denzin and Lincoln (1994, 2), qualitative research typically involves various empirical materials that describe routine, moments, and meanings in individuals' lives.

For this thesis, case-study methods were adopted as the research strategy. The data collection was based on the interviews and organisational documents. As Denzin and Lincoln (1994, 14) and also Stake (2005, 444–447) suggest, case studies pay attention to what is shared in common and what is particular to a given case and they gain credibility by triangulating the descriptions and interpretations throughout the study period. Variation is important, since the cases are expected to represent some population of cases and the intention is to achieve the best possible

explanations of the phenomena (Stake, 2005, 449–451). To build variation in the sample, three distinct types of case organisations were selected for this study: a government agency, a university of applied sciences, and an IT enterprise. The variation arises from the differences in core business and in the use of IT.

Patton (1990, 54) suggests that case studies are useful when there is a need to understand a special group of people, a particular problem, or a unique situation in great depth. In the thesis project, the three organisations represented both the private and the public sector and provided an appropriate context for this study because they allowed coverage of a broad swath of mobile work.

This research also deployed cross-case analysis. In cross-case analysis, answers from several people to the same question, or considering different perspectives, are grouped together (Patton, 1990, 376). As Huberman and Miles (1994, 435) state, cross-case analysis focuses on sets of individuals within several settings and actors are examined in multiple settings; this extends the external validity.

4.2 The case organisations

All of the case organisations for this thesis represent knowledge-intensive organisations, operating in different fields of expertise. A common feature of all was that they used substantially mobile ICT. Two of the institutions were public organisations governed by laws and regulations addressing records management and internal processes. The other organisation was run by a business entity, which influenced the corporate regulations and policies for carrying out the business processes.

The first case, that of the government agency, involved operations in the national and international field of pharmacy operations and health care with document-centric processes. The functions of this authority are closely regulated by both national and European Union pharmaceutical legislation, which influenced the business processes and records management. This organisation is involved in product regulation in the sector of social affairs and health administration, and it collaborates with other agencies at national and international level. The main business of this institution meant also that most of its records were confidential, and data protection was one of the main concerns in its precisely specified document-

intensive work processes. To enhance the management and co-ordination of the mass of records produced in the work processes, the organisation had dedicated process co-ordinators whose responsibility was to collect the records and follow the deadlines of the process. This organisation also had numerous information systems and registers, each and every one engineered to one particular purpose. In the course of its software implementation, the institution had implemented a common document management system, and one of the objectives for the future was to provide channels for e-government. The records management unit in this organisation was working on the records schedule at the time of the data collection. The staff consisted mainly of professionals whose work was knowledge-intensive, independent, and mobile. These included mainly inspectors and physicians. The respondents were highly educated; most of them had a doctoral degree. All used mobile devices, but some had only a device shared with colleagues.

The second case, the university of applied sciences, was a multidisciplinary regional institution of higher education that offered bachelor's- and master's-degree programmes. The organisation is decentralised and has facilities in two towns. At this university, a document management system had been implemented a few years earlier, but it was used to support specific processes mainly in university administration. Elsewhere than in the administration unit, most of the communication and personal information management was performed via e-mail. At the time of the data collection, this institution was recruiting a records management professional to instruct in information management and archiving processes. However, every unit of this organisation already had its own person who was trained to advise the staff on archiving matters, and personnel were encouraged to contact archiving staff if necessary. Most of the interviewees were teachers, but also personnel involved in research, development, and IT were interviewed. Mobile devices were widely available, and the research participants made both domestic and foreign trips.

The third case, the IT enterprise, was a company providing document-centric-process software applications for archival purposes, had a tradition in implementing systems of various types, and offered services to the public and private sector. The IT enterprise had implemented a records management system, and information technology was utilised in a versatile manner in communication – for example, by

means of virtual meetings and chat. Mobile devices were commonplace in the organisation, and these tools were used by the staff and for communication with customers. In this context, mobility was part of everyday thinking. As mobile workers themselves said, it was a self-evident part of the work. As for the main business – i.e., IT projects – the project manager was responsible for the documentation practices, for how and where records are saved. In software-development projects, the amount of unofficial and informal information may be considerable. A large proportion of this kind of information was in e-mail, virtual meetings, and chat. It was project managers' responsibility to ensure that people involved in the project followed instructions.

The variation in data is an advantage in an exploratory study (Merriam, 1988, 69), but, obviously, making direct comparisons between the case organisations cannot be justified here. Although only a small sample of organisations was presented, the three cases were different in nature and in their function. An advantage of the three case organisations chosen is that they provided various angles for examination of mobile work and therefore widened the view on the issues studied.

4.3 Data collection

For an answer to the four research questions presented in Chapter 3, the decision was made to use more than one source of data. The analysis and empirical data collection in the study was twofold: in the first phase, the concept of organisational memory was analysed through application of Walker and Avant's (1992) model. For this purpose, various publications and other textual information resources were used. The second phase was conducted as a qualitative case study with the three Finnish organisations to illuminate the experiences and challenges of mobile workers' information management and organisations' support for them. This meant collecting both interview and documentary materials.

The aim of the concept analysis was to explain how organisational memory has been defined and to characterise the differences in the definitions between research areas in this. The method used was Walker and Avant's (1992) concept analysis, which is widely applied in nursing science. Also, Walker and Avant stress the

centrality of the literary review to the concept analysis and of carrying out extensive reading from diverse sources to gain a systematic view of the various ways in which the relevant concept has been used in the literature (Knafl and Deatrck, 1993, 47). The data for concept analysis were collected from various scientific publications and other information resources, from various disciplines. The data consisted of 69 scientific articles, conference papers, monographs, and Internet resources (e.g., Ackerman, 1996; Conklin, 2001), of which 13 proved to be extremely relevant for analysis, given the perspective associated with the topic. The material covered the years from 1984 to 2002, with the emphasis being on research into information systems, especially case studies. The data for concept analysis are presented by research area in Table 1.

Table 1: The data employed in the concept analysis, categorised by research area

Research area	Total	Percentage	Notes
Information-systems science	29	42%	The total includes three articles from the field of organisational theory
Organisational theory	16	23%	
Information management	10	14%	
Business administration	8	12%	
Archival science	6	8%	
Psychology	1	1%	
Total	69	100%	

The focus of the thesis changed in the course of the research, from the first article's definition of organisational memory and knowledge management perspective to the mobile workers' personal information management and mobile work's challenges for corporate records management. Organisational memory is a background concept that drew the research interest toward the challenges arising from mobile work in organisations' records management and for mobile workers.

The second phase of the data collection was conducted in the above-mentioned organisations: a government agency, a university of applied sciences, and a medium-sized IT enterprise, all in Finland. In all, 23 research participants were recruited from among employees who used several mobile devices regularly in their work and whose work was mobile. In addition to this, two records management professionals were interviewed. For purposes of this research, mobile work was defined as work done outside the office on monthly or weekly business trips. Mobile devices were defined as mobile phones, personal digital assistants, and laptops. The informants were professional experts and managers, including one managing director. All of the subjects had a higher education, with a bachelor's, master's, or doctoral degree. The sample did not feature much variation in terms of generic demographics, since the participants were skilled and educated professionals and were selected to represent the population of mobile professionals.

The informants represented white-collar workers – experts, teachers, IT support staff, project managers, inspectors, etc. All were mobile workers, except two records management professionals. For the participants, mobile work meant at least monthly or weekly business trips and use of mobile devices during these trips. A few subjects spent only a couple days a month at their office desk.

Interviews are commonly used to access aspects of the reality of the phenomenon researched because otherwise these elements would remain inaccessible, locked up in people's subjective experiences. According to Peräkylä (2000, 869), interviews require more effort than questionnaires do but offer more in-depth information about the phenomenon studied. Face-to-face interaction with participants creates a sense of confidence and enables the researcher to observe unspoken emotions. Telephone interviews require the researcher to create a much more confidential atmosphere with the respondent even if the research topic is not sensitive. This is even more important if the researcher and interviewee have not met.

The interviews were collected in 2004–2005 and 2009–2010 (see Table 2). Data were collected in public organisations (the university of applied sciences and the government agency) in the first phase of data collection, and the private organisation (the IT enterprise) was studied a few years later. All interviews were tape-recorded and transcribed. The total duration of the interviews was over 27 hours. The average length of an individual interview was 1 hour 10 minutes, and duration varied from 52 minutes to 1 hour 40 minutes. The transcribed interview data came in at 426 pages. All of the interview data were collected and analysed by the author.

Table 2: Years of data collection and the number of research participants and organisations

Organisation	2004	2005	2009	2010	Total
Government agency		7			7
University of applied sciences	2	6		1	9
IT enterprise			9		9
Total	2	13	9	1	25

When the data collection began, scheduling the process in two parts was not part of the plan, but eventually it had to be concluded for reasons external to the research. The aim was not to conduct a longitudinal study. The time delay between the conclusion of the first part and collection of the second dataset is not exploited, but use of two-phase data collection is expected to increase variation.

The mobile world changed dramatically in the time of the data collection, and, as the technology matured, new devices and solutions emerged on the market, with mobility becoming part of daily life also. The growth of mobile IT has been exceedingly rapid in the last two or three years. Features earlier provided by separate devices are all incorporated into tablets. Smartphones equipped with QWERTY keyboard, WLAN access, and touchscreens make them record-producers for anyone.

Regardless of technological change in the mobile world, the development of the mobile device as such was not the focus of this study. The interest was in how corporate records management paid attention to mobile work and how it supported information management in mobile work. This topic had not been examined earlier.

The first interviews were conducted in the public sector, and these organisations were not at the forefront of the technical revolution. The staff of the IT enterprise were interviewed a few years later, when more advanced technology had emerged and the use of modern technology was much more common. During the interviews in the second organisation, the empirical data were saturated. Boeije (2010, 38) states that a point of saturation has been reached when no further information is yielded and that at this point in the data collection the researcher may stop collecting data.

All participants were mobile-phone- and laptop-users with several years of use experience at activity levels of daily use. At the time of the first phase of data collection, smartphones were quite rare even among mobile workers. Half of the interviewees used a smartphone (such as a Nokia 9500 or later Nokia E-series devices), while the others used feature phones, mostly for calls and/or for SMS or e-mail services. A few respondents used universal serial bus (USB) modem to access the Internet.

The aim of the interviews was to explore how the participants utilised mobile devices, how they experienced mobile work, and information management and record creation in a mobile setting. In the interviews, mobile workers and records management professionals explained their information management issues in mobile work. In open-ended themed interviews, respondents described their work and use of mobile devices. The interviews covered information about the participants' education and experience, themes of mobile work in general, the records created and mobile devices used, organisational culture, problems in mobile work, and interviewees' thoughts about the future in this area. The themed interviews covered several aspects of mobile work, including mobility in general, the devices used, records created on mobile devices, advantages of the devices, problems faced, and organisational culture. The interviews were conducted face-to-face, apart from three handled by telephone. The interview guide and interview questions are presented as

Appendix. All but the telephone interviews were recorded in the participants' workplace.

In addition to interviews, organisational documents were collected, for a picture of the organisational records management policies and instructions. Documents, of various kinds, are another type of data available, alongside interviews, in qualitative research. As Cargan (2007, 57) suggests, organisational documents are created to safeguard and preserve special information. For this thesis project, they also offered valuable insights into the organisations' explicit information management policies. Table 3 summarises the interview and documentary data.

Table 3: Summary of the interview and documentary data used

Organisation	Datasets	
	Interviews	Documents
IT enterprise	Account managers (2) CEO (1) Project managers (5) System architect (1)	Business strategy Quality-management handbook <i>Total: 53 pages</i>
Government agency	Head of section (1) Inspectors (2) Physicians (3) Records-management specialist (1)	Annual report Data-security policy Functional classification system Organisational strategies Process flowcharts Records-management user instructions Records-management schedule <i>Total: 203 pages</i>
University of applied sciences	Secretary of international affairs (1) Teachers (4) IT support staff (3) Records-management specialist (1)	Functional classification system IT services report Organisational strategy Report on IT services Records-management user instructions Records-management schedule <i>Total: 185 pages</i>
Total	25 interviews	Documentary data, total: 441 pages

The body of documentary material in the public organisations was more extensive, but these organisations were, after all, obliged to produce directions as to their records management. The size of the documentary dataset amounted to 441 pages all told.

Documentary material was collected from all three case organisations. It was versatile in nature. These materials allowed examination of the organisations' explicitly written instructions and policies and also its comparison to the views expressed by the informants. In qualitative research, a researcher may use data bearing the label 'private' too, material gathered for personal purposes but occasionally published or forming part of the archival system (see Cargan, 2007, 56), such as diaries or personal memos. In this study, all the documentary material consisted of organisational items, created for corporate use. The disparate fields of business of the case organisations meant that some of these records were confidential and others unclassified, and created either on account of legal obligation or for business use. In the main, the material was free for public use, but especially in the IT firm some records were confidential in view of business secrets. Usually, in general, organisations have an abundance of documentation, as Prior (2011, 94) mentions, with forms; memos; monthly, quarterly, and annual reports; spreadsheets; and policy and mission statements. Although organisational documents are always created for a specific purpose, in this study they were used as a source of data, for appropriate evidence of the phenomenon researched. According to Prior (2011, 95), the approach to study of documentary materials may focus on either the content or their use and function. In this study, the main focus of the documentary-material research approach was on the content of the documents, what is 'in' a document or even what was excluded, and thereby on finding out how documents' content has turned into organisational practices. It was not the idea to study how these specific documents are used by human actors in actual work tasks, although the interviews featured a question on how well they knew the organisation's instructions and policies.

As for the more exact nature of the documentary material, records management instructions, including records management schedules, functional classification systems, and detailed instructions, were available both at the university of applied sciences and in the public agency. Keeping these records is typically obligatory

under Finnish legislation. For example, records management schedules are required in public organisations on account of the Archives Act (1994). Organisational strategies, data-security policies, and annual reports completed the view. In the IT enterprise, all of the corporate instructions were part of the quality management handbook, which also included much more than information management rules. Therefore, the business plan was used to extend the analysis.

Prior (2011, 98) notes that, to understand how the words in the documents connect to the world beyond the text – that is, the actions, policies, and people who created the document – a researcher needs other sources of data, such as interviews. Therefore, for a fuller view of the phenomenon in question, the documentary material was compared to the interview data for articles II and IV.

4.4 Methods of analysis

This study combined two types of qualitative analysis: concept analysis and cross-case analysis. Concept analysis (Walker and Avant, 1992) was used to define the framing concept of organisational memory, and cross-case analysis (Merriam, 1988, 153) was employed for analysis of the interview and documentary data. The study produced four articles. The methods used and the data are presented in Table 4.

Table 4: Methods and data used in the study

Article	Title	Method	Data
Article I	Organizational Memory: Knowledge as a Process or Information as an Entity?	Concept analysis	Research articles
Article II	Motivations for Records Management in Mobile Work	Qualitative text analysis, cross-case analysis	Interviews, organisations' documentary material
Article III	Mobile Work and Its Challenges to Personal and Collective Information Management	Cross-case analysis	Interviews
Article IV	'Some Records Manager Will Take Care of It' – Records Management in the Context of Mobile Work	Cross-case analysis	Interviews, organisations' documentary material

In the first phase of the study, concept analysis was used to assess research articles about organisational memory. Concept analysis does not proceed strictly linearly, and the order of the steps in the analysis varies (Knafl and Deatrck, 1993, 43). Analysis starts with selection of the concepts of interest and continues with determination of the object of the analysis.

In the beginning of the analysis, the aim of the analysis was defined thus: to formulate a definition of the concept 'organisational memory'. Creason, Camilleri, and Kim (1993) suggest that in the review of the literature the researcher searches for possible meanings, definitions, and characteristics of the concept, proceeding from a very broad survey. The researcher has to look for the defining attributes, including model cases, contrary cases, and invented cases. The next step is the identification of the antecedents and the consequences of the concept. According to Creason et al. (1993), the antecedents are phenomena or events of various kinds that occur before the concept is used or a phenomenon has appeared, takes form, or is augmented. Consequences are events or elements appearing after the concept has

been actualised. Limited empirical referents can focus on the picture of the concept, but they are voluntary. The literature specifies no strict rules on how to conduct concept analysis when applying the method. The phases of the analysis do not proceed in a strictly linear order; the researcher may also have to return to earlier phases and reconsider the findings.

During the concept analysis process, the data were first thoroughly read, and notes and annotations were added with a word processor. The data were analysed for purposes of finding the answers to the research questions (as to the meanings, definitions, and characteristics of the concept). The question identifiers were marked in the margins of the articles, and after that the expressions (characteristics, antecedents, consequences, related concepts, etc.) were summarised in a table. The next phase was to rearrange and reconsider the list on the basis of the table. The final result was a simplified list of the characteristics, the model examples, the antecedents, the consequences, and the concepts related to organisational memory. The most commonly used concepts, those that were key concepts and through which an attempt was made to clarify the concept of organisational memory, were taken into account as related concepts in the analysis. The differences and similarities in various disciplines and areas of research emerged through reading of the data and comparison of their interpretations against each other.

The model examples were interpreted in this analysis to indicate the various places where organisational memory is stored. These examples, which make the abstract and undefined concept more concrete, are the embodiment of organisational memory. The differences and similarities across various disciplines and research fields emerged in reading of the data and comparison of their interpretations with each other. There was not much comparison between disciplines in the actual data; therefore, the summary was based on the analysis itself.

In the second phase of the study, the interview and document data of the case organisations were examined by means of qualitative content analysis via theme coding and cross-case analysis. According to Merriam (1988, 153), cross-case studies involve collection and analysis of data from several cases. In this study, instead of one case organisation applying mobile work, three organisations were researched. Merriam (1988, 436) notes that one frequently used approach in cross-case analysis is to find themes that cut across all cases. In cross-case analysis,

people's answers to the same question, or answers considering different perspectives on something, are grouped together; a case study is not developed for each person interviewed as in case analysis (Patton, 1990, 376). As Huberman and Miles (1994, 435) point out, cross-case analysis focuses on sets of individuals within several settings, which extends external validity when actors are looked at in multiple settings. Merriam (1988, 156) suggests that cross-case analysis can be more than a collective description across cases: it can build categories, themes, or typologies that conceptualise the data from the cases.

Different approaches and methods can be used to study the same subject. In qualitative research, literature and previously selected theory are used mainly for an understanding of the phenomenon and what is happening in the field. Boeije (2010, 5–6) states that in qualitative research inductive thinking is paramount. This implies that the phenomenon is explored for what it reveals of empirical patterns that can function as a starting point for a theory. In this thesis, organisational memory as a framing concept has been used to conceptualise the repository of records in three organisations; therefore, the inductive approach was taken to interpreting the interview data

The cross-case analysis started with thorough reading of the transcribed interviews and document data and adding of the data to a table alongside research questions and information on the data sources (documentary data and respondents). This was done by means of a spreadsheet application. The next phase was to identify the unit of analysis. It was defined as one expression directed toward one research question. One analysis unit could include several sentences or several small groups of sentences. During the analysis, the textual descriptions of interviews were searched for common themes and regularities. As Boeije (2010, 77) has suggested is likely, relevant topics could be found throughout the data and different data in different places introduced the same theme. It was also observed that informants did not usually give straightforward answers to the researcher's questions; moreover, they did not answer the questions in the same order, because during the conversation new themes of mobility often appeared. Boeije (2010, 77) notes that this is quite common when one uses open or semi-structured instruments. The interviews were compared with each other, and differing expressions related to the same phenomenon were grouped together even though the interviewees used dissimilar

wording. Again, annotations were made during the reading by means of a word processor.

As Strauss (1995, 160) recommends, the data were read through several times, for underlining of key words and phrases from the interview responses and textual material. After that, the key words and phrases were coded. The dataset was separated into pieces, analysis units, with those thought to belong together forming a group. To reduce the quantity of data, coded and relevant analysis units were identified and detached from the mass of the data and placed in the separate table. In this phase, the segments of text were organised into categories in constant consideration of the individual data and their interpretation. The pieces of data were compared, for determination of their similarities and differences. The units of analysis were processed again and coded, and emerging themes and categories were registered through a search for similarities, differences, and uniqueness. The categories were refined until new ones or anomalies could no longer be identified.

In articles 2 and 4, organisations' written texts were used in a complementary role; therefore, no sophisticated text-analysis methods were needed (Peräkylä, 2000, 870). Qualitative text analysis was used to identify and categorise certain issues. This analysis process was relatively straightforward, and there were no anomalies or borderline cases. The categories were deduced from the text material.

4.5 Reliability and validity of the study

All types of research are concerned with validity and reliability. Especially in qualitative research of this sort, these issues may be more pertinent than in experiment-based research. Positivist social science applies four criteria for disciplined enquiry: internal validity, external validity, reliability, and objectivity (Denzin and Lincoln, 1998, 186; Yin, 1994, 33). Merriam (1988, 165) states that these issues can be approached through attention to the data collection, analysis, and interpretation.

The research design involved a case study of three organisations that had implemented mobile work and mobile ICT. How the research can generalise from a single or a few cases is an issue. Generalisation is not the aim of qualitative research, and the aim in this thesis work was to investigate a new, non-researched

phenomenon. The researcher may try to select the most 'representative' case (Yin, 1994, 37) but can increase generalisability by conducting a cross-case analysis (Merriam, 1988, 174, 177) and providing detailed description of the context of the research.

Internal validity has to do with how well the findings match reality (Merriam, 1988, 166; Denzin and Lincoln, 1998, 186). The factors associated with internal validity include sample composition, which may affect sample generalisation; Cargan (2007, 230) states that this refers to ability to generalise from a sample to a larger population. This study was not longitudinal in nature, or a long-term experiment. There were no dropouts during the data collection. Another factor affecting internal validity is interfering events that occur during the data collection. During the two phases of data gathering, the information technology matured and use of mobile devices changed, as explained in Section 4.3. The focus of this thesis is on how corporate records management paid attention to mobile work and how it supported information management in mobile work; therefore, technological change in the mobile world was not given the focus. Selection of faulty or inadequate sampling methods too may result in a biased sample (Cargan, 2007, 230). In this thesis, the sampling was done not by any mathematical means but to gain representative informants from all three case organisations.

External validity refers to the extent to which the findings of a study can be applied to other situations and whether they are generalisable (Merriam, 1988, 173; Denzin and Lincoln, 1998, 186). To increase external validity in this project, the three case organisations were chosen for their different core functions. Each of the case organisations operated in a different field of society and business. The organisations were selected to represent both private and public organisations, and they also were a sample wherein mobile work and mobile ICT were already widely employed. Therefore, they offered different insights into the phenomenon and the individual organisational cultures. Yin (1994, 45–46) argues that when one is studying multiple cases, every case should serve a specific purpose in the enquiry. Each case should be carefully selected for prediction of similar results or contrasting results. Reliability, in turn, indicates that repeated measurements by the same technique should produce similar results (Merriam, 1988, 170; Denzin and Lincoln, 1998, 186; Cargan, 2007, 230). The three dissimilar organisations of this thesis gave

an opportunity to replicate the interviews in different environments, which increases reliability. The organisations provided both similar and contrasting results, which are further explained in sections 5.2–5.4. In addition, the informants represented diverse categories of professionals and positions, although the small number of informants per organisation does not justify generalisation between organisations.

Interviews were conducted with 25 informants, both mobile workers and records management professionals. The employees were working in a mobile manner, using mobile devices and generating and managing records with them. How the interviews were conducted and coded is described further in Section 4.3 and Section 4.4. The quantity of interview data was adequate, and this was verified via saturation. The themed interviews provided a flexible way to proceed between interesting themes with the interviewees. The questions were tested beforehand in test interviews and discovered to be sufficient. The themed interviews as an interactive and informal occasion also offered an opportunity to refine the question or the answer concurrently if necessary. The interviews were documented at the beginning of every conversation through completion of a form for information about each interview's time and duration, location, participants, and interruptions (if any). The themed-interview guide and questions are included as Appendix. The researcher recorded and transcribed all interviews. In addition to the interviews being recorded, notes were made.

In this study, multiple sources of evidence and methods were used to increase validity. The strength of case-study-based data collection is the opportunity to use many types of evidence sources, and case studies inherently deal with diverse data. Boeije (2010, 176) refers to triangulation here: the use of more than one method or source of data in research. Triangulation can also reveal varied dimension of a phenomenon by leading up to thicker description of a subject. Yin (1994, 91–92) argues that the findings and conclusions in a case study are likely to be acceptable if they are based on several sources. In this type of research, multiple types of sources are relevant. In the thesis project, documentary materials were used to complete and refine the picture of the phenomenon from the organisational viewpoint but also to confront contrary sources of information. Further, the verbal information captured from the interviews provided a different type of data than the organisations' documents did. Boeije (2010, 177) asks a question about the problem of synthesis:

how can data generated via two or more methods be compared? Differences in outcomes may be disturbing but may help to reveal more about the topic. In the present study, triangulation of data offered a chance to compare the informants' and organisational perspectives on mobile work. It is worth noting that Cuba and Lincoln (1989, 240–241) state that the notion of triangulation carries overly positivist implication and therefore should be thought of as cross-checking of data items of a factual nature.

Cuba and Lincoln (1989, 235) suggest that pursuit of objectivity is a demand for neutrality and requires that the enquiry be free of bias, values, and prejudice, so that the findings are determined only by the subjects of the enquiry. Objectivity also has to do with the extent to which the findings are free from bias. For this thesis, the mission was to investigate the new phenomenon of mobile work and use of mobile ICT, not to search for an ideal type of mobile work or organisation. Scientific information must be gathered in an objective, logical, and systematic manner without the influence of the researcher's opinions and values. Therefore, according to Denzin and Lincoln (1998, 186) and Cargan (2007, 3–4), objectivity also means that the researcher should be sceptical about the findings and submit them to evaluation by others. The four articles included in this work have been published in peer-reviewed scientific journals; thereby, the findings have been evaluated by others.

Although this research's topic was not sensitive, controversial, or inclusive of experimentation, some ethics issues can be discussed. Gorman and Clayton (2005, 43) state that in qualitative research the ethics considerations may be even more important than in quantitative work, and that all research subjects have ethics-related rights. Merriam (1988, 187) points out that ethics includes the relations with those studied and responsibility to the discipline, sponsors, and interest groups. Confidentiality, consent, and trust are the issues most frequently raised in ethics guidelines (see Ryen, 2011, 418; Gorman and Clayton, 2005, 43). The thesis work was not financed or guided by any of the case organisations; therefore, the researcher was independent from their motives.

In addition, Lowe (2007, 86) states that interviews are of an interpersonal nature and therefore have an ethics dimension. In this research, although the topic was not very controversial, anonymity of the case organisations and informants was

employed, for protection of the case entities and people. For clarification of the context of each interview quotation made in this publication, the informant's organisation and position are indicated. At the start of the research process, the nature of the data collection and the purpose of the study were outlined for every case organisation and informant. Ryen (2001, 418) suggests that research subjects have the right to know that they are being researched, to be informed about the nature of the research, and to withdraw at any time. Boeije (2010, 45) too sees this as important, for ensuring that the informants can freely decide whether and how to participate. They should actively give their consent. All informants in the present study came to the interviews voluntarily, and they were informed of the nature of the data collection in advance. The researcher submitted the research plan to every informant before the interviews took place. Also, the topic and nature of the research were explained at the beginning of every interview, and the plan related to publication of the articles was explained to the interviewees. At the end of the interviews, the interviewees were encouraged to contact the researcher if they had any questions about the study or anything to add to their interview comments.

Confidentiality and anonymity issues were considered from the very start of the research process. Ryen (2011, 419) states that confidentiality means that the researcher is obliged to protect the participants' identity, and Boeije (2010, 73) suggests that the researcher should ensure omission of all information that could identify participants. None of the informants particularly wanted to be anonymous, but it had been decided at the outset to handle the organisations without stating their names explicitly. One of the case organisations required that neither names of participants nor content of organisational records be published. Therefore, all informants are quoted anonymously, but, instead of pseudonyms, reference is made to their professional posts: this was deemed essential to understanding of the informants' various views (for mobile workers and records management professionals alike). Correspondingly, direct quotations from organisational records are not used.

Mobile work is a widespread means of doing work and does not appear only in a specific context or organisations. Therefore, the question of whether this study's results may carry over ('transfer') to other organisations should be considered. Transferability is a parallel concept to external validity or generalisability and

provides an alternative to the notion of external validity (see Cuba and Lincoln, 1989, 241; Nicholson, Lindgreen, and Kitchen, 2009). It refers to the extent to which a case study can be transferred to other settings. Temporal and spatial transferability indicates that the results should hold in some other time and another place. Graneheim and Lundman (2003) suggest that transferability is always relative and depends on how much the central conditions overlap or those in other settings match. The researcher can offer suggestions as to transferability, but it is the reader who judges whether or not the findings are transferable to another context. Because the data acquisition took place in two phases, one may call the temporal transferability of the research into question. When considering the transferability, one should bear in mind the maturation of mobile ICT during the research process, addressed in Section 4.3. Thoughts of spatial transferability from mobile work in the three case organisations prompt the question of whether the findings will hold in another country or even another organisation. It is noteworthy that the case organisations were all Finnish and situated in Finland, but two of them were operating in an international context.

The most important tool for increasing transferability is a description of the time, place, context, culture, selection, and characteristics of the participants; the data collection; and the process of analysis. Nicholson et al. (2009) state that both the explanation of relating atmospheres and their significance and dominance enable comparison and evaluation against another environment. Schünemann, Fretheim, and Oxman (2006) argue that factors that influence transferability across settings should be considered, including modifying factors such as important variation in needs, values, costs, and the availability of resources. The objective is to provide as complete a database as possible that any other person can apply to his or her own situation as appropriate. Both Cuba and Lincoln (1989, 241–242) and Graneheim and Lundman (2003) agree that also rich presentation of the findings, along with appropriate quotations, enhances transferability.

In the present work, the researcher's data needs were fulfilled satisfactorily, and the costs of the resources in the organisations did not present an issue. All of the case organisations voluntarily offered all required resources (e.g., informants and places for interviews), and the researcher was able to obtain all the necessary documentary material. Most of the documentary data in the public organisations

were in the public domain, though some documents, especially in the IT firm, were of a confidential nature. In addition, the most relevant quotations from the interview data were printed with publication of the research articles.

The level of transferability has been increased through description of the characteristics, selection, context, and culture of the case organisations (Section 4.2) and informants (Section 4.3). The analysis process and the changing environment of the mobile world and its implications for the study were illuminated in Section 4.3 and the methods of analysis introduced in Section 4.4. Also, the availability of documentary data resources in the case organisations has been explained, in Section 4.3 and in detail in Table 3. Recent research is further introduced in Section 6.2, and professional discussion of the challenges of ICT developments for records management is presented to explain current and related atmospheres, in Section 6.3.

5. Summary of the findings

The main issues addressed in the present study are the challenges mobility poses to organisational memory, especially to records management. The objective of the study was to examine the prerequisites for augmentation of organisational memory in mobile work. The interest is in the users and their everyday information management, and in the conditions for augmenting organisational memory in the institutions. At the core of the study is work for four articles published earlier. Description of the conceptual analysis of the associated concept, organisational memory, is presented in the first paper. In the second paper, the issues that motivate mobile workers in records management and how motivations affect the capture of organisational memory are reported. The efforts mobile workers must exert in their personal information management and how do they perceive the organisation's collective aims in records management are studied in the third paper from the user perspective. In the fourth paper, the issues the mobile working environment creates for corporate records management are analysed.

5.1 Organisational memory (Article I)

Organisational memory is a concept that has been used to explain and understand the diversity of organisational information resources and their utilisation. It is connected to collection and storage of an organisation's knowledge for development of new information resources. The aim for the paper was to define the concept of organisational memory by providing thorough content analysis that applies the Walker and Avant method (see Knafl and Deatrck, 1993), which has been explained in Section 4.4, above. The analysis here was aimed at highlighting differences in definition of the concept of organisational memory among various research fields.

The roots of the concept of organisational memory go back to the organisational-science and information-processing theories of the 1950s. The concept has been discussed in computer science, organisation theory, business administration, and archival science, and in the multidisciplinary research area of knowledge management. However, there is no consensus on the definition of the concept. The Walker and Avant (1992) method was chosen because earlier concept analyses have been based on considerably fewer data and have applied unsystematic analysis.

The data consisted of 69 scientific articles, conference papers, monographs, and Internet resources published in 1984–2002. The emphasis is on research into information systems, especially on case studies, because dozens of organisational memory studies were published in the 1990s and the topic has been particularly popular at information-system conferences. These conference articles comprise the most recent information on organisational memory research. Also, data on organisation theory, information management, business administration, archival science, and even psychology are represented. Toward the end of the analysis, the data were saturated, and most of the definitions and references in the articles referred to the same researchers and ideas.

Characteristics of organisational memory identified in the conceptual analysis were described in terms of the adjectives ‘individual’, ‘knowledge-based’, ‘collective’, ‘explicit’, ‘concrete’, ‘abstract’, ‘organisational’, ‘decision-making supportive’, and ‘competitiveness-enhancing’. Obviously, some of these characteristics are mutually contradictory, highlighting the complex nature of organisational memory. The explicit form of organisational memory was emphasised, and at the same time the case-specific and abstract nature of the concept was underscored. Organisational memory in recorded form is concrete and tangible, taking such forms as paper records in an archive. However, organisational memory also appears in implicit form, and it has been described as invisible, mute, fuzzy, lacking a location, and easy to lose.

‘Individuality’ manifested itself as an important characteristic of organisational memory. Organisational memory refers first and foremost to individuals instead of groups so is easily lost and unreachable. But memory can also be distributed either by social interaction or via storage in information systems. Organisational memory is an abstract metaphor and does not refer to concrete concepts such as information

resources of the organisation. Another characteristic seen in the data was the ability to store events and experiences of the past for later utilisation. Organisational memory supports decision-making because it preserves the organisation's history and therefore builds the background and rationale for decisions. It can be said that organisational memory prevents an organisation from repeating the mistakes of the past.

An attempt was made to concretise the concept through model examples. These examples were presented with the nouns 'individuals', 'processes', 'structures', 'databases', 'documents', 'culture', 'ecology', and 'information systems' used. Most of the retention places were tangible, but culture, structure, process, and ecology are examples of the abstract nature of organisational memory. These examples were listed in the articles but not explained any further. One antecedent to organisational memory is a need to answer a question or solve a problem. Descriptions of situations wherein organisational memory is used were rare in the data and associated with empirical studies.

The data included three types of antecedents:

- 1) Situations wherein organisational memory is required
- 2) The factors that promote development and preservation of organisational memory
- 3) The factors that threaten or prevent the development and preservation of organisational memory

Important factors cited in building and storing of organisational memory were *usable and retrievable information, maintenance, information systems, information organisation, user-centrality, communication, learning, and collaboration*. The threats and obstacles to organisational memory's development were *wrong expectations, negative attitudes toward organisational memory, and individuality*. The personnel may have erroneous beliefs in the advantages of organisational memory and dissemination of expertise. Also, individuality refers to the fact that employees may be reluctant to share their expertise or assume that its sharing is very easy. Organisational memory is individual, which poses many challenges: capture and preservation are difficult.

Organisational memory is created in situations wherein experts and knowledge are needed. For organisational memory to be utilised, it must first be saved in explicit form in the information systems. This requires descriptive information. Developing new products and services are the kind of extended processes in which information and knowledge emerge, which too often remain implicit knowledge, tacit knowledge, or soft knowledge (see Anand and Manz, 1998; Cross and Baird, 2000).

The consequences and advantages of organisational memory are *enhancing and supporting the information organisation, preserving of history, supporting processes, supporting collaboration, preparing for changes, enhancing business activity, and facilitating decision-making*. These were clear and concrete advantages of preserving and using organisational memory. Particularly in the area of business administration, the increase in the organisation's competitive advantage and efficiency were emphasised, but there was also some mention in the area of information-systems science (see Bannon and Kuutti, 1996).

Related concepts of organisational memory were *organisation, organisational learning, knowledge management, organisational memory information system, information technology, and computer-supported co-operative work*. Typically, the relationship of 'organisation' to organisational memory was not defined or analysed. In fact, the concept 'organisation' was defined in only a few articles and was used in connection with 'organisational memory' to describe the context of memory operation. Instead, the relationship between 'organisational learning' and 'organisational memory' was most profoundly analysed in the data. This also means that remembering and learning are closely connected, and there is no learning without remembering. Development and formation of organisational memory is a learning process, and employees learn from the past by using organisational memory.

On the basis of the concept analysis, organisational memory was defined thus:

Organisational memory is the organised knowledge of an organisation, a process which is individual and distributed and past preserving, which has an effect on organisational learning, competitiveness, and decision-making, and which can be supported by information technology.

The ideas of preservation and use of organisational memory refer strictly to working life and information used in work-related settings. The empirical case studies on organisational memory pertain particularly to carrying out a task.

The paper was comprehensive analysis to define the concept of organisational memory. Earlier analyses have been based on smaller quantities of data and unsystematic analysis. The data analysis reveals that the preservation and use of organisational memory refer strictly to working life and information used in work-related settings. The 'organisation' concept does not refer only to work organisations, however; it applies also to all other kinds of organisations and communities.

The paper also argued that the concept's theoretical foundation is more closely related to the research field of knowledge management. It also reveals that organisational memory is more related to the enhancement of knowledge construction based on organisational learning as a source of competitive capability than to information management. This may indicate a shift from an individual organisation-member's way of applying his or her knowledge and use of information toward distributed knowledge, communication, and information- and knowledge-sharing, also through information systems.

In this context, the management of organisational memory in a mobile setting can be seen in a new light. Organisational memory is more and more created and managed outside the office in quite different locations. This ongoing shift creates new challenges for both individual-level and corporate management of information. Organisational memory forms a motivating, conceptual, and structuring framework to this thesis and to the three following articles.

The author's contribution to this article was data collection, concept analysis, writing for the piece (introduction, previous research, and reporting of findings).

The theoretical basis of KM and IM, discussion, and conclusion were written in collaboration with the second author.

5.2 Motivations for records management in mobile work (Article II)

The article reports the results of the first study in the mobile working environment. On the basis of analysis of the ISO 15489 standard (International Organization for Standardization, 2001) and the interviews of mobile workers, the paper focuses on the users' motivations to engage in records management. For this paper, the aim was to explore motivations for records management applying various aspects of records management. The ISO 15489-1 standard was selected as a target of analysis because as an international standard it is not tied in its content to any particular administrative or functional context and it has been widely accepted in the records management community. The standard provided the framework that was compared to the motivations of mobile workers.

There were two research questions for the paper:

- 1) What are the motivating factors for records management in mobile work?
- 2) How do these motivations appear in different organisations utilising mobile devices?

The ISO 15489-1 standard defines motivations for records management in terms of traditional professional thinking by justifying why records are needed: to have evidence of an organisation's functions and accountability, to comply with the regulatory environment, and to gain organisational memory for historical research and cultural reasons. The analysis of interviews gave a different view. On the basis of the analysis of the standard, the final categories were divided into three groups: internal motivations (e.g., 'providing continuity in the event of disaster'), external motivations (e.g., 'meeting legislative requirements'), and cultural-societal goals (e.g., 'maintaining organisational memory').

Internal motivations. The analysis of interview data gave a perspective on how mobile workers were motivated for records management (research question 1). The most commonplace motive for saving and managing records among users was *documenting* actions. The motivation here lies in collaborative needs; *sharing information* with co-workers was important because of the need for up-to-date information and continuity. Access and the availability of records are highly valued among mobile users. The usability and availability of recent records is significant, especially, because of team work and personnel changes over time.

Information's sharing, transmission, and reuse, along with the documentation of work processes, were the most common factors motivating facilitation of records management among mobile users. These were mentioned by almost every research subject. The mobile working environment increases the need to organise one's work, especially when the work process is strictly scheduled. Organisation of information is closely connected to work practices. Mobile workers found it important because their information was scattered across multiple devices, information systems, and hard drives. In the government agency and in the IT enterprise, organising one's own work included transmitting records for archival, in a document management system or paper-based archives. At the university of applied sciences, it meant personal information management, making backup copies of personal files.

External motivations. The organisation's function affected the nature of the records produced in the organisation, and this has an impact on users' attitudes to and knowledge of records management. Although the public sector is more closely tied to records management legislation and rules, individual staff at the university of applied sciences had little understanding of records management requirements. The absence of records management education and rules was shown in respondents' uncertainty when they were asked about the archiving of records. In the government agency, users were familiar with the existing internal records management rules. In the IT enterprise, it was clear what kind of legislation is binding for enterprises and which not. *Cultural-societal goals* such as establishing cultural identity or supporting research did not motivate users; only one respondent mentioned this motivation.

Interestingly, even when people were motivated to handle records properly, they had difficulties in recognising what information should be treated as a record. This forms a barrier between the motivation and its realisation in daily work. Identification of records is connected closely to the features and attributes of the record, such as its confidentiality, but not to organisational processes or regulations.

Respondents highlighted the information-based and work-process-related ISO motivations. Documentation, information's sharing and reuse, and need to organise one's own work are associated with internal motivations. For mobile workers, records management is a tool to manage information and both one's own work processes and those of colleagues. Employees find information-based and work-process-related factors important, but they use different and more concrete terms than does the standard.

Users' attitudes to records management and archiving varied, depending on the organisation's main function (research question 2). The main function has an influence on which records are created and, especially, on the confidentiality of the material. The three case studies showed how individual workers' knowledge and interest in records management and records' treatment rules varied dramatically from one organisation to another. Confidentiality of the records created and managed in the organisation was one of the main reasons for this. It became evident in the research process that if organisational processes involved sensitive records and information, whether their own or other organisations', individual personnel were better aware of records management requirements than in those organisations that do not deal with confidential information. Users might have a motive to operate as records management regulations demand when they understand the sensitive nature of the data.

The findings varied considerably among the three organisations studied. The meeting of legislative and regulatory requirement differs between the public and private sector influenced the workers' motivations. The requirements are different for private organisations, where, in consequence, records management serves business processes more, while fulfilling regulatory requirements for good records management *per se* is less important. Public organisations are under ongoing surveillance by citizens and administrative entities, under the Act on the Openness of Government Activities (1999), and the Archives Act (1994). Regardless of this

surveillance, there were differences between records management in the government agency and the university of applied sciences.

Analysis of motivations in the ISO 15489-1 standard provided a new perspective on organisational records management. The motivations complement the picture given by studies of records usage in organisations. They are, however, a step in a different direction: to understanding how organisational culture and environment affect records management. Analysis of the ISO 15489-1 standard and user views also points up a contradiction between the written records management directions and what users see as a motivating factor behind records management.

The author's contribution to this article was in the data collection in the three case organisations, the analysis of interview data, and writing of the article's material on previous research and on the findings. The introduction, sections on objectives and methodology, discussion, and conclusion were written in collaboration with the second author of the paper.

5.3 Mobile work and personal and collective information management (Article III)

The study concentrated on mobile workers' experiences with their personal information management and its connections to the organisation's records management. The interest was in how mobile workers cope with their personal information management before records are captured in organisational memory.

The research questions were:

- 1) What are the records generated by mobile workers outside the standard office environment?
- 2) What kinds of problems do mobile workers encounter in personal information management, and how do they solve these problems?
- 3) What are the issues perceived towards to collectivity in the creation and management of records created on mobile devices?

Research question 1 dealt with the records created by mobile workers. The analysis of interview data revealed that records that were created on a mobile device were closely related to the work situation in which they were created. Most records created and edited while a worker was mobile referred to documentation of work situations. Among these records were notes and memos on individual work tasks. Another category was records that were formulated in co-operation with other actors. Inspection reports, project plans, statements, instructions, project strategies, plans, and system specifications are examples of records that were generated with co-workers and customers. The third category of records created on mobile devices was connected to routine work, such as e-mail, copy-typing, and meeting agendas. The final category was presentation material, including lectures and other teaching materials.

Records created on the mobile devices in the field were categorised into two groups: vital and not of substance for the organisation. Vital records showed natural variation from one organisation to another. At the university of applied sciences, project records and strategies of diverse types were considered vital. In the government agency, inspection reports and marketing authorisations were vital for the sake of organisational memory. In the IT enterprise, informants regarded the records connected to customer projects as vital. For example, on customer premises, records created in customer meetings pertaining to an IT project were vital for the sake of business. Accordingly, in the government agency, the inspection reports and marketing authorisations were connected to the main business processes. Therefore, records created in inspections were vital, both for the sake of the organisation performing the inspection and for the object of the inspection, to document the statutory inspection procedure and its findings. At the university of applied sciences, the tasks were typically related to teaching, projects, and development affairs. Non-substantial records, such as meeting agendas, working-hour reports, and travel invoices, were generated in connection with main functions, but respondents considered them more to be supportive of the daily work.

The findings in response to research question 2 suggested that mobile work creates three types of problems: 1) information management problems, 2) device-dependent problems, and 3) difficulties in adjusting to the mobile working environment. Many issues are technical in nature, but one of the most important

ones, from the records management point of view, is information management. In the mobile working environment, information is dispersed across many devices. Managing several records and versions creates a risk of losing information. The respondents' solution to this was to store various copies, in several locations, such as desktop computers, laptops, e-mail archives, and USB flash-memory sticks. Many respondents said that they might need material that was not always with them, so various storage locations were used.

Information management problems such as document version control involving multiple mobile devices caused problems. Typically, a mobile worker created a record on a business trip on his or her laptop and continued editing at home with a desktop computer. In the office, the mobile worker might have another desktop computer, with which he or she completed the work. Every time the record was being edited offline, it became a local version that had to be uploaded to the organisation's EDRMS. In between, numerous versions might have been saved in external locations. Without strict version numbering, the latest of these was difficult to find. The versioning problem was more substantial if the record was created collectively. The interviews indicated that one solution for the version problem might be online connections to the document management system – the document that is being edited is always in the same place. The record could also have a designated owner who is responsible for that distinct record.

Mobile devices dependent problems were related to the changing environments and circumstances in mobile work. Technical and usability problems were associated with poor network connections, poor capacity of mobile devices, and synchronisation or compatibility of multiple devices. To solve the problems, mobile workers were usually thoroughly prepared with handouts, backups, their own laptops, paper and pencil, USB flash memory, and connections to IT support. Technical matters usually could not be resolved through innovative thinking as information management problems could. The technical issues, which were not necessarily dependent on the worker, usually could be worked out by IT support staff.

Some research participants found *adjusting to the mobile working environment* difficult. This referred to situations wherein mobile devices were used under exceptional conditions. It is often assumed that mobile workers are familiar and

technically skilled with mobile devices, used to working with them, or at least very interested in new technologies. But the empirical data analyses revealed that this is not the case: most of the mobile workers were not especially technically competent. The respondents considered mobile devices to be tools that enabled them to cope with, and speed up, their work tasks. Hence, for them, devices were not privileges, and they were not necessarily interested in the technical features of the mobile devices. Mobile devices simply helped them in their work and supported it. A minority of mobile workers seemed to be early adopters who were interested in the technical features and innovations of devices and who had the latest models.

How did mobile workers act when they encountered a personal information management problem? Mobile workers have developed many ‘survival strategies’, which could be categorised into three groups: securing records, utilising technical solutions, and centralising. Mobile devices are tools both to create and to access information. The strategies of mobile workers were connected not to production of information itself but to management and use of information.

The analysis revealed that *collectivity* and *independence* are features influencing how information is managed. These features of information are connected to how mobile workers process and save the records that they have created on mobile devices. *Collectivity* refers to the situation wherein records are shared with colleagues and saved properly. *Independence* suggests the need to keep records mostly on the creator’s part.

The interviews indicated that office workers were dependent on mobile workers’ output, while mobile workers needed office workers’ input. For example, the field workers needed vital information from the office in order to carry out a work task on customers’ premises. Hence, joint storage locations and common records management policies are profitable tools for mobile workers’ use to bring better information management in organisations. Clearly, there was a need for collaboration in records’ creation, transmission, and retention, even if the work was mobile and independent.

5.4 Records management in the context of mobile work (Article IV)

The aim of the fourth article was to provide a picture of how records management responds to the challenges of a mobile environment and to mobile workers' needs. Traditional methods of records management were developed for the objectives of the office-bound paper-based world. One may question how well conventional records management policies support work in a mobile setting. It can be assumed that capturing and saving organisational memory is challenged by ubiquitous technologies and mobile work practices based on them, since capturing organisational memory has traditionally been tied to office-bounded information technology.

The paper focused on three themes: organisations' documented policies and guidelines for records management, mobile workers' experiences of organisational records management in their work, and records management professionals' views of mobile work and records management. These issues were examined through analysis of the interviews with mobile workers and records managers and of organisations' documentary material. These were the research questions used:

- 1) How does mobile work appear in documented records management policies?
- 2) How do mobile workers experience organisational records management and its support for their work practices?
- 3) How do records management practitioners recognise the special needs of mobile work in the development of records management?

Various documentary materials were analysed for exploration of organisations' records management policies and instructions (research question 1). Records management instructions, with such elements as records management schedules, functional classification systems, and detailed instructions, were available both at the university of applied sciences and in the government agency. Strategy papers present the objectives and goals for the future in general terms. Records management guidelines specify certain policies and how the personnel are expected to take care of records. Data-security policy papers and annual reports completed the

document-based view. All the IT enterprise's records management related instructions were part of the quality management documentation. In addition, business-plan documents were included, to extend the analysis.

From the analysis of documentary materials it seemed that organisational policies did not effectively support diverse ways of conducting mobile work. Document and interview-data analysis revealed several unsolved problems in the organisations' records management policies and practices in coping with the challenge of expanding mobile work. The special requirements of mobile work were not explicitly taken into account in the organisations' records management policies or guidelines.

In both public institutions, records management instructions emphasised the responsibility of individual personnel to manage records properly. This had led to a situation wherein mobile workers had to solve their practical problems themselves. Neither records management instructions in general nor data-security policies stated how documents regarded as informal, such as e-mail or chat messages, should be preserved. In addition, the instructions lacked information on how to capture records generated offline. Organisational IT architecture did not support records management in mobile work; neither did the staff have collective responsibility for managing records.

In contrast, in the business activities, customer relationships have high priority and documenting of customer meetings is assigned importance. These issues were emphasised in the IT enterprise's quality management instructions. Documenting matters was essential when project staff were mobile – working, generating records, and making decisions outside the office. It was recommended to create records online directly in the databases or to replicate them in the office if online connections were not available. The informants reported that mobility was a natural part of their work, and the management agreed with this view. Many of the respondents stated that they could not cope without mobile devices and could not imagine their work without mobility.

The interviews reflected mobile users' attitudes to the records management function (research question 2). The majority of respondents were unfamiliar with the records management function, methods, and tools. Clearly, there was a great deal of confusion surrounding records management in all three case organisations. Many

mobile workers knew practically nothing about the organisation's records management policy and how it related to their work practices. Mobile workers managed their records in the way they found most suitable for their needs. Some interviewees thought that, in maintaining organisational memory, individuals must count on each other to manage the documents properly.

Records management was felt to be a non-personal and remote function. It emerged in the interviews that many of the respondents did not know what was going to happen to their records and who would take care of them. Records management instructions were available in the government agency, and the mobile workers were aware of them, even if they were not thoroughly familiar with them. In fact, only a couple of respondents identified retention schedules and mentioned the retention periods for their records. At the university of applied sciences, in turn, the respondents were not aware of any records management instructions. The instructions available were general in nature and did not offer users concrete help. In the IT enterprise, however, mobile workers had familiarised themselves with the quality management instructions and knew what to do with their records, even though they were not aware of how records were archived.

The interviews with records management professionals reflected how they recognised the special needs of mobile work in the development of records management (research question 3). During the analysis, it emerged that records management professionals apparently were poorly informed about the everyday mobile work and its problems. Additionally, records management professionals were not aware of the extent of use of the mobile devices in the organisation or of the volume of records generated via mobile devices and how those records were managed. The prevailing view was that most of the work was done in the office with standard desktop tools. Records management tools and policies supported this stance; records management actions were still tied to the office infrastructure. There was a gap between mobile workers' everyday life and records management professionals' knowledge of it. While discussing the problems that mobile work may cause for records management, the records management professionals did not refer to information management issues. Mobile work was regarded as, in effect, a separate matter that did not immediately involve records management. The records

management professionals regarded mobility as a technological matter of coping with several devices rather than an information management issue.

The differences among the case organisations may reflect the differences in their core business processes and organisational culture. In the IT enterprise, business activity and management of customer relationships required information's retention and sharing. Information reuse may mean new customers, and information sharing is a necessity in system development; therefore, the mobile workers in the IT enterprise were committed to saving their records in the records management system, while in the public sector, obeying the law was the primary aim for managing information.

The analysis of both document and interview data revealed mutual unfamiliarity. Records management policies and guidelines, especially in the two public organisations, tended to be too generic to be applicable in mobile work. Mobile workers were not aware of the records management policies and functions, and, more crucially, records management professionals were unfamiliar with mobile work practices and their challenges. Interestingly, while the IT enterprise did not have a records management policy defined by records management professionals, its records management practices were the most developed and adopted by the staff. In this case, mobile work was an essential part of operations. The records management rules were based on work practices and business activity, and they were quite advanced even though not always thoroughly defined. This study indicated that records management practices may be built without the control of an official records management unit.

The main outcome of the analyses described in this article is the discovery that the relationship between mobile workers and records management is a complex one. Several unsolved problems were identified in the organisations' records management policies and practices in coping with the challenge of expanding mobile work. The special requirements of mobile work were not explicitly taken into account in the organisations' records management policies and guidelines.

5.5 Summary of the analysis in the three case organisations

In general, the findings reported in the three articles addressing the case organisations interestingly show that the organisations did not likely recognise the information management needs of mobile workers. Information management issues were known to every mobile worker in this study. In the IT enterprise, online connections to office information on mobile devices had been built to make mobile work easier, but mobile workers with the government agency and at the university of applied sciences had to manage for themselves or do without. Also, the IT enterprise was dissimilar to the other case organisations in many ways. Naturally, the business of this organisation affected the IT infrastructure available to the personnel. Mobile devices were available to all employees, and, although the background and experience of workers in this firm varied greatly, they were familiar with ICT and committed to managing and storing organisational memory. In addition, in this enterprise, records management served business processes primarily; meeting regulatory requirements for good records management solely was not essential.

Some interesting observations can be made about the differences in organisational information management cultures. In the IT enterprise and government agency, a culture of shared information was better assimilated. Organisational information systems were widely in use, common practices were internalised, and mobile workers understood their meaning. In contrast, records at the university of applied sciences were understood as being more for personal use, with the EDRMS being regarded as only a tool for the administration unit. However, public organisations are governed by legislative and other mandates. Regardless of these directions, as mentioned above, there were differences between records management in the government agency and at the university of applied sciences. This was visible also in the motivations of mobile workers: when processes were closely tied to legislation and rules, as they were in the government agency, users were more motivated in their records management. If the users are not committed to using the organisation's information systems, the situation will be crucial for the capture of organisational memory.

Another interesting distinction among the case organisations was that records management practices may depend on the surveillance by an official records management unit. When the practices were built on the needs of the organisation's core business and by informed people in charge of the core business, workers were more committed to them than to the instructions issued by a special records management unit. The IT enterprise was an example showing this type of common and integrated records management practices. In the two public organisations, which both had dedicated records management professionals on staff, mobile workers showed poor awareness of the relevant directives. At the university of applied sciences, the informants' commitment to records management was clearly poor. In the government agency, the mobile workers kept created records to themselves and were dubious about the organisation's archiving procedures, but, because of the nature of the organisation's core business, they engaged in saving their material since work processes were strictly regulated by legislation.

6. Discussion and conclusions

In this chapter, the findings seen in the four articles are discussed. Furthermore, the contributions to the body of research and reflections on the research process are considered. Section 6.1 presents a review of the contributions of the study, and Section 6.2 includes a review of recent research and its relevance to this study. Professional challenges to records management are discussed in Section 6.3, and Section 6.4 concentrates on reflections on the research process. Suggestions for future research are presented in Section 6.5, before final conclusions are presented, in Section 6.6.

6.1 The contribution of the study

The objective of the present thesis was to explore the challenges of corporate records management in the framework of changing information technology: the context of a mobile worker, the context of the organisation, and records as shared objects of interest. The project aimed also to explore the consequences of expanding mobile work for the mobile worker's personal information management and the organisation's corporate records management.

In the pursuit of these goals, the thesis work first defined the concept of organisational memory in order to create an overall metaphoric framework for the empirical study. Then the research built three distinct views on mobile work, involving the mobile worker's motives in managing records, mobile workers coping with personal information management, and the organisation managing the information repository produced in mobile work. The 'record' concept was used as a boundary object to build a general meaning for organisational memory.

Taken together, these four studies answer the main question: what are the features and challenges of mobile work for organisational records management, and how have these challenges been remarked upon in records management?

The research questions for the sub-studies of the thesis are summarised thus:

Study 1: What is organisational memory?

Study 2: What motivates mobile workers to manage records?

Study 3: What are mobile workers' experiences of personal information management, and how do they perceive the organisation's collective aims in records management?

Study 4: How does records management respond to the challenges of a mobile environment and the needs of mobile workers?

Records management research operates in fields of interest similar to those of knowledge management, but its interest has been in the by-products of the organisational processes, the records. This is the first study to integrate perspectives of personal information management with corporate records management. The contribution of the study is that it introduces the shortcomings in organisational records management's support for mobile workers. The study also suggests that records management, in order to capture organisational memory, should support mobile workers in their personal information management. The weakness of organisational information management in general is that it is still office-bounded and organisations do not facilitate mobile work. Also, the case organisations did not support diverse ways of conducting mobile work. To support mobile workers' efforts more fully, organisations should better promote means of multi-location mobile work and especially information management therein. Mobile workers' information management needs should be taken into more thorough consideration, and records management professionals should familiarise themselves with the work practices of mobile workers.

The study extends records management research into a new field, which represents fundamental challenges and constant development. Records management in a mobile context has not been researched before. This study was the first attempt to draw a picture both of mobile workers and of corporate records management on the basis of empirical analysis. In addition, this research synthesises the records management views at the levels of individual employee and organisation.

The phenomenon of mobile work was approached through study of three organisations from three perspectives: experiences of mobile workers, the organisation's policies and practices related to records management, and views of records management professionals. Organisational memory was used as a conceptual framework situating these components. The three perspectives and three case organisations provided a rich dataset allowing depiction of how records management is considered in an organisation and how it serves the needs of the individual mobile worker. The concept of organisational memory has been used before as a framing concept but remained fragmented and not integrated fully in the research literature.

6.2 Contributions in comparison to earlier research

Mobile work is not a new phenomenon *per se*, but its relationship with records management has remained uninvestigated. The great expansion in the use of mobile information technology over the last decade poses obvious challenges to traditional policies and practices of records management. Only a few user studies of records management have been published. The present study is exploratory and draws a user-centred picture of the new area of research.

A recent shift in the emphasis of research into organisational memory involves the capture of information in project-based organisations and team work. This study has defined the aim of organisational memory as being to collect and store organisational knowledge. Koskinen (2010) argues that project-based companies in particular cannot create a useful memory store just by capturing large quantities of data, but they must also somehow organise it in ways that create a collective entity. In this thesis especially, the case of the IT enterprise indicated that the constantly increasing amount of project information is something that must be dealt with. In the IT firm, shared policies were based on reflected experiences of practice. Alvarado et al. (2005) have proposed that the maintenance of organisational memory improves application of past experiences and practices, facilitates information search, and improves communication. Both Koskinen (2010) and Alvarado et al. (2005) see organisational memory as an extensive repository of knowledge that is valuable to the organisation, but, regardless of the directions and

tools available, the capture of organisational memory remains an unresolved challenge, for example, in records management.

The first ISO standard for records management was released in 2001. Though this area of management has been standardised by means of regulations and statutes over the course of a decade, the focus of the research has not been on the records management standards' influence on management practices or even users' practices. This thesis has described the first effort to illuminate users', especially mobile workers', motivations for records management. It points to users' motivations as closely connected to the facilitation of their and their counterparts' work. It was interesting that the core functions of the organisation also had an effect on how users were motivated in their records management. This may indicate different information management cultures or differences in how records managers have trained users to follow organisational policies.

The analysis of motivations for records management in mobile work provides a new perspective on organisational records management. Looking at motivations help us to understand how organisational culture and environment affect records management. Internal motivations for managing records are important for users. The findings suggest that records management professionals should consider records management to be a repertoire of partially independent activities and understand that there can be different motives and goals for these activities. Organisations may need the activities for different reasons and in varying degrees. Organisational context affects the activities carried out in the organisation's work.

As discussed in Section 2.4, mobile devices and mobile work itself have gained researchers' attention over the last decade. However, the consequences of mobile work for the mobile worker's personal information management have not been at the focus of research. In addition, the question of what kinds of records are created in a mobile context and how vital these records are for the organisation in question has remained unexamined. The present study revealed that mobile workers' personal information management is complicated and corporate information management or records management did not support it. The analysis of vital records implied that mobile work was typically associated with the primary functions of the organisation. Records created outside the office were, therefore, essential for the organisation. If

these records cannot be captured, the risk of losing important business information and organisational memory increases.

In this thesis, the three entities (and their relationships) mentioned in Table 2 were explored: 1) mobile worker, 2) organisation, and 3) record as expression of organisational memory. The findings indicate that these relations have an effect on each other and that the connections are complicated. The findings also point to how poorly prepared the records management professionals in the case organisations were for the emergence of mobile work. One problem is the mutual professional unfamiliarity of records management professionals and mobile workers, alongside incapability of corporate records management to support users as a function. Organisational records management policies were developed for office-tied work, and mobile work has thoroughly challenged this starting point. Records management policies have ignored mobile work and not included specific guidelines for it. In addition, a contradiction was seen between the users and records management regulation. Mobile workers are not interested in the details or nuances of records management theory, or even policies; they only want to accomplish their work tasks, have access to the relevant records, and generate others. However, mobile devices and multiple work locations have barely been taken into account in information management and, especially, records management policies and practices.

Broadening the perspective from that of the present thesis is justified, for a view on some opinions that have been expressed in public discussion. One implication of the two different worlds of the users and records management professionals pertains to the implementation and use of organisational information systems. The users' approach has recently been under discussion in professional debate in records management (see Warland, 2010; Bailey, 2012). One of the problems lies in the emergence of EDRMSs implemented in the last 10–15 years. Records processes such as adding of metadata, classifications, and setting of retention times have been transferred to the responsibility of the individual user, not a records management professional. For example, Joseph et al. (2013) have suggested that EDRMSs should be designed for improved usability such that users can meet their needs better. The individual workers are not information management professionals, nor have they wished to be; they are users and producers of information. In addition, they should

be able to retrieve information and filter the relevant information from the irrelevant. Foscarini (2010) suggests that records management is supposed to be a mediator and a facilitator to the records creators. These creators are also the users of records management systems, and records management professionals' mediating intervention becomes critical when they enable the transfer of records to a digital repository. In our experience, this is more fundamental in a mobile context when records' creators are not involved in the direct surveillance of records management. The records management function offers standards, policies, and guidelines, but the professionals today are asked the following question: are records managers sufficiently prepared to complete their mediation task? The findings presented in this thesis suggest that they are not.

Another implication of the two worlds may involve three IT paradigms introduced by Bailey (2008). The first of these paradigms was born in the widespread adoption of the personal computer (PC), and extends further, to the phenomenal growth of the World Wide Web and Web 2.0. Established records management practices rely on stationary workers using organisation-controlled client-server record or document management systems. The findings described in this thesis suggest that organisations still hold on to this second IT paradigm with EDRMSs, as Bailey states, while mobile workers are adopting a third IT paradigm. It also appeared that mobile devices had been implemented on the assumption that mobile work would be identical to traditionally office-based work.

This thesis has concentrated on the challenges mobile work imposes, but Web 2.0 too introduces new IT issues. The emergence of Web 2.0 tests the very idea of organisational information management and systems (see Harries, 2009; Stuart and Bromage, 2010; Farrell, 2010). Web 2.0 and mobile technology are examples of transformations in the environment that records management as a professional field should react to. Records management as a function is developing in the direction of integrated corporate information management. Moreover, Warland (2010) suggests that the use of social media and its influence on records management are yet to be seen, because these documents do not have any paper counterparts.

In addition to mobile technology, the emergence of cloud computing has increased the number of ways in which mobile workers can access and use information resources remotely. The most frequently highlighted advantage of 'the

cloud' has been potential cost savings (Sharif, 2010; Cervone, 2010; Farrell, 2010), but there is also a possibility of utilising shared storage environments and applications outside the office. Cunningham and Wilkins (2009) and Blowers (2012) suggest that data-security, legislative, and accountability issues are important angles when one reflects on the benefits and risks of the cloud. Even though cloud computing has come into focus in the last few years, according to Farrell (2010) many organisations still hesitate to adopt cloud-based services since their privacy and security issues have been considered problematic. Mobile workers would benefit from these emerging technologies, though organisations have not yet implemented them extensively. Records management as a profession is only beginning to be aware of such services.

As mobile devices and the types of them proliferate, employees often bring their personal devices to the workplace and use them to access the corporate information base. These devices are less clumsy to carry than a laptop computer, and they have many of the features and applications that are needed for delivery of corporate information to mobile or remote users. But if personal mobile devices used at work are lost or stolen, the business risk of losing sensitive data such as e-mail messages and other critical records grows (Securing today's mobile workforce, White Paper; Thomson, 2012). This kind of 'bring your own device' (BYOD) policy further strains IT staff, on account of the increasing number of devices and data-security issues, but it also challenges records management professionals to apply a new professional focus in their work. To direct corporate information management, records management professionals need to know how and with which tools employees create and process corporate records.

This thesis also has examined how mobile workers see the position of records management in supporting mobile work. Only a few studies (Stuart and Bromage, 2010; Askhoj, Sugimoto, and Nagamori, 2011; Brogan and Roberts, 2011; Stevenson, 2012) have been done to discuss the impact of new tools on records management practices. Those efforts have concentrated mainly on keeping records in the cloud secure or on attempts to archive social media. This indicates that records management as a profession has not taken notice of new ways of working and the new issues they bring to work practices.

6.3 Professional implications

In addition to the challenges mobile work creates for scholarly study, there are professional challenges to be faced. The future position of records management professionals has recently been under discussion in the discipline. Ismail and Jamaludin (2011) have suggested that the role and functions of records management lie either with the administrators who handle paper-based records or with the IT personnel responsible for electronic records. Since organisations need accurate and reliable records to support business and administrative processes, specialists in both records and electronic records management should be established. The findings of this study have revealed that there is very low awareness on organisations' part as to the role of records professionals in supporting the organisation's efficiency and viable operations. Cunningham (2010) has expressed concern about records managers' unawareness of the new technology and therefore about IT staff becoming more involved in the management of information, not only technology itself. Further, Warland (2010) suggests that the records management profession will diverge, with people choosing to specialise in the new professions of digital preserver, developer, and information specialist, as digital preservation becomes a new, specialist profession. All of these persons will be affected by the change in how organisations communicate where mobile devices are involved and with real-time interactions, both internally and with the outside world. Gilliland-Swetland (2005) has argued that records managers and archivists are no longer passive recipients of inactive records but deeply involved with the development of organisational processes, information systems, and workflow.

In conclusion, this research raises the question of whether records management should re-examine its role in organisations more profoundly. Records management as a profession should pay more attention to what seems from a traditional perspective to be an unconventional way of conducting work, and identify the problems the users face in their information management. There is no evidence that this phenomenon has thus far been taken into consideration in records management or that the stances of records managers would have changed over the years. The future should see in-depth examination of the views of records management professionals on the usage of new technology.

6.4 Reflections on the research process

This thesis has focused on the uninvestigated area of mobile work. The research process was influenced by the needs seen in related research, especially on records management in mobile work. Therefore, the use of studies from other branches of the sciences was justified.

Concept analysis is a method of clarifying new, unclear, or contradictory concepts. Because of the lack of strict rules for application of the Walker and Avant (1992) concept analysis model, the researcher has to make his or her own decisions on how to interpret and conduct the concept analysis. Some problems were encountered during the analysis. For example, it was unclear whether the components of the analysis (meanings, definitions, characteristics, antecedents, and consequences) should be exactly the same as mentioned in the raw data. It was decided, therefore, that the final expressions should be built from categories based on the data, and terms and parts of sentences were picked out, including nouns, adjectives, and verbs.

Case studies are valuable when the researcher seeks to understand a special group of people, detailed problem, or unique activity in great depth (Patton 1990, 54). This research employed cross-case analysis focusing on sets of mobile workers who were examined in different settings. In a cross-case study, the data collection is conducted for learning as much about the variables as possible; moreover, studying several cases increases the potential for valid generalisation. Huberman and Miles (1994, 435) suggest that by comparing cases the researcher can establish a range of generality of findings especially when examining a heretofore unexplored area. The three case organisations provided a fruitful source of information since the core tasks of the public institutions differed from each other. The three organisations were chosen for analysis of the research questions under various organisational conditions and to maximise the distinctness of the phenomenon of interest. The main information source for this study was interviews, but organisational documents too were analysed, yielding insight into corporate policies and instructions.

The data collection was carried out in two phases. This should not have caused distortion of the analysis, since in both stages the use of mobile technology was an everyday routine. Variety was sought in the data acquisition, through choice of the most functionally divergent organisations for study, and temporal diversifying

supported this goal. Variation in this sense refers to differences between organisations in mobile work's frequency, the sophistication of the IT technology, and how long the organisation had to tailor their records management practices to a mobile-work setting.

Collection of data on a rapidly developing phenomenon may be problematic because of the time lag between the data collection and reporting of the findings. The time between the two data collection phases provided an opportunity to observe the development and maturity of mobile ICT. Re-interviews in the first and second case organisation (the university of applied sciences and the government agency) were considered for the second phase of data collection, but this idea was rejected since most of the original informants had moved on to other positions and organisations; accordingly, repeat interviews would not have offered reliable data on the phenomenon. The interviews with mobile workers were conducted over a short span of time (within a few weeks) in each organisation, so they represent the same organisational situation in each case. Additionally, the amount of data gathered was adequate, so further data collection in those case organisations was not regarded as necessary.

The researcher could have chosen a different method of data collection, one wherein observations would have offered a different view on the phenomenon. However, as is noted in Section 4.3, the interview data were saturated and were supplemented with documentary material, and all sources of evidence proved satisfactory.

This thesis work had some limitations, which should be made explicit. The focus changed in the course of the research process, shifting from defining organisational memory in the context of knowledge management toward examining mobility more closely in the context of personal information management. While the present work does not include analysis of organisational memory as knowledge construction, analysis of organisational memory did contribute to the research framework. The choice of a move from the knowledge management perspective to the relationship between mobility and records management stemmed in particular from the goal of finding a new perspective on the consequences of mobile workplaces for records management.

In addition, as noted above, the mobile world underwent radical change between the two phases of the research process. This research was carried out on the verge of new mobile technology's breakthrough and before extensive adoption of tablets and touchscreen smartphones with mobile applications. The growth of mobile ICT in the last few years has been very rapid. Today, cloud computing is providing mobile workers with new opportunities to conduct work away from the office desk. At the time of the data collection, cloud computing was not yet under wider discussion and consequently was not implemented or even an option in the three case organisations. In the second phase of the research, the case organisations provided variation in data, but direct comparisons between organisations cannot be made and the findings cannot be generalised.

6.5 Needs for further research

In this thesis, mobile work has been examined from the mobile user's perspective, and the research was augmented by records management professionals' interviews and documentary material.

The present work points to some challenges that merit further research. An urgent need for more study is associated with the impact of records management as an organisational function and its connections to other roles, such as those of information managers and librarians. Also, we have discussed the mutual unfamiliarity between the users and records management professionals. It would be interesting to examine how individual actors adopt records management requirements and how they view the role of records management guidance.

There is also a need to explore more systematically how to facilitate personal information management in mobile work and how organisations could better support it. The relationships among mobile workers' personal information management and the organisation's various records management policies and tools need to be studied. This may be a subject of interesting further research.

6.6 Conclusions

This study is a contribution to the examination of records management in non-traditional settings. It has extended our understanding of the various professional positions in organisations and how they affect each other and the organisational information management. The significance of the study for records management as a profession is that records management should be recognised not as a separate organisational function dealing with filing cabinets and registers but as an activity flowing through the entire organisation and every individual in it.

Moreover, records management professionals may evaluate their role as corporate information managers more thoroughly and seek the role of mediators among a group of complicated and interacting factors. Records management is a field of operation that an organisation's core functions affect directly. In consideration of how organisational culture exerts its influence here, information management could aid in establishing matching disciplines and flexible guidance for records' users.

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APPENDIX: Interview information and themed-interview guide and questions

INFORMANT _____

POSITION OF THE INFORMANT _____

DEPARTMENT _____

NUMBER OF THE INTERVIEW _____

DATE _____

PLACE _____

TIME OF THE START OF THE INTERVIEW _____

TIME OF CONCLUSION OF THE INTERVIEW _____

DURATION _____

INTERRUPTIONS _____

REMARKS _____

Work tasks

- To begin with, I would like to know something about your work.
 - o Can you tell me about your work?
 - o What kinds of work tasks do you perform?

Mobile work and its features

- In your own words, how do you define mobile work?
- In your opinion, what kind of work is mobile work?
- In your opinion, are you a mobile worker yourself or is your work mobile work? To what extent?
- Are there mobile-work features to your work?
- Which of your work tasks can you carry out also in a mobile environment?
- Which of your work tasks can't you carry out in a mobile fashion?
- Can you estimate how much of all your work these tasks account for?

Material created in a mobile environment

- What kinds of work tasks do you perform while mobile (department, organisation, or an equivalent)?
- Could you describe this in more detail: what processes are they related to?
- What material do you create when mobile?
 - o Is it official? Is it unclassified? Is it going to be transmitted or be published?
 - o Can you categorise the materials in a few ways – for example, are they applications, memos, protocols, unofficial planning documents, your own documents, ...?
- Can you explain, in detail, how you create records during a work task and what happens to them afterward?
- What happens to the records after you have produced them?
 - o Will you send them to someone?
 - o Will you save mobile-context-created records somewhere?
 - o Do you usually use them afterwards?
- Do you send the records to someone for filing? Whom?
- Do you edit mobile-context-produced records with colleagues or counterparts?
 - o With whom?
 - o Do you do the editing while mobile?
- Have you been facing any problems in finding these mobile-context-produced records afterwards?
- Are there any instructions on mobile-context-produced records with respect to managing or filing etc.?

Tools of mobile work – infrastructure

- What mobile devices do you use in your work? Is there any particular reason to use them?
- Do you feel that these devices are useful to you?
- What kind of role do these mobile devices have in your work?
- How do these mobile devices affect your work? Could you do your work without them?
- What about their potential in your work? Or obstacles they impose? Or problems associated with them?
- Are there any advantages in mobile work, for you personally? Could you describe what kinds of these advantages there are...
 - o For you?
 - o For your department?
 - o For the entire organisation? (In other words, why has the organisation employed mobile work; what kinds of expectations have there been; and how are these expectations met in concrete work tasks, work practices, work processes, etc.?)
 - o For your stakeholders or counterparts?
- In your opinion, are there any disadvantages to mobile work...
 - o For you?
 - o For your department?
 - o For the whole organisation?
 - o For your counterparts and stakeholders, for example, in collaboration networks?
- Can you estimate roughly what proportion of your work tasks you carry out while mobile?
- Do you use any mobile services in your work at the moment? What kinds of services?
 - o What would be an ideal situation?
- Is there any need to use specific information systems in mobile work (e-mail, intranet solutions, document management systems, or registers)? Why?

Organisational culture and climate, and the information culture and its support to mobile work

- How do you feel your organisation relates to the mobile work and mobile devices?
- How have the use of mobile devices and mobile work been supported and encouraged in your organisation, concretely?
 - o How has support been manifested?
 - o Have you jointly deployed new devices and services?
 - o Have any new modes and possibilities been developed for mobile work (for example, possibilities for use of information systems while mobile)?
 - o Are there any instructions on how to conduct mobile work?
 - o For that matter, are there any new devices that have been purchased? Or have any new services been developed? And has technical support been provided?

- Has it (support or lack of support) affected your way of using mobile devices in your work?
- In your opinion, has it (support or lack of support) increased the general willingness to use mobile devices in work within the organisation?

Problems in mobile use

Technical problems

- What kinds of limitations are there in mobile devices, in your personal experience?
- What kinds of technical problems have you encountered in mobile work when using devices?
- How have you solved these problems / do you have any solution to these problems?
- How have any technical problems affected your willingness to use mobile devices?
- Do you encounter other types of problems?

Cognitive problems

- What is the most troublesome when you're using mobile devices?
- Have you received enough guidance in their use?
- Do you feel that you can use the devices well enough?
- Do you feel you know enough about the possibilities and services of the devices?

Organisational, social, and other problems

- What is the reason you work in a mobile fashion and use mobile devices?
 - o Because of the nature of your work?
 - o Because there are devices and services available?
 - o Because your organisation supports mobility?
- What kinds of limitations are there in relation to your mobile device use, apart from technical ones?
- What kinds of problems are there in mobile work?
 - o Are there enough information resources available? (Are the necessary papers available?)
 - o What about concentrating in a strange and restless environment?
 - o Are you always carrying work with you?
- What is the biggest problem in mobile device usage?
- If there are problems, what do you think one should do about them?
- What do you see as the most important reasons for not deploying mobile devices more widely?
- In your opinion, how should these problems be solved?
- What are the factors mentioned earlier that have an effect on how you use mobile devices or don't use them (problems)?

The future

- How do you see the use of mobile devices as developing in the future?
 - o For you?

- In your department?
 - In the organisation?
- How do you feel mobile devices are going to change?
 - Will there be new services? What kind of services?
 - In what direction are the devices developing / should they develop?
- How do you find that mobile work will develop in your organisation, in the future?
 - Will mobile work change in any way? In what way?
- What plans for the future do you have in this respect?
 - For yourself?
 - In your department?
 - In the organisation?
 - With stakeholders and counterparts?
- Do you now have anything else to tell me, or is there a need to make any corrections or clarify something?

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VOLUME 2

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**Mehdi Khosrow-Pour
Information Resources Management Association, USA**



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Organizational Memory - Knowledge as a Process or Information as an Entity

Sari Mäkinen, M.A.

Department of Information Studies, FIN-33014 UNIVERSITY OF TAMPERE, Phone: +358-3-215 6969, Fax: +358-3-215 6560,
E-mail: sari.makinen@uta.fi

Maija-Leena Huotari, Ph.D.

Department of Communication, FIN-00014 UNIVERSITY OF HELSINKI, Phone: +358-9-191 24176, Fax: +358-9-191 24849,
E-mail: maija-leena.huotari@helsinki.fi

ABSTRACT

The aim of the paper is to define the concept of organizational memory by providing the first thorough content analysis applying Walker and Avant's method popular in nursing science. The analysis covers a total of 69 articles published between 1985 and 2002 in computer science, information science, archival science, economics (organization theory and business administration) and recently also in the multidisciplinary research area of knowledge management (KM). Organizational memory is a process, not a store of individual and collective organizational knowledge, related to organizational learning, decision-making and competitive capability. Therefore, it is argued that the concept is related to the emerging research area of KM, which regards knowledge as a social construct, rather than to information systems research, which dominates the empirical research of organizational memory.

INTRODUCTION

The roots of the idea of organizational memory go back to the organizational science and information-processing theories of the 1950s. The concept of organizational memory has been discussed in computer science, organization theory, business administration, and archival science, and in the multidisciplinary research area of knowledge management (KM). However, there is no consensus about the definition of the concept. The nature of the conceptions of organizational memory in general is examined, and the approaches of KM and their links to Information Management (IM) and organizational memory are analyzed. The definition of organizational memory is presented including the detailed findings of the analysis. Finally, the consequences for the theoretical basis of empirical studies are discussed, and ideas for further studies are proposed.

Definitions of organizational memory

Many researchers claim that the understanding of the concept of organizational memory is limited, the term is vague, but widely used. According to Ackerman (1994a, 1994b) and Ackerman and Halverson (1998) organization is a whole and organizational memory is invisible, muted and hazy. Megill (1997) defines organizational memory as consisting of all the active and historical information in an organization that is worth sharing, managing and preserving for later reuse. Walsh and Ungson (1991) model the structure of organizational memory from the perspective of administrative science. According to them organizational memory consists of five retention bins: individuals, culture, transformations, structures, and ecology. They claim that individuals are the prime resource of organizational memory. As a consequence of this, memory is embedded in organizational activities, work practises and routines in an implicit and even tacit form. The definition presented by Walsh and Ungson is most often referred to:

"In its most basic sense, organizational memory refers to stored information from an organization's history that can be brought to bear on present decisions." (Walsh & Ungson 1991, 61)

In this definition the role of decision-making is emphasized. Bannon and Kuutti (1996) criticize this model as an attempt to include everything in the concept of organizational memory. Megill's (1997) definition has to do with the same problem. It can be argued that the mission and advantages of organizational memory are much more diverse, like preserving history for posterity and supporting diverse operative functions of an organization. It is a highly individual aid, because it accumulates and in the first place is stored in individuals, employees, and other members of an organization. But organizational memory is also a distributed and collective resource, which may be explicit (like documents, databases, reports, manuals) or implicit (knowledge, processes, structures, culture).

Theoretical basis of KM and IM

Schwartz, D'iviti and Brasethvik (2000) note that organizational memory has become a close partner of KM, denoting the actual content that a knowledge management system purports to manage. They perceive knowledge as the key asset of the knowledge organization, and argue that organizational memory extends this asset by capturing, organizing, disseminating and reusing the knowledge. Generally the purpose of KM is seen to be to make these resources available for use. This approach refers to knowledge as an object (Sveiby 1996) and, thus, brings KM close to the traditional role of IM.

Even in information science, whose research objective is basically related to codified knowledge, the socio-behavioral (e.g. Ingwersen 1995, 170) and socio-cognitive (Hjørland 2002; see also Hjørland 1995) perspectives are emerging. The dynamic nature of knowledge has recently been emphasized (e.g. McInerney 2002), and due to its social nature, knowledge is inextricably linked to human behavior. KM can be defined as the management of people as creators and producers of knowledge and of information as the raw material of processes related to knowledge creation and production (see Huotari & Iivonen 2004). From this perspective, social aspects of human behavior and knowledge construction also become the basis for organizational memory.

It has been proposed that the concepts of intellectual capital and KM are complementary and that KM therefore needs to be placed in the wider field of intellectual capital management (e.g. Wiig 1997, MacMorrow 2001, Choo & Bontis 2002). Intellectual capital is knowledge that transforms raw materials (both tangible and intangible) thereby increasing their value (see Stewart 1997, 2001). For example, Nahapiet and Ghoshal's (1998, 246) view of intellectual capital stresses the significance of socially and contextually embedded forms of knowledge and knowing as a source of value. Sveiby (1996) also emphasizes that this process perspective will become the focus of KM during this decade. Orlikowski (2002) goes even further by showing the inter-related nature of action and knowing involving both tacit and explicit types of knowledge without separating them as, however, is done, for example, by Nonaka and Takeuchi (1995) and Cook and Brown (1999).

Schultze and Leidner (2002) showed two dominating theoretical conceptions of KM in information systems research. By applying the framework of Deetz (1996) they challenge Burrell and Morgan's (1979)

four paradigms and instead identify four discourses - normative, interpretative, critical, dialogic - as more appropriate for determining the theoretical assumptions underlying conceptions of KM including organizational memory and organizational behavior. The research focused mainly on two discourses: the normative (codification of knowledge) and the interpretative (knowledge as socially constructed, a culturally bound process based on situated learning).

Wilson (2002) argues that the information systems (IS) orientation dominates the approaches and implicit conceptions presented in the research papers, consulting practises and university curricula of KM. According to him the theoretical foundation of this orientation is similar to IM research, i.e. the term 'knowledge' is in fact used to refer to information. He argues that we cannot manage individual knowledge because it resides in human minds. Research on organizational memory information systems also supports this view by serving the needs of information retrieval and information seeking in the case of an explicit preserved form of organizational memory.

CONCEPT ANALYSIS OF ORGANIZATIONAL MEMORY

This analysis aims at highlighting differences in defining the concept of organizational memory in various research areas. The method is Walker's and Avant's approach of concept analysis used in particular in nursing science (see Knafel & Deatrick 1993).

The research questions for the content analysis applying Walker and Avant's model were set according to the following phases. First the possible meanings, definitions and characteristics of the concept are identified. Second, the identification of the antecedents (i.e. different kinds of phenomena or events occurring before the concept is used or a phenomenon has emerged, takes shape or is augmented) and, third, of the consequences (i.e. events or elements appearing after the concept occurs) of the concept. (Creason, Camilleri & Kim 1993.)

The data consists of 69 scientific articles, conference papers, monographs and Internet resources providing the perspective of the topic published from 1984 to 2002. The emphasis is on the research area of information systems, especially on case studies, because dozens of organizational memory studies were published in the 1990s and the topic has been particularly popular at information system conferences. These conference articles are the most recent information on organizational memory research. Besides data on organization theory, information management, business administration, archival science and even psychology are represented. (See Table 1.) Towards the end of the data collection data saturation became evident as most of the definitions and references in the articles referred to the same researchers and ideas.

Due to the lack of strict rules for applying the Walker and Avant concept analysis model, some problems were encountered in the analysis. First, it was unclear whether the characteristics, model examples, antecedents, consequences and related concepts should be exactly the same as mentioned in the literature. Therefore, it was decided that the

Table 1. The data categorized by research areas.

Research area	Total	Percent	Notes
Information systems science	29	42 %	Total also includes 3 articles on the discipline of organizational theory
Organizational theory	16	23 %	
Information management	10	14 %	
Business administration	8	12 %	
Archival science	6	8 %	
Psychology	1	1 %	
Total	69	100 %	

final expressions should be built from categories based on the data. Secondly, characteristics are assumed to be properties, but organizational memory was rarely described with such words in the data. Thus terms and parts of sentences were picked out including nouns, adjectives and verbs. Antecedents were phenomena or events occurring before the use of formation and augmentation of organizational memory. In this analysis, antecedents were decoded with reference to reasons why organizational memory was used, and what preceded or supported the generation and storage of memory. Consequences referred to elements or events resulting from the use and storage of organizational memory.

The model examples were interpreted to refer to the various places where organizational memory is stored. These examples render the abstract and undefined concept more concrete, being the embodiment of organizational memory. The most commonly used concepts, those which were key concepts and by which an attempt was made to shed light on the concept of organizational memory were considered as related concepts in the analysis.

The differences and similarities of various disciplines and research areas emerged by reading through the data and comparing their interpretations against each other. However, there was not much comparison between different disciplines; therefore the summary is based on the analysis itself.

FINDINGS

On the basis of concept analysis, the definition of organizational memory is taken to be as follows:

Organizational memory is the organized knowledge of an organization, a process which is individual and distributed and past preserving, which has an effect on organizational learning, competitiveness and decision-making, and which can be supported by information technology.

The preservation and use of organizational memory refer strictly to working life and information used in work-related settings. The empirical case studies on organizational memory pertain particularly to carrying out a task. A summary of the analysis is presented in Table 2.

The analysis indicates that the characteristics of organizational memory are contradictory, thereby reflecting the complex nature of organizational memory. The explicit form of organizational memory was emphasized, but simultaneously the individual and abstract nature of the concept were also underlined. Organizational memory in recorded form is concrete and palpable, like paper records in an archive. However, organizational memory was also manifest implicitly and defined as invisible, mute, fuzzy and easy to lose.

Individuality was an important characteristic of the concept because it referred first and foremost to individuals and secondarily to groups. Organizational memory supports decision-making because it preserves an organization's history and therefore includes the background and rationale for decisions. Organizations need to remember decisions and the knowledge connected to them (Conklin, 2001, 28). Decision support systems (DSS) provide the means to acquire and store knowledge and to support decision makers (Bolloju, Khalifa & Turban, 2002, 164).

Most of the storage places were palpable. However, culture, structure, process, and ecology were examples of the abstract nature of the concept of organizational memory. Although these examples were

Table 2. Characteristics, antecedents and consequences of organizational memory.

Characteristics	Antecedents	Consequences
individual	usable and retrievable information	enhancing and supporting information organization
knowledge based	maintenance	preserving of history
collective	information systems	supporting processes
explicit	information organization	supporting collaboration
concrete	user centrality	preparing for changes
abstract	communication	enhancing business activity
organizational	learning	facilitation of decision-making
supportive in decision-making	collaboration	
competitiveness enhancing		

Table 3. Related concepts of organizational memory.

Concept	Mentioned with OM	Relationship to OM defined	Relationship to OM analyzed	Total mentions
Organization	18	6	1	25
Organizational learning	6	10	8	24
Knowledge management	9	3	5	17
OMIS	5	8	4	17
Information technology	8	4	3	15
Computer-supported cooperative work	10	-	-	10

listed in the articles, they were not explained any further. In empirical case studies the procedures and information systems had important roles (see e.g. Ackerman & Halverson 1998).

An antecedent of organizational memory is the need to answer a question or solve a problem. Those descriptions discussing situations where organizational memory was used were rare and related to the empirical studies. Wrong expectations, negative attitudes towards organizational memory and individuality were the threats and obstacles of organizational memory. The personnel may hold erroneous beliefs about the advantages of organizational memory and dissemination of expertise.

Particularly in the area of business administration the increase of competitive advantage and efficiency of the organization were emphasized. These issues were also mentioned by some researchers in information systems science (see Bannon & Kuutti 1996).

Related concepts of organizational memory are presented in Table 3. Organization is a concept which is used together with organizational memory to describe the context of memory function. The relationship of 'organizational learning' to 'organizational memory' was most profoundly analyzed in the data. This indicates that remembering and learning are closely connected, and that without remembering there is no learning.

No significant differences between research disciplines could be identified. However, information systems scientists' perspectives were pragmatic, concentrating more often on the development of databases and information systems supporting organizational memory. Examining the content of the concept, in turn, was the focus of organizational scientists. Bannon and Kuutti (1996) claim that the concept of organizational memory does not belong exclusively to any particular research area or discipline. In the field of archival science the purpose of archives to retain and store the historical memory was emphasized. Organizational memory research has been criticized for perceiving organizational memory as solely a problem of information technology (see Koistinen & Aaltio-Marjosola, 2001).

DISCUSSION AND CONCLUSION

The contribution of this study is the first comprehensive analysis to define the concept of organizational memory. Earlier concept analyses have been based on considerably smaller amounts of data and unsystematic analysis. According to the data the preservation and use of organizational memory refer strictly to working life and information used in work-related settings. However, the concept of organization does not refer only to work organizations but also to all kinds of organizations and communities. Therefore it would be interesting to examine the types of organizational memories in the context of more informal communities, such as sports clubs or associations. These aspects could be a subject for future organizational memory research.

We claim that the theoretical foundation of the concept is more closely related to the multidisciplinary research area of KM and enhancement of knowledge construction based on organizational learning as a source of competitive capability, than to IM. This indicates a

shift from an individual organizational member's way of applying his/her knowledge and use of information towards distributed knowledge, communication, and information and knowledge sharing, also through the use of IS. This characteristic of the concept refers to the social nature of knowledge and information, implying that knowledge is socially constructed, i.e. knowledge is a process, not an entity. The process perspective is rarely applied to studies on organizational memory, and mostly in relation to an information system and its use (Ackerman & Halverson 1998). The strategic perspective has gained more emphasis in economics (e.g. Hatami, Galliers & Huang 2002). Previously the process approach to organizational memory has not been explored or examined from the strategic perspective in the data analyzed in this study.

It would therefore be interesting to examine the role of organizational memory from a more constructionist viewpoint at the level of a workgroup, an organization, a network or even society as a whole. For innovating individual and organizational learning, these approaches would also link more closely the use of individual knowledge in collective tasks, knowledge and information sharing in knowledge processes and work practises, and even organizational culture and climate, including more intangible factors, for example, trust. When linked with the strategy building processes, these approaches would add to the knowledge of the research of strategic management of organizational knowledge and information. Beyond the organizational context examined, the memory organizations in society (libraries, museums, archives) have been assigned the role of enabling and supporting the social construction of new knowledge. In a global economy the history as well as the social and cultural nature of nations preserved by them could play a crucial role in enhancing knowledge construction and innovativeness more widely in society.

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Motivations for records management in mobile work

Sari Mäkinen and Pekka Henttonen

Department of Information Studies and Interactive Media, University of Tampere, Finland

Abstract

Purpose – All organisations may not have the same motivations for investing in records management. For some organisations the benefits of records management are more important than for others. It can be hypothesised that an organisation with a “natural” motivation for records management controls records processes more thoroughly than an organisation without a similar motivation. However, it is not understood how organisational context affects records management. In this paper the aim is to examine what motivations there are for an organisation to invest in records management especially in a mobile working environment.

Design/methodology/approach – Aspects explored were ISO standards, and record users in three different organisations. The empirical data were gathered by interviews with 25 respondents and qualitative analysis of the ISO 15489 standard content. Results from the interviews were compared with the ISO standard. For this purpose, quantitative analysis was used to identify and categorise motivations given in the standard.

Findings – Respondents highlighted information-based and work-process related ISO motivations. In general, internal motivations were emphasised and cultural-societal goals were practically not mentioned at all. For mobile users records management is a tool to manage information and support their own and colleagues’ work processes. The organisation’s function affects the nature of the records produced, and this has an impact on users’ attitude towards and knowledge of records management.

Originality/value – Analysis of motivations in the ISO 15489-1 standard gives a new perspective to organisational records management. The motivations complement the picture given by studies of records usage in organisations.

Keywords Records management, ISO 15489, Private sector organizations, Public sector organizations, Standards, Mobile technology, Design of work

Paper type Research paper

Introduction

Records management is the field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including the processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records. Records are “information created, received, and maintained as evidence and information by an organisation or person, in pursuance of legal obligations or in the transaction of business”. The purpose of records management is to ensure that adequate records are created, captured and managed. To achieve its goals records management sets policies and standards; assigns responsibilities and authorities; establishes and promulgates procedures and guidelines; provides a range of services relating to the management and use of records; designs, implements and administers specialised systems for managing records; and integrates records management into business systems and processes. (International Organization for Standardization, 2001.)

All organisations may not have the same motivations for investing in records management. For Maslow (1954), motivated behaviour is need-related. Motivation is behaviour which is purposive or goal-oriented. The purpose instead, is a result, end and aim of the action. In professional literature records management is often described as a risk management issue: improving records management is justified when risks surpass costs resulting from poor records management (Dmytrenko, 1998; JISC Infonet, 2009; DIRKS, 2003, Appendix 10). For some organisations the benefits of records management are more important than for others. It can be hypothesised that an organisation with a “natural” motivation for records management—rising from its functional needs and goals—controls records processes more thoroughly than an organisation without a similar motivation. For instance, an enterprise in defence industry has a need to protect sensitive data from unauthorised access. Therefore, the enterprise is likely to systematically control access to data even without recognising it as a feature of good records management.

However, we do not fully understand how organisational context affects records management. A better understanding of this might help to identify organisations where improving the level of records management should bring clear benefits. An organisation with a high natural need for records management can be in a danger zone when records management is neglected. Conversely, understanding the relationship between organisational context and records management may help to identify “societal risk” organisations which lack internal motivation for investing in records management, but in which good records management is desirable for broader societal reasons. In these organisations appealing to organisational self-interest and risk minimisation is not a sufficient motivation. Therefore, a different kind of records management strategy is required.

In this paper we examine what motivations there are for an organisation to invest in records management especially in a mobile working environment. Essential to mobile work is motion, that is work is carried out on the move (Wiberg, 2001). The analysis of motivations is based on the ISO 15489-1 records management standard which is used to create a model of relevant characteristics. The model is tested against interviews in three different types of organisations to see whether the interviews give support to it and differences between organisations.

Previous research

Organisational motivations for records management have not been explicitly studied, however, in some studies the area is approached from a different perspective. There are a few studies of how records are used by users. Studies have previously focused mainly on use of archival resources (see Goggin, 1986; Miller, 1986, Duff and Johnson, 2002, Yakel and Torres, 2003). Recently, some empirical researches on the purpose of records' use in organisations have appeared (see Gunnlaugsdottir, 2006). Borglund and Öberg (2008) have pointed out, that there are two temporal structures, primary purpose and secondary purpose that stand for categories in which records are used in organisations. These purposes consist of business purposes, accountability purposes and cultural purposes.

Sundqvist (2009) has studied the information behaviour of users of records in organisational settings, how records are used and how the search for records is mediated. The needs for records were generated by a task or accomplishment of any kind with the purpose to achieve something. Those needs motivated the purposes of use of records: material, operational, accountability seeking or knowledge enhancing purposes. Users seek to obtain records with the help of different mediational means, e.g. artifactual intermediaries as the journal and the archives inventory that could be defined as representational systems, in order to reach a certain outcome: fact-finding, reconstruction of past actions and events, regaining experience and knowledge, verifying status, or illustrating and exemplifying.

During the past few years, mobile work and mobile information technology have been the focus of increasing attention in general. Bardram and Bossen (2005) argue that attention arises from two sources. First, it rises from remote mobility where mobile workers move across large distances and the focus is on developing new technologies that enable this work. Second, it rises from the realisation that computer support for collaborative work introduces new problems. Mobile work creates challenges because workers need to move about and need to have access to resources, computers (Bardram and Bossen, 2005).

A lot of work is done outside the office in different and unpredictable locations because of an explosion in mobile computing and telecommunication technologies (Allen and Shoard, 2004; Weilenmann, 2003). Records are being created outside of an organisation and outside an organisation's control and purpose. The management of these records can be named “the cloud” (Stuart and Bromage, 2010). The impact of these new tools on routines and work practices is still under examination. For example, mobile document work refers to a mobile professional who needs to access documents when away from the desk in a wide variety of geographical locations (see Lamming et al., 2000). One perspective to changing the mobile work environment is nomadic computing. Users are seen as nomads, mobbing between office, home, airplane, hotel, car, conference room etc. (Kleinrock, 1996). Recent studies of mobile environment have been carried out mainly in the field of education and computer science. The studies have focused on utilisation of mobile technology (Fagrell et al., 1999; Churchill and Munro, 2001; Kristoffersen and Ljungberg, 2010), mobile learning (Liaw et al., 2010), impacts in commerce (Johnstone and Vaghjiani, 2008; Kalakota et al., 2003), or mobile work itself (Antunes, 2008; Wiberg, 2009). There is no academic research in the field of records management in mobile working environment, but Bailey (2008) has noted the challenge of Web 2.0 and mobile work for established records management practices that rely on stationary workers using organisation-controlled client-server records/document management systems.

From the perspective of information management, Huotari (2001) conducted an empirical study on executives' perceptions of the critical organisational factors, of the information needs, and of the use of information systems in pharmaceutical company. Information management was discovered to be a highly critical, strategic factor in the pharmaceutical industry. Information management was crucial for the achievement of the strategic aims, and the speed of information storage, retrieval and dissemination were significant. Similarly, the quality of information management was related to the accuracy and know-how of information processed and provided by internal accounting and planning.

Objectives of research and methodology

In this paper, our purpose is to explore motivations for records management by analysing an ISO standard, and examination of record users in three different organisations.

Research questions are as follows:

RQ1. What are the motivating factors for records management in mobile work?

RQ2. How do these motivations appear in different organisations utilising mobile devices?

The empirical data was gathered by interviews with 25 respondents and qualitative analysis of ISO 15489 content. The ISO 15489 was selected as a target of analysis because as an international standard its content is not tied to any particular administrative or functional context and it has been widely accepted in the records management community.

Research participants were recruited from three different kinds of Finnish organisations to gain versatile view of the research problem and mobile working environment. These three organisations represented state government, education and enterprise sectors.

(1) The government agency participating in this study is part of product regulation in the sector of social affairs and health administration. In its work it cooperates with other agencies at national and international level. The respondents were highly educated; most of them had doctoral theses. These experts quite often travelled abroad on work trips. All of them used mobile devices but some shared a device and did not have a mobile device exclusively in their personal use. Few mobile computers were used and shared with colleagues. The organisation is located in one place.

(2) The university of applied sciences offers a bachelor level and master level degree programs in different fields of study. Most of the interviewees were teachers, but also IT personnel were interviewed. Mobile devices were widely available and research participants had trips both abroad and domestic. The organisation is decentralised and located in two towns.

(3) A medium-sized enterprise operates in information technology and offers services to public and private sectors in the area of document centric process software applications. Enterprise is decentralised to several districts in Finland. Business trips were domestic. Mobile devices were common in the organisation. Information technology was versatily utilised in communicating, for example by using virtual and chat meetings.

In this article, a mobile device is defined as an application of wireless communication technologies to process, transmit and exchange data. This includes laptop computers, personal digital assistants (PDAs), mobile phones and smart phones (see e. g. Allen and Shoard, 2004; Weilenmann, 2003). A mobile device is a smart device. It communicates, it is personal, it provides information anytime and anywhere and its user can be located easily (BenMoussa, 2003). Records can be created, processed, transferred, stored, disseminated, shared, used, and disposed in and by mobile devices. Work exploiting mobile technology has increased in two ways. First, people whose work has been mobile in the traditional sense have taken the computer as part of their work in different locations. This means that records that were earlier created as a separate process in the office (offline) are now created online in the actual work context. Second, work that was done earlier in a fixed location, (e.g. in the office of a doctor) can now be done freely in any place selected (e.g. in the home of a patient; Bardram and Bossen, 2005).

Respondents were chosen among employees whose work was mobile and who used mobile devices, like cell phones, PDAs, and laptops. Interviewees represented teachers, physicians, software analysts, project managers, sales managers, researchers, and senior inspectors. A few managers and records management professionals were interviewed. Interviews were carried out in 2004-2005 and 2009-2010 and data was analysed by using qualitative content analysis. The data was preliminary coded and these categories were identified. The categories were refined until no further new categories were recognised. In the analysis the data was coded into the final four categories, which are presented in the findings. Anomalies were not found.

Results from the interviews were compared to ISO 15489-1 standard. For this purpose, we used qualitative analysis to identify and categorise motivations given in the standard. The final categories were divided into three groups:

- (1) internal motivations (e.g. “providing continuity in the event of disaster”);
- (2) external motivations (e.g. “meeting legislative requirements”); and
- (3) cultural-societal goals (e.g. “maintaining organisational memory”).

The process was relatively straightforward and there were no anomalies or border cases. The categories deduced from the ISO 15489 standard serve in this study as a tool for comparing motivations between the organisations.

The interviews and the ISO standard were analysed separately by different researchers. The last stage of the research process was to put the results together and identify similarities and differences.

The motivations in the ISO 15489-1 standard are shown in Figure 1.

In some cases motivations are interlinked. For instance, protecting sensitive information (1.1) or complying to legislation (2.2.1) may reduce risks (1.2.4). Likewise, interests of the society (2.3) can be satisfied by supporting research (3.3). On the other hand, it is possible to serve cultural-societal goals (3) even when there are no positive gains to expect or identified interests of the society (2.3).

It seems that different motivations may encourage different actions in records management. Information-based motivations (1.1) lead to controlling access and usage of records. Work-process related motivations (1.2) require records and supervision of processes, but they do not necessarily require preserving records for long periods. This is likely to happen when serving cultural-societal goals (3) is the motivation.

It can be hypothesised that ordinary employees are likely to recognise, most easily, motivations that are directly related to execution of processes in daily activities (1.2.1). Other motivations are either managerial or can remain hidden, if records management education is not offered to users and organisational culture does not emphasise their importance.

1. Internal motivations

Motivations emerging inside an organization.

1.1 Information-based motivations

Sensitive personal, commercial or operational information in records or value of records as an asset.

1.2 Work-process related motivations

Role of records in business processes and managerial work.

1.2.1 Execution of processes

Need for records in daily activities: transaction of business, re-use of information, continuity in the event of disaster.

1.2.2 Managerial needs

Using records to support organization's management.

1.2.2.3 Managing processes and information

a. Tracking documents and/or actions

Documenting the movement of records to ensure that items can always be located when required. Tracking processes where time limits for actions are imposed by or on the organization.

b. Controlling manner of execution

Conducting business in a consistent, orderly, efficient, equitable or accountable manner. Providing consistency, continuity and productivity in management and administration. Facilitating effective performance of activities.

c. Improving processes

Supporting quality process framework to comply with ISO 9001 and ISO 14001. Improving the effectiveness, efficiency or quality of processes.

1.2.3 Supporting decision making and policy formation

1.2.4 Reducing risks

2. External motivations

Incentives emerging from expectations which are external to an organization.

2.1 Accountability to stakeholders

Ensuring accountability to present and future stakeholders, meeting needs of internal and external stakeholders.

2.2 Regulative environment

Requirements arising from current business, the regulatory environment and community expectations in which the organization operates.

2.2.1 Compliance Meeting legislative and regulatory requirements, ethical rules, standards, best practices, and community expectations about what is acceptable behavior.

2.2.2 Protection from litigation Providing protection from and support in litigation.

2.2.3 Safeguarding interests, rights and obligations Protecting interests of the organization and the rights of employees, clients and present and future stakeholders, documenting the rights and obligations of individuals and organizations.

2.3 Interests of the society

Getting legal, financial, political, social or other positive gains from preserving records to serve the interests of society as a whole

3. Cultural-societal goals

3.1 Providing evidence Providing evidence of business, personal and cultural activity.

3.2 Establishing identity Establishing business, personal and cultural identity.

3.3 Supporting research Supporting and documenting current and future research and development activities, developments and achievements, as well as historical research.

3.4 Maintaining memory Maintaining corporate, personal or collective memory.

Figure 1. Motivations for records management in the ISO 15489 standard

Findings

Users and internal motivations for records management Documentation, information sharing, and reuse. The most common motive to save and manage records among users is documenting actions. It is motivated by colleagues' needs; sharing information with co-workers is important because of the need for up-to-date information and continuity. Access and usability of records are highly valued among mobile users. Usability and availability of recent records have significance, especially because of teamwork and changes in the staff over time (Figure 2).

Mobile work is done online; customerships are taken care of here and now. Mobile workers have to deal with oncoming matters immediately while travelling. Documents are produced by mobile devices "on the way". Information systems have to be updated with latest versions as soon as possible because colleagues may need them. This cannot wait until the mobile user is at his desktop. Documentation needs to be available up-to-date now, not in two weeks. For example, in an enterprise records management is vital from the customer and project point-of-view; project history has to be saved because of continuity and in case of turnover of project personnel. For a mobile user it is significant that information shared exists and is up-to date.

Information is always connected to another piece of information, and it only has significance if the history and context is known. Therefore the networked nature of information and aggregations of information are highlighted in digital and mobile environment. Work is done in teams more and more often and mobile users find it necessary that employees document information so that a colleague is able to continue where another has ended. Projects are carried out in teams, and everyone in a team has to be up-to-date about information.

"All the documents, persons, organisations that are related to a certain project, they all should form a spider web; you should be able to see everything from any angle." (Manager)

In collaborative networks information and records management is even more significant. Work that is done in these networks means also new challenges to information and records management. More and more often work is done in groups in which each member represents his or her organisation. Personal information and

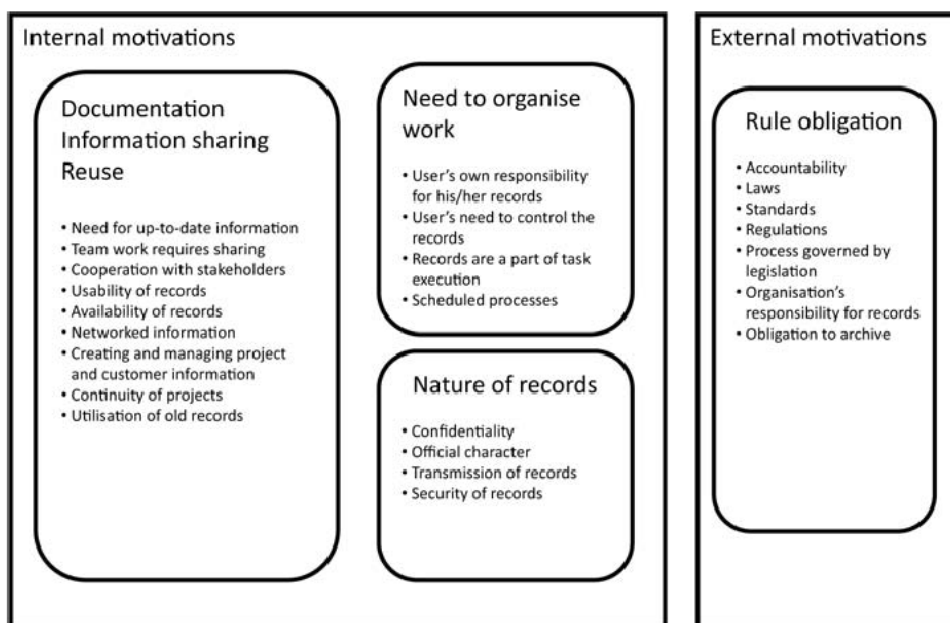


Figure 2. Mobile workers' motivations for records management

records management is not enough, records management has to be more comprehensive, and working patterns commonly accepted. Responsibility for records management in communities of practice needs to be determined. For instance working in international working groups records have to be delivered and responsibility for saving them for later use specified. Saving in own inbox or a drawer is not enough.

In the mobile working environment information and especially records management is dispersed in different devices, hard drives, and locations. Mobile workers very often work in diverse places with several colleagues from different organisations, and customers, meaning collaborative networks. That is why these records may not be captured and saved properly by creators, because these records more or less are not part of records management processing. Lack of records management information and guidance leaves individual staff members to make their own assessment of the appropriateness of management control of records.

The responsibility for records resides mostly on employees. This is especially because records are not necessarily produced on-line in document management systems in mobile working environment if remote use is not available. Updating to document management systems is not automatic, which makes the role of the individual mobile user even more important. That is why records are saved on laptops and hard drives, and it is dependent on the interest and memory of individual staff members that these records are captured, shared, and stored.

Mobile users have to deal with problems of dispersion of information every day. They also realise the risks and how it affects information management in an organisation, but do not know how to solve this problem.

The educators of the university of applied sciences seem to have no culture of information sharing. In enterprise instead, sharing information is considered as extremely important from the continuity standpoint. When removing customers from one project manager to another the history of customership must also be transferred to another person. Project history is considered as a competitive advantage in enterprise; it produces savings, efficiency, quality, and productivity. Reuse is significant especially in companies, because reuse of information in customerships is a competitive advantage. In public service (government agency, university of applied sciences) there are other records management motivators for users than competitive advantage. The responsibility of the entire agency motivates individual users to manage records: users in public organisations usually understand the public authority's responsibilities. But in educational organisation, records are most often considered as a matter of administration only, not relevant to teachers' work.

In business activity, archiving and disposal of records is not considered necessary even if the company itself sold solutions for records management, because "Archival legislation does not concern us" (Manager). The importance of archiving for historical research is not understood. The need to archive is concretised when people are talking about document reuse and project history in customerships. Even then the word "archiving" is not used, but transmitting customer information to another colleague is mentioned when records are discussed. The significance of archiving is understood in own work, "It is good that old documents are available" (Project Manager 1). As one research participant put it, "They only are, there in the database" (Project Manager 2).

The third category in the ISO standard, cultural-societal goals, was almost entirely ignored by the respondents. Only one interviewee (who represented state government) of the 25 respondents mentioned the historical importance of records, "Is it so, that records have then only historical value?" (Senior Inspector). Ten years was mentioned as a time limit after which records have only historical value to organisation.

In all three case organisations individual staff members are given much responsibility for their own records. In the enterprise for example, project staff save their records themselves in the document management system, and no records management personnel is assigned. In the government agency instead, specific personnel, coordinators, are liable for product regulation process and records involved in the process. Additionally, there are full-time archivists who complete the classification and organise the paper records. In the university of applied sciences there were no records management personnel at the time of the interviews. This situation is clearly shown in research participants' comments. Because of absence of records management instructions and education record-keeping practices varied from one person to another.

Need to organise work. Users' own responsibility and motivation for records management is emphasised in the mobile environment. Responsibility for created records is users' common motive to save records; there are no other people to do so, especially in the mobile working environment. There is almost no surveillance

related to capturing records in a mobile environment, because nobody can be controlled continuously to ensure that all records are captured and archived properly. The users have to understand themselves the value of their records to organisational memory. This is significant especially among mobile users because they do not necessarily create their records on-line in document management systems.

So long as a user has their own space to save records, it will be a problem to capture organisational memory. There may be a records management policy that requires that records be transferred to an archive for long-term preservation. In spite of the policy, many users maintain their own paper archives in the office. The reason for this is an old habit; they want to control the material themselves and want the material to be always available – in their own office. On the other hand, some of the users find archiving to be someone else's responsibility, not their own. The life cycle of a record is considered to be at most ten years, not longer. This is the time a record has significance to a user. The historical meaning of records is lacking almost entirely among research participants. They do not think about what kind of picture researcher will get from their organisation in the future. Records serve them as a part of their work tasks and how they can get information delivered to their colleagues by records.

The mobile working environment causes information management problems for users. Multiple devices, storage media and mobile worktable are a challenge with changing circumstances and network connections. Without any systematic routine of capturing and saving records mobile users cannot cope with records management. The need for a common procedure was often mentioned in interviews especially when the process re-occurs and the steps are known in advance. Employees know that there are common rules for managing information and records. In the IT enterprise common rules meant a quality system, in the government agency following instructions in records management schedules which are used in public administration to guide record life cycle, access and handling. If there are no rules relating to how work is done, people tend to create their own rules and act accordingly. A situation like this will end up in confusion and disorder. If common procedures are not functional from the user's point-of-view, people create their own practices.

Mobile work is a great challenge if the steps in the process are determined by norms and legislation, and deadlines have to be followed. This is emphasised if at the same time the amount of records involved in the process is extensive. For example, in the public agency one process may include a few cubic meters of paper and at the same time schedules of the process have to be obeyed. The need to organise own work is a motive to save created documentation, especially when the employee is responsible for a certain project or handling process. One tries to serve customers, both in the public and private sector in the best possible way. In all three cases organisations' good personal information management is motivated by the need to organise own work processes.

Nature of records. ISO 15489 defines records as "information created, received and maintained as evidence and information by an organisation or person, in pursuance of legal obligations or in the transaction of business". Defining whether information is a record or not was extremely difficult for mobile users. This is not a surprise, even records management professionals argue about this question. Defining a record in actual work context is often too difficult, and this may be one of the reasons why some respondents did not know how to handle their records. How to define a record, which should be saved? All respondents were insecure about this definition. Some of them estimated it to be related to whether the record is delivered outside or inside of the organisation. Interviewees were also uncertain whether or not the record was their responsibility after the transmission.

Mobile users understand a document as being a record depending on a few characteristics: transmission, confidentiality, and official character. They define "recordness" through their every day practice: if a document is sent to others, it is official and it may be a record. But if a document is created only to personal use, like personal notes, memos, or teaching material, it is not necessarily a record. E-mails are considered as records only exceptionally. An e-mail message is "official" only when it is delivered outside of the organisation. Also if a document is confidential, it should be managed with certain policies and controls and it is a record. In the IT enterprise and government agency users knew how to manage confidential records. In the university of applied sciences, respondents were much more insecure about what to do with their records. This also leads to the assumption that the organisation's mission, function and business affect how well staff are aware of records management policies and regulations. What the business organisation is involved in and the nature of records affect how users relate to records. This assumption was supported by interviews.

The question of recordness is relevant in the mobile working environment. Capturing organisational memory is in a mobile environment more complicated than in a traditional working environment. For mobile employees the risk resulting from having records scattered around multiple mobile devices is more obvious than for employees who do not do mobile work. Particularly, in the university of applied sciences, records are considered as personal, that is, part of a person's own work, not necessarily part of organisational memory. Nevertheless, users in the university of applied sciences see differences between records. Documents that are felt as significant from the perspective of organisational functions and those connected to public administration are most likely to be treated as records and archived by interviewees – mostly in their own workroom. Examples of these are large project applications and records connected to public contracts.

Security is important to all mobile workers but it means different issues in different organisations. To mobile workers security means preserving records in a safe place, typically on a server. It also means taking regular backups, usually by individual staff members themselves. In the university of applied sciences security is understood as taking backups from your own work so that records would be available to you. Sharing information with colleagues is not considered. In the enterprise and government agency users see themselves as information providers and security is understood more widely: as saving records in information systems to ensure their usability and information transmission to colleagues.

Mobile users face the question of confidentiality every day. They consider managing the process, and records created in it also a question of trust. If the material concerning the process is confidential, the users are aware of it and manage the records with care. It is the question about trust with customers in an IT enterprise, and trust of civil servants in a government agency.

Users and external motivations for records management

Rule obligation. The records management field is guided by rules, legislation and standards. Rules are tools of implementation and justification for records management professionals. Rule obligation was one of the motivating factors especially among mobile users in the government agency. These users were conscious that there are laws about records they are creating. Regulations in the public sector are based on legislation and are obligatory factors affecting both organisation and its users.

Surprisingly, in the university of applied sciences research participants did not mention legal issues at all. For example, “archiving” is understood as a technical operation: uploading records consisting of files to server for backup. Archiving is not understood as saving records to the document management system or printing them to paper and transmission to archives, although this is the meaning of the term in the laws and regulations governing public sector records management. Archiving is seen as the information systems department and computing's responsibility, not as saving history or the obligation of public administration. In the state government accountability and legislative requirements are mentioned by most interviewees. In the IT enterprise they are recognised because of the business (document management) they were involved in.

Mobile users are not interested in records management policies as such and they assume that records management professionals take care of archiving. In state government, respondents are aware of records management obligation, but they do not identify themselves as part of life cycle of records; their approach is that archiving is others' responsibility, not their own. As one respondent, a records management professional, put it, “Records management is invisible, and somebody just archives those records”. For an end-user it is difficult to see as far as ten years in the future because active use of records is up to five years. Organisations are changed and disbanded, so what is the value of organisation's records at that point? Respondents' perspective is in their own work history in the organisation.

Accordingly, respondents in the state government understand better and are more aware of the organisational responsibility for capturing records because the organisational processes and their deadlines are accurately designated in specific legislation. In these cases, deadlines of rules determine the process very strictly and records management processes must adapt to it. This is the most remarkable difference between the organisations studied.

Users are also motivated to archive if they are answerable for the process which records are involved. In some cases, for example in the government agency, there are particular persons, coordinators, who are responsible for capturing and transmission records to archive. These coordinators are not responsible for the whole process, but their work is highly important. In the IT enterprise mostly the project manager is the

person responsible for the process and the records. In the university of applied sciences, users themselves make the decision whether and for how long they keep their records.

Respondents in the enterprise and government agency recognise the existence of organisational rules and regulations, like quality systems and records management schedules. Research participants regard them as a tool to help gain common procedures. Remarkably in the university of applied sciences interviewees did not at all mention rule obligations of any kind, although the laws and instructions governing records management in public administration also apply them.

Summary of findings

According to the ISO standard, records management motivations obey traditional professional thinking of why records are needed: to have evidence of organisation's functions and accountability, to comply with regulatory environment, and to gain organisational memory, to historical research and cultural reasons.

Among mobile users the most common motivating factors to records management were documentation of work processes, information sharing and transmission, and information reuse. These were mentioned by almost every research participant. The mobile working environment increases a need to organise your work especially when the work process is strictly scheduled. Organisation of information is closely connected to work practices. Mobile users found it important because their information is scattered all around multiple mobile devices, information systems and hard drives. In the government agency and in the IT enterprise, organising own work included transmitting records for archiving, in a document management system or paper archives. In the university of applied sciences it meant personal information management, making backup copies of personal files.

The organisation's function affects the nature of records produced in the organisation, and this has an impact on users' attitude to and knowledge of records management. Although the public sector is more tightly tied to records management legislation and rules, in the university of applied sciences individual staff members had little understanding about records management requirements. The absence of records management education and rules was shown in respondents' uncertainty when they were asked about archiving of records. In the government agency, users were familiar with the existing internal records management rules. In the IT enterprise it was clear what kind of legislation obligates an enterprise and what does not.

Even when people are motivated to handle records properly, they have difficulties in recognising what information should be treated as a record. This forms a barrier between the motivation and its realisation in the daily work. Identifying records is tightly connected to the features and attributes of the record, not to organizational processes or regulations.

Cultural-societal goals do not motivate users; only one respondent mentioned this motivation.

Respondents highlighted information-based and work-process related ISO motivations (1.1 and 1.2). In general, internal motivations were emphasised and cultural-societal goals were practically not mentioned at all. Documentation, information sharing and reuse and need to organise own work refer to internal motivations. For mobile users records management is a tool to manage information and support own and colleagues' work processes. Employees find information-based and work-process related factors important but they use different and more concrete terms than ISO standard. Rule obligation among users has interdependency to compliance (2.2.1) in ISO standard.

Users' attitudes towards records management and archiving varied depending on the organisation's main function. The main function has an influence on records that are created and especially on confidentiality of the material. The three case studies showed how individual staff members' knowledge and interest in records management and records' treatment rules varied dramatically from one organisation to another. Confidentiality of records created and managed in the organisation was one of the main reasons for this. It became evident in the research process that if organizational processes involved sensitive records and information, whether own or other organisations', individual staff members were better aware of records management requirements than in those organisations that do not deal with confidential information.

Users do not find records management interesting, refer to it as records management, or do not know that it is records management, but they might have a motive to operate as records management regulations demand when they understand the sensitive nature of the data.

There are obvious differences between the three organisations studied. Meeting legislative and regulatory requirements differs between the public and private sectors. The requirements are different for private organisations. In private organisations, records management serves business processes, fulfilling regulatory requirements for good records management is as such less important. Public organisations are under ongoing control by citizens and administration. In spite of this, there were differences between records management in the government agency and the university of applied sciences.

Discussion

Public administration is based on written documents, which makes records a central component in the handling of business matters (see Sundqvist, 2009). This is why records are understood as a matter of evidence and accountability in the government agency. Records are considered as a matter of documentation also in the private company and educational organisation. The motivations for records management differ from one organisation to another depending on the nature of the records and the main function of the organisation. In the mobile working environment, documentation and records management ability to support own work is emphasised.

The users consider records management from the point-of-view of their own work, not necessary from the historical and cultural point-of-view. Records support respondents' work tasks and after they have been accomplished, records have little significance to them. This observation is supported by Sundqvist (2009): the use of records is purposive, i.e. motivated by specific needs. If deadlines and responsibilities for handling the process are defined in legislation and the records managed in the process are confidential—as in the case of a public agency—users are more aware of records management regulations and their knowledge of records management is at a good level. Sundqvist has indicated that ideally each function and each member of the organisations should contribute to this overruling objective, while fulfilling their work tasks. The need for records would thus occur as a consequence of the work process.

If the users in the enterprise understand that records are significant and confidential for customership and possibly contained trade secrets, they handle records carefully and were conscious about their responsibility for keeping the information secret. In the business world, confidentiality is vitally important, and customers' information cannot be spread all over the world. On the other hand, if processes are not standardised, most records are not confidential, and there is no deadline involved, like in the university of applied sciences, capturing and archiving of records was considered only as a matter of taking technical backups. Huotari (2001) has pointed out that information management is a competitive advantage in a pharmaceutical company. Information management is crucial for the achievement of the strategic aims and the significance of information management function seems to be related to the industrial sectors the organisation is in. This assumption is supported in these three case organisations, especially in the IT enterprise.

According to Records Management Maturity Model (JISC, Info Net, 2009), when working in partnerships with other organisations and sharing information, institutions should ensure that all participating staff are aware of the records management implications and that all parties agree on common protocols. Records management controls should be applied also to information being shared with or passed to other bodies or being held by another organisation on the institution's behalf. (JISC, Info Net, 2009). Our research results support the ideas of JISC that records created in the course of collaborative working are often not part of records management controls.

Differences between the three organisations studied raise new questions. Especially the difference in user conceptions in the two public organisations — the government agency and the university of applied sciences —requires an explanation. The regulatory environment is for the most part the same for both, but it was ignored in one organisation and acknowledged in the other. Also, in the other organisation there existed a culture of information sharing missing from the other. A traditional explanation would be to blame the organisational culture or lacking records management education; with proper education the teachers in the university of applied sciences could be guided to do "the right thing" and handle information as records of the organisation like they should. A closer examination of how the users see their work, its context, and individual and organisational goals might reveal other reasons.

Conclusion

Analysis of motivations in the ISO 15489-1 standard gives a new perspective to organisational records management. The motivations complement the picture given by studies of records usage in organisations. They are however a step in a different direction: to understanding how organisational culture and environment affect records management. Analysis of ISO standard and user views also raises a contradiction between the written records management rules and what users see as a motivating factor behind records management. Internal motivations are more important for users than we have understood. Analysis may inspire records management professionals to justify their profession in a different way in their own organisation.

Instead of thinking of records management as a single entity we should perhaps consider it as a palette of partly independent records management activities, like capturing and storing information, organising information, controlling access, and managing the record lifecycle. There can be different motives and goals for any of these activities. Organisations may need the activities for different reasons and in varying degrees. Organisational context affects what activities are carried out in the organisation's work. In the future, we should try to better understand the interplay between records management activities, organisational work, goals, and context.

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About the authors

Sari Mäkinen has a MA in history. She has worked at the Department of Information Studies and Navy Command Finland. Currently she is working on her PhD at the Department of Information Studies and Interactive Media in Tampere University, Finland. Her research area is records management in the mobile working environment. Sari Mäkinen is the corresponding author and can be contacted at: sari.makinen@uta.fi.

Pekka Henttonen has a DSocSc in archival science. He has worked in the National Archives of Finland and in the Military Archives of Finland. Currently he is Assistant Professor at the Department of Information Studies and Interactive Media in the Tampere University, Finland. His research area is electronic records management.

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Mobile work and its challenges to personal and collective information management

[Sari Mäkinen](#)

School of Information Sciences, 33014 University of Tampere, Finland

Abstract

Introduction. The aim of the study is to give a user-centered perspective to mobile workers' personal information management while they are exposed to unpredictable circumstances and challenges in records creation, management and retention.

Method. The study was conducted as a qualitative case study by interviewing mobile workers in three Finnish organizations in 2004-2010.

Analysis. The interview data were digitally recorded and transcribed. After that the data were analysed qualitatively by cross-case analysis to identify common themes and issues.

Results. Records created in mobile work were both vital and non-substantial. Personal information management problems referred to information spread over many devices, version control, and access to records. Issues regarding collective information management were collective records creation and independence of the individual employee.

Conclusions. The methods and tools should be further examined to improve mobile workers' everyday information management. Mobile workers would benefit from developing information systems which would better support mobile work.

CHANGE FONT

Introduction

The way office work is carried out has been changing profoundly in the last couple of decades. Today, technology has become an enabler of mobile work. A lot of work is done 'in the field', outside the office, in different and unpredictable locations, due to the emergence of mobile computing and

telecommunication technologies ([Allen and Shoard 2004](#); [Weilenmann 2003](#)). For a mobile worker, the most important features of the technology used are easy access to document services, timely document access, user interface, ubiquity, and compliance with security policies ([Lamming et al. 2000](#)). These factors are also practical differences between records management using conventional information and communication technologies and mobile technologies. Current solutions in records management do not necessarily meet these requirements.

Therefore, personal information management is an integrated part of individual work processes, whether the employee is sitting in the fixed office or working remotely. The term refers to users' activities in acquiring, organizing, retrieving, and processing information in their personal information spaces ([Vassileva and Vassileva 2008](#)). These include finding new information, organizing any information found into a collection, re-finding information that has been previously seen or possessed, and maintaining a personal information collection ([Elsweiler 2008](#)). A mobile device is an application of wireless communication technology to process, transmit and exchange both personal and work related data. This includes laptop computers, personal digital assistants (PDAs), mobile phones and smart phones (see [Allen and shoard 2004](#); [Weilenmann 2003](#)). For a mobile worker, mobile devices are mainly personal tools to create, process, transmit, store, share, use and dispose of work-related information, such as records.

The focus of this study is on the emerging and growing phenomenon of mobile work and how records are created, managed, captured and stored in that context. Research on mobile work and how scattering of information to different devices, locations and formats affects records management is lacking so far. Presumably, records are created in a similar manner both in the mobile work and in the office. An open question is what happens to the records after they have been created on mobile devices? Do they become captured and a part of the organization's memory?

Perry and Brodie ([2006](#)) note that a large part of connectivity is directed to remote people, not remote information. This aspect is not supported by mobile technologies. All documentation of organizational and personal activities are records, regardless of their medium and characteristics, if they serve as evidence of those activities. Records create a strategic asset to the organization by ensuring compliance with legal obligations and continuity of business processes. However, the same duties and obligations are imposed on the production and information management of records in mobile devices as any other documents ([Staffady 2011](#); [Pence and Podolny 2011](#)).

Records are characteristically generated in one context by their creators and used in a totally different context by other persons ([Sundqvist 2009](#)). Studies of records management have focused on organizational context but understanding the challenges that mobile work raises for records management requires research from the mobile users' perspective. Information management in mobile devices is a new perspective which questions the traditional records management tools and methods. In this paper, records creation is examined in mobile work contexts and users' experiences. The interest is how mobile workers cope with their personal information management before records are captured into organizational memory.

Information re-finding is often seen as the most important personal information management activity. It can be hypothesised that mobile workers with several devices may encounter problems managing their work-related records and these records do not become part of the organizational memory. This study presents empirical analysis of the information management questions of mobile workers. Aspects explored were: 1) What are the records generated by mobile devices in the mobile work? 2) What kinds of problems do mobile workers encounter in personal information management and how do mobile workers solve these problems? and 3) What are the issues perceived by mobile workers towards collectivity in creation and management of personal records created in mobile devices?

Previous research

'Mobile' is defined as a quality of an individual who moves to and from different places and works while travelling, utilising information and communication technologies. In general, distributed work is a

characteristic of knowledge work, and mobility is an additional feature of organizational work today (Vartiainen 2006; Vartiainen 2007: 74-75). Work has become multi-locational and it is being carried out at home, clients' premises, aeroplanes, trains, cars and so on. Mobile teleworkers have been defined as those who work at least ten hours a week away from home and their main workplace; for example, on business trips, field work, travelling or in customers' premises using on-line connections (ECaTT 2000).

An unexamined area of mobile work is how well organizations control mobile workers' information management. A mobile worker's day is blurred by information retrieval using several devices, and managing uncertainty, interruptions and changing locations. The change in workplaces and use of alternative offices has had a great effect on the organizations. In addition to social functions and required technologies, multi-locational work has challenged knowledge sharing and organizational learning (Vartiainen 2007: 81).

Types of individual physical mobility have been defined by Lilischkis (2003). In his typology, mobility has been analysed by two dimensions: space and time, and each type of mobile work has its characteristic criterion. 'On-site movers' carry out work in different places inside an office or on campus, like security agents, hospital doctors and farmers. 'Yo-yos' are mobile workers who have a solid office desk which they occasionally leave to work in temporary workplaces, as on business trips, field work such as interviews, working during travelling, and doctors' visits to their patients. 'Pendulums' refers to people working at two different fixed locations. These are in the office, at home or customers' premises. 'Nomads' include people who are constantly working at changing locations moving from one location to another. Nomads are for instance diplomats, circus artists, and field sales forces. 'Carriers' are mobile workers who carry either people or things. Work is done on the move and it cannot be carried out in fixed work places without changing location. Train conductors, cabin crew, sailors, taxi drivers and bus drivers are examples of carriers. All of these mobile professionals have their own way to assemble and organize their mobile office and to cover the problems with conducting mobile work (Laurier 2002).

These physical types of mobile work do not exclude each other and one person may represent several of these types at the same time. This typology is based on what kind of physical movement their work requires and it does not take into account the mobile devices they use or information they process. For example, conductors' and taxi drivers' work is driven by routines and transactions, and the devices and software they are using are dedicated by nature. Mobile workers like professional experts, so-called white-collar workers, operate with office software, and their tasks are varying, complex and non-structured. In this study, the interest is in this kind of knowledge work and its mobile forms.

In mobile work, access to information may pose a challenge to the user. The problems of access are probably most familiar to mobile workers: how to unpack and plug in a laptop in an unfamiliar environment, how to access remote records and databases, how to transfer a file, how to print a file, and how to secure a confidential file. In the spatial dimension of collaboration in hospital (Bardram and Bossen 2005) the problem of access to documents anytime and anywhere would force the user to manually locate the relevant paper-based information in a certain situation. Bardram and Bossen argue that support for accessing '*the right documentation at the right time, in the right place*' (p. 156) would be preferable. Combining mobile tools and information-related activities, O'Hara *et al.* (2002) found that mobile professionals have a particular need for technologies that can flexibly accommodate their information needs across unpredictable circumstances. It also indicated that there are implications of technologies that more closely integrate access and distribution of electronic documents with mobile phone technology.

Information management in mobile work has not gained attention in research. There are a few studies on the productivity of mobile work and how interaction of knowledge workers can be supported. Venezia *et al.* (2008) indicate that organizations should consider undertaking a thorough review of their typical space profile and reassign space in greater alignment with the needs and expectations of an increasingly mobile population. Based on respondents' answers to the survey, there are several ways to create a more accommodating and effective workplace. Bosch-Sijtsema *et al.* (2009) define the crucial elements that either hinder or enable knowledge work productivity in distributed teams: team tasks, team structure and

processes, the physical, virtual and social workspaces, as well as organizational context.

Mäkinen and Henttonen (2011) have examined what motivations there are for an organization to invest in records management, especially in a mobile working environment. They suggest that in some organizations there is a natural need for good records management and that individual staff members' motivations for records management are closely connected to their own work and organizational culture. People document their work activities, share information and keep their colleagues informed about what has happened in their work, in order to organize their own and team's work.

The lack of related literature lent support to the importance of studying personal information management in mobile work. Analysing the types of issues mobile workers struggle with in everyday working life provides knowledge about their personal information management and creating organizational memory.

Research goals and questions

The purpose of this paper is to explore workers' experiences of records management in the mobile working environment, what types of records mobile workers create, how records are created and whether these records become a part of organizational memory. Work is not carried out in one location any more. Therefore, workers have to encounter the problems of mobile work and its technical environment. These questions will be explored by studying mobile workers in three case organizations.

The research questions are as follows:

1. What are the records generated by mobile workers outside the standard office environment?
2. What kinds of problems do mobile workers encounter in personal information management and how do they solve these problems?
3. What are the issues perceived towards collectivity in creation and management of records created in mobile devices?

Methods and data

The work was conducted as a qualitative case study. The empirical data was collected in three Finnish organizations: government agency, university of applied sciences and a medium-sized information technology enterprise. Case studies are useful when there is a need to understand a special group of people, particular problem or unique situation in great depth (Patton 1990). The three organizations represented both private and public sectors and provided an appropriate context for this study because it is possible to cover a wide setting of mobile work. The research participants were recruited among employees who used several mobile devices regularly in their work and whose work was mobile. Mobile work in this research meant work done outside of the office on monthly or weekly business trips. Mobile devices were defined as mobile phones, personal digital assistants and laptops. The informants were professional experts and managers, including one managing director. The subjects had either a polytechnic or a university degree from Bachelor's to PhD level.

In open-ended, themed interviews the respondents could describe their work and use of mobile devices. Interviews were conducted face-to-face, except for two cases conducted on the telephone. Interviews involved information about education and experience of the participants, themes about mobile work in general, created records and used mobile devices, organizational culture, problems in mobile work and interviewees' views about the future in this area. Altogether twenty-five interviews were collected in 2004-2005 and 2009-2010 (Table 1). All interviews were recorded and transcribed afterwards. Transcribed interview data were altogether 426 pages (twenty-eight hours) and interview durations varied from 52 minutes to 100 minutes.

Table 1: Years of data collection and the number of research participants and organizations.

Organization	2004	2005	2009	2010
Government agency	—	7	—	—
University of applied sciences	2	6	—	1
Information technology enterprise	—	—	9	—

In data collection, interviews require more effort than questionnaires but offer more profound information about the phenomenon studied. Face-to-face interaction with participants creates a sense of confidence and enables the researcher to observe unspoken emotions. Telephone interviews require the researcher to create a much more confidential atmosphere with the respondent even if the research topic was not sensitive. This is even more important if the researcher and the interviewee have not met.

The interview data were analysed by qualitative content analysis. Content analysis is the process of identifying, coding and categorising the primary patterns in the data (Patton 1990). The interviews were analysed by cross-case analysis, meaning that answers from different participants were grouped together on common questions (Patton 1990). At the beginning of the analysis, transcribed interviews were read through and tentatively commented on. After that the data were transmitted into a table of research participants and their answers to each question. The unit of analysis was defined as one expression from one person directed to one question. These units of analysis were attached to notes in relevant data passages. The next step was to identify patterns or themes from the data by cutting and pasting. After these were recognised from the data, they were classified inductively under tentative categories. Categories were formulated from empirical data by searching for similarities, differences, anomalies and uniqueness. These categories were coded and written into the notes. The preliminary coding resulted in diversified categories which were refined further until no new categories were identified.

Findings

Mobile-created records

Mobile workers carried out their work in varying and unpredictable locations. Processing of records was either done directly in the work situation, or as soon as possible after the work situation when all that had been agreed was easy to remember (meeting memos, inspection reports). It might have meant working while travelling, at home or in other places such as hotels and clients' premises. Documentation was important because it was often necessary to start agreed measures in the organization and to guarantee their continuity even if individual persons might leave the organization. Also colleagues who worked for the same project needed up-to-date documentation and therefore information sharing was necessary.

For example, if I go someplace and save the record on the laptop, I may download it into the database right away... I put the record where it is supposed to be; there it is available to colleagues. (Team Manager, information technology enterprise)

The records which are on my laptop are always in databases, too. I take care of that. I put the records there. (Project Manager, information technology enterprise)

Analysis of interview data revealed that records which were created on a mobile device were tightly related to the work situation where they were created. Most records created and edited while mobile referred to 1) *documentation of work situations*. These records were for example notes and memos concerning single work tasks. Another category was 2) records that were *formulated in cooperation* with other actors. Inspection reports, project plans, statements, instructions, project strategies, plans and system specifications were examples of records generated with co-workers and customers.

The third category of records created on mobile devices was connected to 3) routine work, like e-mail,

copy-typing and meeting agendas. The final category was 4) presentational material, including teaching materials and lectures. The third and fourth categories were produced mainly during waiting hours and spare time on business trips, when not much concentration was needed.

It is that kind of work which does not require much thinking, because I am such a person who wants to be in a quiet environment when doing something more important and requiring [more attention]. It suits best for me and I can arrange it that way. On the train it is not always so peaceful. In hotels access to telecommunication networks varies. (Teacher, university of applied sciences)

In many cases, the work tasks carried out by mobile workers were related to the main organizational functions. Records created on the mobile devices *in the field*, were categorised by how vital mobile workers regarded they were for the organization. For example, in customer premises, records created in customer meetings concerning an information technology project were vital for the sake of the business. Accordingly, in the government agency, the inspection reports and marketing authorisations were connected to the main business processes. Therefore, records created in inspections were vital, both for the sake of the organization executing the inspection and the object of the inspection, to document the statutory inspection procedure and its findings. At the university of applied sciences, the tasks were typically related to teaching, projects and development affairs. Non-substantial records, such as meeting agendas, working-hour reports and travel invoices, were generated in connection with main functions but respondents considered them more like supporting the daily work. Examples of vital and non-substantial records are presented in Table 2.

Table 2. Examples of vital records and non-substantial records in organizations.

Organization	Vital records	Non-substantial records
Government agency	inspection reports instructions marketing authorisations statements	e-mails lectures meeting memos memos travelogues articles
University of applied sciences	project applications project plans project reports strategies study guides	e-mails meeting agendas meeting memos notes operating directions teaching materials
Information technology enterprise	application modifications contracts installation documents project information project plans system specifications	e-mails meeting agendas notes travel invoices working hour reports

Vital records naturally varied from one organization to another. At the university of applied sciences, project records and strategies were considered vital, and in the government agency inspection reports and marketing authorisations were vital for the sake of organizational memory. In the information technology enterprise, fundamental records were connected to customer projects.

Most of the records were created individually with personal work-related needs in mind but some records were also created in cooperation with other actors, both inside and outside of the organization. Records

might have been compiled collaboratively in particular situations and work tasks. For example, in international inspection cases or in the client projects of the IT enterprise, material is often created, edited and shared in virtual meetings, chat and e-mail.

We have been able to facilitate the work by writing it [inspection report] there already on the spot while the process goes on. If there are two inspectors, we just write our own parts in turn. (Inspector, government agency)

Then I edit it and the client comments on it. Or we do so, what I nowadays do quite a lot, that I prepare it, send it to the client, and the client reads it. Then we'll have a teleconference and look at it by Internet, share the display and make the corrections straight away. (Project Manager, information technology enterprise)

The Short Message Service (text messages) was an essential service which was utilised by the research participants. Information transmitted by these messages was mostly acute approvals or confirmations. For example, teachers at the university of applied sciences sent their students confirmations concerning their studies. Project managers in the information technology enterprise asked for help from their colleagues. Text messages were not used for carrying out more important or complex tasks, their primary use was communication. Mobile workers realised that text messages were not an easy way of documenting more important issues.

I keep voice mail messages and SMSs to a minimum. They are more difficult to deal with because they will not become a document. (Teacher, university of applied sciences)

None of the research participants mentioned text messages as records; they were considered as a service offered by mobile devices and operators. As a matter of fact, some of the messages included information which should have been properly documented. For instance, at the university of applied sciences, text messages were, in some cases, used to deliver passwords to students. This way had been approved as a safer way to transmit this kind of information than by phone only.

In the government agency context, text messages were used to send requests to the office to e-mail material that was needed abroad. These were a more powerful message, directed straight to a colleague, than e-mail because e-mails tend to get lost in the pile of other messages.

For example [I send text messages] to the coordinator, if I know she has a mobile phone, I send a message like, "E-mail me the file, please". They get a lot of e-mail so I have to raise attention in this way like, "Now she cries for help from Brussels!". (Chief Physician, government agency)

The work outcome, whether it was vital or not, is achieved regardless of where the records have been created, only when they are considered a part of organizational memory and they have been saved to jointly decided storage places.

Mobile workers and personal information management

It [the mobile working environment] has not made it [information management] easier. It gives more options and information is more fragmented... Information management would be easy in the environment where all created material would be and it had to be in one place. (System Architect, IT enterprise)

Mobile work creates problems that can be categorised in three types (see Table 3). Many of them are technical by nature but one of the most important, from the records management point of view, is information management problems. In the mobile working environment information is spread over many devices. Managing several records and versions creates a risk of losing information. The respondents' answer to this was to store various copies in different locations such as desktop computers, laptops, e-mail archives and USB flash memory sticks. Many respondents said that they might need material which was

not always with them, so various storage locations were used.

Table 3. Mobile workers' problems.

Information management problems	Device dependent problems		Adjusting to mobile working environment
	Technical problems	Usability problems	
Document versioning and version management	No network connections, poor network	Weight of mobile devices	Technical environment makes insecure
Losing records	Poor capacity of mobile devices	Size of mobile devices	Forced to adapt even if not ready
Information scattering to many devices	Synchronisation or compatibility of multiple devices	Small display	No technical education
Information retrieval	Problems with old equipment	Difficult to read from display	Slow learning
Confidentiality of records	Making backups	Equipment getting old	Global work
Access to records	Transferring data from one device to another	Changing battery disturbs working	Networking of work Coping with technical problems No personal devices available

Document version control in multiple mobile devices caused problems. Typically, a mobile worker created a record on a business trip with their laptop and continues editing at home with a desktop computer. In the office the mobile worker might have had another desktop computer with which they completed the work. Every time when the record was being edited off-line it became a local version which had to be uploaded into the system. In between, there might have been numerous versions which had been saved into an external memory. Without strict version numbering the latest one was difficult to find.

The problem was more substantial if the record was created collectively. One solution for the version problem could be on-line connections to the document management system. The document which is being edited is always in the same place. The record might also have an owner who is responsible for that distinct record.

The ideal situation would be if we created the record directly to the database. But mobile usage limits that. We should constantly work on-line, but off-line use is reality... The ownership of the records stays the same and the person who wants to edit the record asks for it. The owner of the record collects the comments and updates. (System Architect, information technology enterprise)

Mobile workers also encountered situations in which they needed access to remote information. They tended to prepare themselves as much as possible to avoid the problem by saving a lot of material on their laptops in case they need it. Many respondents described incidents of important files which were in the office and the employee was for example abroad. In those cases, colleagues at home were contacted and asked to e-mail or fax the files. The lack of connections to organizational information systems, or even e-mail, made mobile workers' tasks even more troublesome.

And then we could, of course ask a colleague to look at the specific folder, where the needed record is. This is an emergency solution. (Senior Inspector, government agency)

One information management challenge was the confidentiality of records. Many confidential records were only on paper and carrying a large number of papers in a suitcase or spreading them in the airport was a data security problem. Most of the confidential papers were rather saved in digital format and encrypted.

Mobile devices dependent problems were related to the changing environments and circumstances in mobile work. *Technical* and *usability problems* were compounded by poor network connections, poor capacity of mobile devices, and synchronisation or compatibility of multiple devices. To solve these issues, mobile workers were usually thoroughly prepared with handouts, backups, own laptops, paper and pencils, USB flash memories, and connections to technology support. Technical matters usually could not be solved by innovative thinking like information management problems. Those issues were not necessarily dependent on the worker but they usually could be worked out by technology support.

Some research participants found *adjusting to the mobile working environment* difficult, meaning mobile devices and exceptional conditions. It is often assumed that mobile workers are familiar with mobile devices, are used to utilising them and they are technically skilled, or at least very interested in new technologies. But the empirical data analyses pointed out that this is not the case: most of the mobile workers were not especially technically competent. The respondents considered mobile devices as tools which enabled them to cope with, and speed up, their work tasks. Hence, for them, devices were not privileges and they were not necessarily interested in the technical features of mobile devices. Mobile devices simply helped them in their work and supported it. A minority of mobile workers seemed to be early adopters, who were interested in technical features and novelties of devices, and who had the newest models.

People always think that if you work in the ICT business you know everything about it, especially technical matters. I am far away from that. I know the specific area and it is enough. (Project Manager, information technology enterprise)

The most difficult problem for mobile workers was the lack of user guidance. Many of them were unsure of themselves with the mobile devices. Support was offered if it was asked for, but mobile workers needed to be active themselves if they wanted any guidance.

How did mobile workers act when they encountered a personal information management problem? Mobile workers have developed many survival strategies which could be categorised into three groups: *securing records*, *utilising technical solutions*, and *centralising* (Table 4). Mobile devices are both tools to produce and consume information. The strategies of mobile workers were not connected to production of information itself but to managing and using information.

Table 4. Mobile workers' survival strategies in PIM.

Securing records	Utilising technical solutions	Centralising
Copying material as much as possible in several places	Using e-mail	Creating a folder hierarchy on the hard drive
Using a note book	Naming files by versions	Saving everything needed in one place (laptop)
Printing	Using search engines	Continuous saving
Saving files to the server		

The solutions developed by mobile workers resulted from their own efforts. They perceived that the organization could not support them much in the problems of personal information management specific in mobile work. The mobile workers were to a large extent themselves responsible for their personal

information management.

Collective management of mobile produced records

For managing organizational memory, capturing records in joint storage locations is essential. However, individual employees have a great deal of responsibility for the information they create. Personal information management was related to respondents' work tasks and associated business processes.

Based on the interview data, the features that influence how information is managed are *collectivity* and *independence*. These features of information are connected to how mobile workers process and save their records which have been created in mobile devices. Collectivity refers to ensuring that records are shared with colleagues and saved properly. Independence suggests the need to keep records mostly by the creator.

When work tasks did not include much cooperation inside or outside of the organization, the records were most likely to be kept on the individual worker's computer. These records were not captured or archived and they were not necessarily shared with colleagues in the organization. They were created mostly by one expert, for example a teacher or member of computer support staff, who was usually the only specialist in their field in the organization. The work itself might have been mobile and varying but if it was connected to one person, who was responsible for a certain limited area, records tended to remain in their possession. In that case, records were probably not transmitted to anyone, nor to the archives.

Conversely, joint work increased sharing and transmitting of records to colleagues and counterparts. The importance of sharing and saving of records was also better understood in these situations. After the creation of the record, a mobile worker saved it either to the corporate hard drive or into the information system and the record was transmitted to stakeholders, customers, members of the team or other parties.

The government agency had a document management system in which records were saved, in order to track the process and deadlines. The mobile workers identified vital records and tended to save those in the system. In the IT enterprise, there existed documented policies for managing records. For example, project documentation in an information system project had to be up-to-date and all the needed information available. In particular those participants whose work demanded extreme mobility looked after their records more carefully.

My own records are quite well organized so that I have different versions of them. Those which are on my laptop are always in the databases, too. I take care of that and if there is something else, I download the latest versions in the database. (Project Manager, information technology enterprise)

However, at the university of applied sciences, there was nothing like this system. Instead, records were saved on the hard drive of laptops or they were archived to the worker's home directory in the network server.

The interviews indicated that office workers were dependent on mobile workers' *output*, while mobile workers needed office workers' *input*. Hence, joint storage locations and common records management policies are profitable tools for mobile workers to gain better information management in organizations. Clearly, there was a need for collaboration in records creation, transmission and retention, even if work was mobile and independent.

Discussion

The data for this paper were gathered over several years. Because mobile work is a new phenomenon, it is likely that the long data collection period increases variation in results. During the data collection, technology matured, new devices and services emerged in the market and mobility became a part of everyday life. The first interviews were carried out in the public sector and these organizations were not in

the front line of the technical revolution. The staff of the information technology enterprise were interviewed a few years later, when the advanced technology had emerged. The variation in data is an advantage in a descriptive study but, obviously, making direct comparisons between the case organizations cannot be justified.

A study by Mäkinen and Henttonen (2011) revealed that mobile workers are motivated to handle records obeying records management rules better if the records are significant to the organization. The present study supports the view that mobile workers are able to identify vital organizational records and therefore these records are captured in organizational information systems.

The use of records is tightly related to work assignments and functions in the organization. This is natural because records are results of business transactions (Borglund and Öberg 2008). Borglund and Öberg also revealed that records and their use are an integral part of the organization's main functions. Similarly, based upon the empirical data of the present study, records generated in mobile work are also related to the main functions of the organization. Records are by-products of the work tasks executing the main functions. In general, the independence and the collectivity of the individual employee affected how well the records were captured into the organizational memory.

In this study, the interest was in knowledge work and its mobile forms. In principle, records created in mobile devices were not different from those created in the office but the number of vital record types was surprisingly high. The analysis of vital records implies that most mobile work tasks were associated with the primary functions of the organization. Therefore, records created *on the move* were essential for the organization and if these records cannot be captured, the risk of losing important business information and organizational memory exists.

The analysis of empirical data revealed that mobile workers did have problems with their personal information management. These problems indicated that it may create problems with saving organizational memory. Multiple mobile devices and changing circumstances do not make personal information management any easier. Information management problems were common to every mobile worker in this study. In the information technology enterprise, the situation had been facilitated by creating on-line connections to office information in mobile devices. In the government agency and university of applied sciences, where the data were collected earlier, on-line connections to organizational information systems were mostly lacking. Mobile workers' solutions and survival strategies could assist product design of mobile devices and development of mobile work. Mobile workers' experiences offer valuable information in this field.

The features of problem solving in the mobile environment are related to information management: securing and centralising information is even more important than ever before. On the other hand, office-tied solutions and requirements of records management do not support mobile work. Cloud computing has emerged in the last few years and it seems that mobile workers would benefit from it, but it is not a way to capture and save information for public offices, or other enterprises, because of data security (Stuart and Bromage 2010; Serewicz 2010). Even if the World Wide Web is developing from sharing documents towards interactive content provision environments, it has not much significance in organizations.

Unpredictability and changing locations required that mobile workers developed survival strategies. Lack of organizational support for personal information management means that they have to be innovative to prepare themselves for future problems. To be ready for any kind of situation in advance they download digital records on their laptops and carry paper records as much as possible. In spite of all inconveniences, mobile workers benefit from mobile devices so much that they prefer to suffer some problems rather than to abandon the devices. Working in the mobile environment demands certain devices and know-how but many mobile workers are willing to familiarise themselves with the devices only enough to carry out their work tasks.

Although the data collection time range limits the possibility of direct comparisons, some interesting

observations can be made about differences in organizational information management culture. At the university of applied sciences, teaching materials were obviously associated with the main functions of the organization. However, the interviewees considered that their records were personal. In the enterprise and in the government agency, the culture of common information resources and shared organizational memory was more internalised. Common policies and information systems were widely in use and mobile workers understood their meaning.

Conclusion

The present study is descriptive in nature and it draws a user-centered perspective to the new research area of personal information management by mobile workers. Almost daily the mobile setting creates challenges which they have to deal with. Organizations do not offer solutions; mobile workers have to resolve these problems by themselves. The information management infrastructure is far behind the reality of mobile workers. There is a need to explore more systematically how to facilitate personal information management in mobile work. Developing information systems which support mobile work better would also improve records management in the mobile working environment. The research methodology in this field could be developed further by applying Engeström's model of activity theory, which may help in maintaining the relationship between the individual and social levels in the object to be studied ([Engeström 1987](#); [Engeström 1999](#); [Kuutti 1994](#)).

Analyses of mobile workers personal information management raises new research questions. It increases the need to examine more thoroughly the problems of mobile work and its relationship with the organization's records management. The relationships between mobile workers' personal information management and the organization's records management policies and tools need to be studied. Records and information management policies and practices should be improved so that they would support flexible and mobile work better. In this way, organizational memory would be captured more efficiently.

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About the author

Sari Mäkinen received her MA in history and is a PhD student in the School of Information Sciences, University of Tampere. Her research interests include mobile work and records management. She can be contacted at: sari.makinen@uta.fi.

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'Some records manager will take care of it' – Records management in the context of mobile work

Sari Mäkinen

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'Some records manager will take care of it' – Records management in the context of mobile work

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Sari Mäkinen

University of Tampere, Finland

Abstract

Mobile work challenges organizational records management. This paper reports the results of a study in three case organizations on how the organizations' records management meets and adapts to the increasing role of mobile work. Data was collected by interviewing mobile workers and record management professionals. Documentary materials were used to analyse official records management policies. The findings revealed that documented organizational policies do not take into account mobile work, and cannot effectively support personal or corporate records management in mobile work. Records management professionals were poorly informed of the extent of mobile work in the organization, and of the special problems related to managing records in mobile work. The overall conclusion is that organizations should pay more attention to the new requirements for records management caused by mobile work.

Keywords

mobile devices; mobile work; mobility; organizations; personal information management; records management

1. Introduction

The goal of records management is to govern the practices of records creation and use in organizations. It means setting policies, assigning responsibilities, establishing guidelines, providing services, designing systems for managing records and merging records management into business processes [1]. Records management is an integrated part of organizational functions and processes [2] and therefore its practitioners operate on several organizational levels to capture organizational memory.

Today, planning records management is increasingly associated with the development of organizational processes and it tries to adopt strategies to meet the challenge of new information technologies (IT). Mobile devices are an important branch of information technology and mobile knowledge work has become common in organizations [3, 4]. There has been a considerable growth in the use of wireless communication technologies to process, transmit and exchange data. These devices include laptop computers, personal digital assistants (PDAs) and other handheld devices for data transfer and communication [5, 6]. An interesting question is: have records management practitioners reacted to the growth of mobile work done outside the static office?

Mobile work can be carried out in different spaces. Vartiainen [7] and Lilischkis [8] have divided physical environments into several categories: home, the main workplace ('Office'), means of transportation and partners' premises ('Other workplaces'), and hotels, cafés, etc. ('Third workplaces'). The degree of mobility varies at both individual and organizational levels: one moves a lot and another stays in a fixed place. Another view on mobility is mobile business models, which aim at providing benefits of use of mobile and wireless technologies to the companies [9, 10].

The special questions of records management in mobile work are practically an unexplored research topic. We lack knowledge of how records management responds to the challenges of a mobile environment and the needs of mobile workers. Traditional record-keeping methods like centralized classification schemas, metadata schemas, records retention schedules, and implementation of electronic records and document management systems (ERDMSs) have served

Corresponding author:

Sari Mäkinen, School of Information Sciences, University of Tampere, 33014 Finland.

Email: sari.makinen@uta.fi

the objectives of records preservation and use in an office-bound paper world, ignoring work that is carried outside the office. An open question is how well conventional records management policies support work in the mobile setting.

The purpose of the study was to explore how the emergence of mobile work has affected corporate records management. It can be assumed that capturing and saving organizational memory is challenged by ubiquitous technologies and mobile work practices based on them. Records management operates in the field of different mandates [11] and its practices merge in the organization in distinct ways: records management may be differentiated to its own unit or it is run along with the core business by employees themselves. Moreover, records are managed at both organizational and individual levels.

This paper focuses on three questions:

1. How do organizations' documented policies for records management take into account mobile work?
2. How do mobile workers experience organizational records management in their work?
3. How do records management professionals see the relationships of mobile work and records management?

to answer the questions we collected data from three case organizations by interviewing mobile workers and records management practitioners, and analysing organizations' documents on records management.

The article is structured in the following way. First, we discuss the recent research focus in the field of electronic records management and earlier contributions of records management and mobile work. Then the questions of mobile work, organizational records management policies and records management practitioners are presented. Finally, we conclude with the discussion of how organizations manage to support mobile workers.

2. Earlier research

Mobile technology has been examined in only a few records management studies and these findings do not form a general view of the relationship between mobile technology and records management. As Weilenmann [5] has stated, office work is seen as the norm. At the office, the worker has access to fax, telephone, desktop computer with calendars, contact information, etc., and in addition, workers are considered as having a static base: their desk, their office or a centre of coordination of some sort. However, mobile spaces present a number of challenges compared with the traditional office. Many of them are related to limited device capabilities, in particular, changing contexts, such as the need to adapt to new environments or unexpected tasks and demands, and limited access to office data network. Carrying multiple devices is likely to impact on the types of information management problems that arise. Moreover, disconnectedness from the organization means that information sources like colleagues, papers, ERDMSs and other information systems are not available while working mobile. In addition, the 'office of the future', providing an environment for new ways of working, has gained research attention. However, it has concentrated on the physical rearrangement of offices [7, 12, 13].

This article is one part of a set of research articles dealing records management in mobile settings. The earlier study by Mäkinen and Henttonen [14] pointed out that in organizations there is a natural need for records management in order to share information and organize work. In the mobile setting, the motivation for records management arises from the employees themselves; individuals' motivations are connected to their work tasks and organizational culture. Mobile work increases the storage places of organizational information since the users create and use their records across multiple devices and locations.

Traditionally, the capture of organizational memory has been tied to office-bound information technology. Bailey [15] suggests that, along with the increasing production of records, different kinds of ERDMSs were developed to collect the corporate memory. Workers were encouraged to save their files in centralized systems because this would help to implement records management policies. Typically ERDMSs have been run in traditional models by servers that were considered as a single, functional unit [16]. However, at the same time, the work has been changing and a large proportion of work is meant to be accomplished outside the office, creating a need for ubiquitous access to information. Business trips mean spending time somewhere else than at the office desk and coping without necessary network connections and systems.

The research focus of electronic records management has mainly been on the traditional office-bound work context [17], the nature of electronic records [18] and the implementation and use of ERDMSs [19–22]. Wilkins et al. [23] reported on ERDMS implementation in Australian local government authority and stated that the creators and users need to work in partnership to ensure the usability of records, for example in remote access. Also Johnston and Bowen [24] studied the city council, which has been able to allow remote access to records by staff who are not in the office. These are a few examples of implementation projects where remote use has been included. Bailey [15] mentions the problems that records management faces owing to its command and control nature and manual process thinking, where decisions

made by records management practitioners are expected to be adopted by users without question. Research on the implications of records management in unconventional office work is needed.

In addition to remote access to records, mobile workers encounter several challenges in their personal information management (PIM). It is intended to support the activities we perform in our daily lives through the acquisition, organization, maintenance, retrieval and sharing of information [25–27]. It is often considered a private activity but from the records management viewpoint personal information is seldom private. At some points in our lifecycle, much personal information is shared or should be available within the work community [28]. Records management and personal information management seem to be interrelated concepts offering an interesting perspective to study the special questions of records management in the mobile work context.

Our earlier study also addressed the fact that mobile workers do have problems with their personal information management, but that the methods and tools of records management do not support mobile work [29]. Mobile users are constantly trying to manage the scattered pieces of their information, but organizations do not offer solutions; mobile workers have to resolve these problems by themselves and the information management infrastructure lags far behind the reality of mobile workers. Perotti et al. [4] made similar observations: mobile workers faced difficulties integrating information across multiple devices as well as across various applications. Different versions of the same information can be found in different locations, including paper-based file cabinets, as well as in different applications and media.

Organizations are constantly dealing with ongoing technological change, increased security-related threats, ever-increasing infrastructure-related costs, and the need for improved records management processes [30]. Recently, the emergence of cloud computing has increased the number of channels through which mobile workers can access remote information resources. The most highlighted advantages of the cloud have been potential cost savings [16], but it is also an opportunity to implement shared storage environments outside the office. Nevertheless, the implementation of this new technology as corporate information base has not been extensive since data security is always an important consideration when evaluating the benefits and risks of the cloud [31]. Overseas hosted data is subject to the laws of the host nation, which may make the use of the cloud more complicated [16]. Additionally, often practices lag behind new technology advances made, and common policies need to be settled to ensure proper use [32].

3. Research goals and questions

The goal of the study described in this paper was to portray the challenges of mobile work in the development of organizations' records management. The question is explored from three viewpoints: (1) organizations' documented records management policies; (2) mobile workers' experiences; and (3) records management professionals' views on mobile work.

The research questions are as follows:

1. How does mobile work appear in documented records management policies?
2. How do mobile workers experience organizational records management and its support for their work practices?
3. How do records management practitioners recognize the special needs of mobile work in the development of records management?

The answers to these questions help to reveal potential gaps and tensions between the goal of records management and the reality of mobile work.

4. Research methodology

A qualitative, case-study approach was used to investigate mobile issues and records management. Studying several cases provides valuable and reliable information and therefore data collection for case studies often relies on many sources of evidence [33]. Documentary information is likely to be relevant to every case study topic, including administrative and other internal documents, but one of the most important sources of case study information is interviews. Most case studies are about human affairs and interviews can provide important insights into a phenomenon [34].

The data consisted of interviews and organizational documentary material that were collected in three Finnish organizations during 2004–2005 and 2009–2010. It was not intentional, but owing to factors external to the research, data collection took place in two parts. The study is not longitudinal and therefore the time interval in the data is not exploited in the analysis. The aim of data acquisition was to gain variation by choosing functionally divergent organizations to the study and temporal diversification supported this goal. Variation in this sense means the differences between organizations in

mobile work frequency, sophistication in information technology and time the organization has spent in customizing their records management practices with mobile work setting.

Although the data collection for this paper was phased in two parts with several years between the periods, the aim was not to conduct a longitudinal study. The differences between the organizations and the time delay between collected datasets are expected to increase the variation in the data collected and the validity of the results. The data from public institutions were collected in the first phase and data gathering in the information technology firm was done a few years later. Data collection in two parts is not supposed to cause distortion in analysis since during both data collection periods the use of mobile technology was routine. In the context of the information technology company, mobile work was performed with more developed technological circumstances and equipped devices and, in addition, employees were more experienced to utilize technology. In the information technology company mobile information technology was considerably more advanced and the use was more extensive than in public institutions whose core business was totally different. Therefore, the two public organizations were more likely to be comparable with each other.

In this paper, researched organizations are referred by the term 'case organizations'. The first case organization, an information technology enterprise, was a provider of software applications. Their business was to implement various types of systems for improving document management and operative processes. The second case organization, a government agency, monitored compliance in pharmacy and health care, where processes and records management are strictly regulated by legislation. The third case organization, a University of Applied Sciences, was a multidisciplinary institution in higher education. In addition to education, it conducted research and development projects.

The three organizations were chosen to scrutinize research questions under varying organizational conditions and to maximize the differences in the phenomenon of interest. The information technology enterprise represents business life and an assumed position in the frontline of information technology development and deployment. The other two organizations, the University of Applied Sciences and the government agency, operate in the public sector, which is governed by legislation. Moreover, the core tasks of these public institutions are different from each other.

The main information sources of this case study were mobile workers. Altogether 23 participants used mobile devices frequently and their work was not tied to a conventional office context. These informants were so-called 'white collar workers', meaning, for example, experts, teachers, information technology support staff, project managers and inspectors. For these informants, mobile work meant at least monthly or weekly business trips and the use of mobile devices. A few of them were extremely mobile and spent only a couple days of the month in their static offices.

In addition, two records management professionals were interviewed at the University of Applied Sciences and in the government agency to collect information data on corporate record management practices. The third case organization, the information technology enterprise, did not have a full-time records manager. Each member of this firm was responsible for managing and archiving their own records. Therefore, the interview data on records management professionals' views do not cover the information technology company.

The theme interviews in this study were open-ended and the number of interviews varied between seven and nine per organization. The interviews covered several areas of mobile work including mobility in general, mobile devices used, records created on mobile devices, advantages of devices, problems faced and organizational culture. All the interviews were recorded and transcribed by the author. The total duration of the interviews was over 27 hours, and the average length of a single interview was 1 hour 10 minutes. Durations varied from 52 minutes to 1 hour 40 minutes. During the interviews in the second organization it turned out that the empirical data was saturated.

In addition to interviews, organizational documents were analysed to gain an insight into organizational records management policies and instructions. Record-keeping instructions including records management schedules, functional classification systems and corporate instructions were available both at the University of Applied Sciences and in the government agency. Both organizations' strategy papers presented the future objectives and goals on a general level and were one subset of the documentary material. Records management guidelines implement certain policies and specify how the personnel are expected to take care of records. Strategies, data security policies and annual reports completed the documentary view. In the information technology enterprise, all instructions were included in a quality management handbook. In addition, business plan documents were used to extend the analysis. In summary, the documentary data included altogether 441 pages. The summary of the research questions and the subsets of data are presented in Table 1.

The qualitative data were analysed using cross-case analysis, which involves collecting data from several cases. The traditional type of qualitative analysis is the single-case study. In a cross-case study data is gathered to learn as much about the contextual variables as possible. In addition, studying several cases the potential for generalizing beyond the particular case increases. Comparing cases the researcher can establish the range of generality of a finding [35]. Cross-case analysis focuses on sets of individuals within several settings and the actors are investigated in multiple settings. The answers from different people to common questions are grouped together to analyse different perspectives [36, 37].

Table 1. Summary of interview and documentary data used to answer the research questions

	Research questions and datasets		
Organization	1. How does mobile work appear in documented RM policies?	2. How do mobile workers experience organizational RM and its support for their work practices?	3. How do RM practitioners recognize the special needs of mobile work in the development of RM?
IT enterprise	Business strategy Quality management handbook Total 53 pages	Account manager (2 persons interviewed) CEO (1) System architect (1) Project manager (5) Total 9 interviews	
Government agency	Annual report Data security policy Functional classification system Organizational strategies Process flowcharts RM instructions for users RM schedule Total 203 pages	Head of section (1) Inspector (2) Physician (3) Total 6 interviews	RM specialist (1)
University of Applied Sciences	Functional classification system IT services report Organizational strategy Report of IT services RM instructions for users RM schedule Total 185 pages Documentary data total 441 pages	Secretary for international affairs (1) Teacher (4) IT supporting staff (3) Total 8 interviews	RM specialist (1)
Total		23 interviews	2 interviews

RM, Records management.

The data analysis started with grouping the data into a table along with research questions. One unit of analysis could include several sentences or short paragraphs. Each unit of information was coded according to identifying factors (person interviewed and organization, which text material and which organization). The data were read through several times underlining key words and phrases from the interview responses and text material in order to suggest possible dimensions in responses. Then the data were sorted by comparing the information with the next unit of analysis [35, 38].

The next phase was to identify patterns or themes from the tabulated data by cutting and pasting passages. Each unit of information was coded according to category representing emerging themes. Developing categories involves looking for recurring regularities in the data and simplifying the complexity of reality [31, 33]. Categories were formulated from empirical data by searching for similarities, differences, anomalies and uniqueness. These categories were coded and written into the notes. The data were read through in order to refine the categories until no new categories were identified.

5. Findings

5.1. Mobile work in documented records management policies

Documentary sources of the organization were used to analyse records management policies in all three cases. In the information technology company, these included quality management instructions and business plans. Records management schedules, information technology plans and strategies and records management instructions were used to analyse the policy of the government agency and the University of Applied Sciences.

The analysis of the information technology company documentation suggested that information was valuable and understood as a part of the business processes. The corporate quality management handbook contained practical advice encouraging the capture of records into the ERDMS. The system included and was used more like a set of several databases for managing project documents. For example, metadata was not attached to the records and they were not protected in an archiving sense. However, mobile work itself or records created mobile were not mentioned as such, even though mobile work in sales and system development was routine.

In two public organizations, the records management regulations were not integrated part of organizational directions; they were separate from other instructions. Partly for this reason users' common records management practices like capturing records into the ERDMS, filling metadata fields and classification or considering archiving purposes were lacking. Most of the records management instructions for users gave generic instructions and did not include hands-on and usable advice for the end-user. Mobile work itself or records created 'on the move' were not mentioned in any of these public organizations' documentary data. In addition, the concept of 'record' or the difference between 'official record' and 'unofficial record' was not explained in any of the documentary material. At the University of Applied Sciences, the registry guidelines included advices for capturing records but orders did not specify which records were supposed to be registered and which were not.

In the information technology enterprise, the focus was on information that was crucial for the business activities. Customer relationships were a priority and documenting customer contacts and meetings was part of it. Documentation of work tasks had a significant role in quality management and control. These issues were emphasized in the company's quality management handbook, especially in the instructions concerning software development documentation. Documenting was essential also when the staff worked and generated records and made decisions away from the office desk. It was recommended to create records directly to the databases or to replicate them in the office if online connections were not available. The project manager was responsible for how and where records were saved, and he/she ensured that people on the project followed the instructions. Notably, the documentation policies in the information technology company were born in and based on the business activity. Instructions for managing records were an integral part of quality management, although the term 'records management' was not used in the directions. An interesting detail in the instructions was that they covered the information management of ongoing projects but not the life-cycle management of the records.

At the University of Applied Sciences, information management practices appeared to be more individual and uncontrolled according to the interviews and the document analysis. Work was mobile and independent and there was mobile equipment available, but on the other hand, organization's records management regulations did not provide tools for managing records on mobile devices. The archiving instructions gave a lot of responsibility and discretionary power to the users. These directions stipulated that individuals were supposed to organize and dispose of records themselves, obeying retention schedules. For example, using ERDMS was voluntary both in the government agency and at the University of Applied Sciences. Only some informants were using a this system, and the reason for this was that mobile facilities and on-line connections outside of the office were not available.

Working groups can decide fairly independently how they store their records, for instance, if the material is in SharePoint only. The group has the freedom to decide itself how it acts with their records. (Records Management Specialist, University of Applied Sciences)

In both public institutions, records management instructions emphasized the responsibility of the individual staff members to manage records properly. This had led to a situation where mobile workers had to solve their practical problems themselves. As mentioned earlier, neither records management instructions in general nor data security policies stated how non-substantial information, like emails or chat messages, should be preserved. Additionally, the instructions lacked information on how to capture records generated offline. Organizational information technology architecture did not support records management in mobile work.

In all three cases there were organizational records management directives but the directives did not pay any attention to the special characteristics of mobile work. Moreover, the mobile users were responsible for management and disposal of their own documents. In the public sector, official regulation did not allow digital processes, which would have been essential in mobile work. This generally prevented developing and having digital processes in the organization, not only in mobile work. Thus, there was a gap between generic instructions and the practice of mobile setting.

5.2. Mobile workers' perspectives on the organization's records management

Work practices in the government agency and at the University of Applied Sciences were different from those in the information technology company. Although many workers in the public institutions were mobile, mobile work and its technical equipment were not integrally assimilated into organizational work practices. However, the informants in the IT firm reported that mobility was a natural part of their work and management agreed with this view. Many of the respondents stated that they could not cope without mobile devices and could not imagine their work without mobility.

In the information technology company several informants reported that up-to-date documentation was the only way to follow what assignments had been completed in the ongoing project. The number of informal documents was in some cases considerable. This included, for example, messages and memos on what had been done before and what had been left undone and why. Much information was transmitted in emails, virtual meetings and chat, which were not considered records. These documents were not saved collectively in the ERDMS, even though the staff was committed to using the system regularly. They were familiar with the system because it was one of the company's products.

In the government agency, the use of mobile technology did not seem to be a part of the organizational work practices. Mobile work was not mentioned in the information technology strategy, but a memo about the information technology services explained how employees could loan laptops. In practice, the need for mobile devices was significant but organizational support for mobile work was inadequate. The respondents generally shared the opinion that there was a lack of equipment (laptops, mobile phones, wireless Internet connections), which made mobile work complicated. Many of them also mentioned that their employers could not understand the need for equipment in mobile work.

In spite of information technology strategy, the government agency did not offer mobile users sufficient information technology infrastructure and devices. In addition, an ERDMS had been implemented, but it was not integrated with work practices and the staff were allowed to ignore it and stay with the paper-based processes. Some of the respondents criticized the usability of the system and stated that loading documents into the system was inconvenient and insecure. Only a minority of the staff saved their materials in the ERDMS because it was seen as new and complex to use. It was also thought that paper records were more useful.

It [saving a document in ERDMS] is voluntary and there are no rules about it. [Different] practices have originated over time. Some stick to the habit of putting all the records into the system. Others instead, do not touch the system at all. (Records Management Specialist, government agency)

Moreover, records management policies varied according to their context. In the government agency, individuals' personal information management was influenced by the normative obligations of the organization since the main processes in this organization were strictly governed by the national legislation. Many respondents thought that edicts of European Union prevented them from processing and archiving records digitally. The interviewees preferred electronic records processing and archiving but international regulations demanded paper. Partly for this reason, the majority of mobile workers printed out their records and archived them in their own offices.

Then it [the record] is processed on paper as it always has been done. I always print out the records and put them into a binder where the other records of the case are. (Chief Physician, government agency)

The government agency staff did not know who would be organizing and archiving their records and why. During the interviews it became apparent that records management was felt to be an unknown and distant organizational function. In the interviews it emerged that many of the respondents did not know what was going to happen to their records and who would take care of them. Employees were aware of records management instructions even though they did not know them thoroughly. Only a couple of respondents identified retention schedules and mentioned the retention periods of their records.

Then the record is sent to the file room, and there some professional will take care of it and see that it finds its place [in the files].
(Head of Section, government agency)

At the University of Applied Sciences, the respondents were not aware of any records management instructions even though records management practitioner had completed the records management schedule. The instructions were available for users but were general in nature and did not offer concrete guidance. Records management instructions stipulated that individuals were supposed to organize and dispose records themselves obeying retention schedules, but none of the informants mentioned the schedule in the interviews. For example, an interviewee had saved several copies of her records in different storage spaces, including a laptop. When asked if there were enough instructions for information management, the informant felt that there were none. Thus, the users were unaware of the existing directions.

Records are [electronically] filed in a directory somewhere, but of course there are also records which need to be filed on paper, for instance copies of applications and similar. (Manager of International Affairs, University of Applied Sciences)

In the information technology enterprise instead, mobile workers had familiarized themselves with the quality management instructions and knew what to do with their records even though they were not aware of how records were actually filed.

I have to say that I do not even know [about filing], and what happens to the records and in what phase, for example, if they are transferred into an archive. (Account Manager, IT enterprise)

The interviews reflected mobile users' attitudes towards records management. The majority of respondents in all organizations were unfamiliar with its methods and tools, and many of the respondents had decided to do the appraisal themselves. They did not follow any retention schedules and took the disposal decisions by themselves. One of the interviewees used the term 'disposable information' to illustrate the kind of information which had no use value after a short period of time or after the transaction in question had been completed.

There is no need to transfer everything [from the laptop to the home directory in the server]. Part of it is 'disposable information' which is not necessarily permanent or useful for later purposes. (Computer Specialist, University of Applied Sciences)

Some interviewees thought that in maintaining organizational memory, individuals must count on each other to manage the documents properly. This was especially stressed in the information technology company when a group of employees worked in the same project.

How do I know for example if the records of a customer project are really available there [in the database] or are they somewhere on the project manager's laptop? (Account Manager, IT enterprise)

At the University of Applied Sciences, the respondents did not see information management as a common issue. Many of these interviewees thought that the information was their own and they sent files to colleagues via email. The participants at the university also supposed that 'archiving' was one's own responsibility. For them it meant taking backups of the personal files.

I save it in the computer memory and if it is a laptop also on a CD disc. Then I might email it to the people whom it concerns.
(Manager of International Affairs, University of Applied Sciences)

The interviewees stressed the access to information sources. For an individual mobile worker, the main issue was to keep the records available and usable for oneself. Those respondents whose work was independent preferred keeping the records mainly themselves and did not download them into the shared system. Notably, at the University of Applied Sciences none of the interviewees mentioned that records should be more often shared in their own organization. In

addition, no one mentioned that records might be significant for the university as a public organization. They tended to think that the office computers or laptops were safe places to store materials. These respondents did not see information management as an organizational issue.

The differences between the case organizations may indicate the differences in their main business processes and organizational cultures. In the information technology enterprise, business activities and customer relationship management required information retention and sharing. New customers and projects may later make information reuse necessary. Therefore the mobile workers in the information technology enterprise were committed to saving their records in the ERDMS. On the contrary, in the public sector, obeying the law was the primary concern in the management of information.

An interesting contradiction was that, in the case of the information technology company, the instructions were made by people in the core business management and motivated by its needs. Although the instructions did not specify the records management procedures in mobile work, the staff were committed and able to apply them in their work practices. In contrast, mobile workers in public organizations had not adopted records management instructions in their work practices despite the more ample records management resources and instructions.

5.3. Records management practitioners and the requirements of mobile work

In addition to mobile users, two records management professionals were interviewed to complete our view on the relationship between mobile work and record-keeping. During the analysis, it became apparent that records management staff were poorly informed about the everyday mobile work and its problems. Additionally, records management practitioners were not aware of the extent of the mobile devices and records generated in mobile devices and how they were managed. The prevailing view was that most of the work was done in the office with standard desktop tools, and records management tools and policies supported this stance. Records management was still tied to the idea that work is done in the standardized office environment. There was a gap between mobile workers' everyday work practices and records management professionals' knowledge of them.

When you initiated the research, it was a surprise to me that we had here such a number of different kinds of mobile devices. It really surprised me. No one had any conversations with me about this, or provided any information or asked anything related to records management and mobile work. (Records Management Specialist, government agency)

While discussing the problems which mobile work may cause to records management, records management professionals did not refer to issues of information management. Mobile work was regarded as a kind of a separate matter that did not immediately concern records management. The practitioners regarded mobility more as a technological matter of coping with several devices rather than as an information management issue. In general, data security, especially in case of USB flash memories and printed records carried everywhere, were seen as a risk.

I would rather see USB flash memories as a problem because of data security. [...] They are a kind of security risk as they could be left anywhere. (Records Management Specialist, University of Applied Sciences)

Records management professionals were also concerned about the handling of confidential material in digital format and had taken actions to improve the situation. This indicated that the professionals were aware of their wider role as organizational information management officers, not only records management.

My colleague has been talking about it and questioned if it is safe to send records. This is especially related to email and in that way to other devices. Emailing records is not safe for the sake of confidentiality and data security. (Records Management Specialist, government agency)

As mentioned earlier, the mobile workers regarded the records management function as distant and impersonal and not affecting their everyday life. It was thought that records management's main duty was to take care of the files and not to help users in their personal information problems. The records management professionals themselves had noticed the same view, and they also thought that this attitude influenced their work in an organization.

Many people shut their ears when filing is mentioned, implying that it is not their business. (Records Management Specialist, University of Applied Sciences)

As noted in Section 5.1, mobile work was not an explicitly specified issue in organizational records management policies. Clearly, there was a great deal of confusion surrounding records management in all three case organizations. Many mobile workers had practically no information about records management policies and how it would affect their work practices. In this context, the mobile workers that were interviewed managed records the way that suited them best. Similarly, records management professionals were not familiar with the practices of mobile work, even though they had thought over the issues relating to it.

6. Discussion

This paper completes our research on how the case organizations' records management meets and adapts to a new technology-induced challenge: the increasing role of mobile work. Earlier we compared records management ISO standard 15489-1 and mobile workers' motivations to records management [14]. Our findings also raised the question of mobile workers' personal information management. Mobile workers struggled with the integration problems of information, and with other challenges that mobility brings into their work [29]. This paper focused on the organizational records management policy and compared it with the mobile knowledge workers' thoughts on records management practice in the organization. Further, we analysed records management practitioners' conceptions of the mobile work environment.

The findings illustrate that the relationship between mobile workers and records management is a complex issue. Documented organizational policies did not explicitly take into account mobile work, and could not effectively support personal or corporate records management in mobile work. Our study revealed several unsolved problems in the organizations' records management policies and practices in coping with the challenge of expanding mobile work. The present study supported the earlier findings that personal information management issues, identifying vital information for the organization and coping with the scattering of information between devices, are everyday challenges in mobile work [29]. In the case organizations the instructions for records management ignored mobile work and did not include specific guidelines for it. This is interesting since a systematic records management policy is required to ensure that the appropriate records will be available. This includes developing and maintaining policies, procedures and methodologies, appointing experts and creating and managing specialized departments [39]. Our findings indicate that records management regulations, especially in the two public organizations, tended to be too generic to be applicable in mobile work.

In the two public organizations, which had a permanent records management unit and expertise in this field, informants were poorly aware of the directives. At the University of Applied Sciences, the mobile workers' commitment to records management appeared to be weak, which apparently affects negatively the creation of organizational memory. The informants saw records more as personal files than organizational documents. Records management function was more concentrated on the limited administrative processes than the core functions of the education organization, like teaching and research. In the government agency, the mobile workers kept the papers to themselves and were unaware of the organization's filing procedures. Owing to the nature of the organizations' core business, they were obliged to save their material since work processes were strictly regulated by legislation.

In general, for any public authority organizations it would be a problem if an individual worker was not committed to or aware of shared records management rules. Presumably, a records management unit may find it difficult to change the existing distinction between administrative records and personal documents.

Records management practices may be built up without the control of an official records management unit. If the practices are built on the needs of the organization's core business and by informed people in charge of the core business, workers may be more committed to them than to the instructions given by a special unit. The information technology company was an example of this kind of shared and integrated records management practices. This firm did not have a records management policy but seemed to have the most advanced information management practices for mobile work. In this organization, mobile work was very common, mobile technology was part of everyday work tasks and the rules of records management and work practices were based on the requirements of business activity. Information management practices were quite advanced, even though not always thoroughly defined. Without a records management practitioner or unit and without explicit instructions with this title, they had managed to develop a common documentation routine which was based on the core business. Even though corporate regulation did not emphasize specific mobile work issues, the staff seemed to be engaged to capture organizational memory. Even though mobility was not mentioned as such in organizational policies, it seemed to be integrated to work processes to the extent that mobile workers could apply the instructions to work practices.

Further, a twofold unfamiliarity between actor groups was observed. Mobile workers were not aware of the organization's records management policies and functions, and more crucially, records management professionals were unfamiliar with mobile work practices and its challenges for records management. Foscarini [40] states that actual work practices are often different from the ways in which laws, regulations, internal manuals and individuals themselves

articulate how work gets done. In our study, it appeared that the views of individual actors – records management professionals and mobile workers – were far apart. Different professionals do not know each others' practices well, which hardly promotes the implementation of instructions.

For a mobile worker, the factors motivating records management are closely connected to the need to organize their own work. From their viewpoint records management should not only aim at organizing corporate information resources, but also support their personal information management and work [14]. This study showed that there is a gap between mobile workers' everyday work practices and the organizational records management function. Organizational records management policies and functions have been developed for office-bound work and mobile work has thoroughly challenged this standpoint. When the use of an information system is dependent on the users' willingness, the organization will have problems in maintaining its organizational memory. Many mobile workers mentioned that they had developed their own solutions to managing information. Understandably, the expectations of cloud computing and new mobile technologies seem tempting to mobile users.

A limitation of this paper is that it was based only on three case organizations and that the number of informants per organization was small. However, the case organizations operated in different fields of business, which adds variation in the data.

7. Conclusion

This study is a contribution to the exploration of record keeping in non-traditional settings. The purpose of this paper was to gain an understanding of how the challenge of mobile technology is met in records management. The phenomenon was approached by studying three organizations from three perspectives. Different perspectives yielded a rich dataset to depict how records management is perceived by different actors in the organization in the context of mobile work.

The fact that mobile workers regarded records management as a distant function and that many participants lacked knowledge of records management raises the question: should its influence be examined more thoroughly and the profession made more visible and user-centred, especially when cloud computing and free, user-friendly software applications are becoming more and more common? The needs and views of records management professionals and users are in conflict. The practitioners need to make their instructions known to the organization and, further, they need to examine records management practices developed by users in core business processes.

The mobile world has comprehensively changed during the last decade. At the time of data collection cloud computing was not yet under wider discussion and therefore it was not an option in the current case organizations. It can be assumed that it brings limitations to this paper. This research was carried out just on the verge of new mobile technology, before the full emergence of tablets and touch screen smart phones, which are able to process records in a totally new way. This may raise the question of whether these findings already outdated?

Today, tablets include a variety of features that were provided earlier by separate devices. Qwerty keyboard, WLAN and a touch screen make the device a record producer for a mobile officer. These handheld smart devices have been widely adopted and therefore they will impact the way records are generated and managed: independent from physical plugging, information resources are available 'on the road'. Additionally, mobile users will not be committed to the corporate storage bases since the cloud will resolve many of their earlier information management problems.

This study examined how mobile workers see the position of records management in supporting mobile work. Only a few efforts [41–44] have earlier been made to discuss the impact of new tools on records management practices, but those have concentrated on securing records in the cloud or attempts to archive social media. This indicates that records management as a profession has not paid attention to these new ways of conducting work and the challenges they bring to work practices. Therefore, there is no evidence that this phenomenon is thus far being taken into consideration in records management or that the stances of records managers have changed over the years.

Records management as a profession should pay more attention to unconventional ways of conducting work and identify the problems that users face in their personal information management. Additionally, records management professionals should bear responsibility for providing tools for atypical ways of doing work. In this sense, the impact of records management as an organizational function and how individual actors adopt records management requirements should be further studied.

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