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WHAT ARE THE CHARACTERISTICS OF RECORDS?

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Abstract

Project documentation, minutes of meetings, emergency plans, and inspection reports are all examples of records, recorded information. There is a changeover from paper-based records to electronic records in many organizations and these organizations often implement information systems managing electronic records that only take archival requirements into consideration to some extent, if at all. This is a problem that makes. preservation of electronic records difficult. The aim of this paper is to describe the characteristics of records, based on a study of empirical data and archival theory. It is essential to identify and understand the characteristics of a record in order to manage and preserve records in computerised systems. Knowledge of what characteristics a record has is one way to make it possible to formalize records. Formalization at different levels is needed for computerized management of records. This paper is based on a qualitative case study performed at four different organizations in Sweden. Empirical data was collected from multiple sources within each organization and resulted in five groups of characteristics with several sublevels. The empirical data were compared with recordkeeping and archival theory. Based on this study the essential characteristics of records were identified as context, form, organization, structure and version/copy.

Keywords: Archival theory, Electronic records, Formalization, Information systems, Record characteristics.

1. Introduction

Many organizations are changing from paper-based records to electronic records. This is a natural process, when more and more information and documents are created by the usage of computer-based information systems (henceforth only the term 'information system' will be used). The problem is that many organizations implement information systems for managing electronic records, which take recordkeeping requirements into consideration only to some extent. A record is more than just information, it is supposed to be trustworthy: reliable and authentic, able to

[1] Both authors are first authors with equal responsibility the paper was produced in full cooperation.

serve as evidence, and to support accountability. The length of time for which the records need to be preserved could vary from months up to hundreds of years [Duranti, 2001a; Thomassen, 2001]. For example, the Swedish police have implemented an information system that does not correspond to recordkeeping requirements. They have a police management information system from which all records should be preserved forever, in accordance with regulations from the Swedish National Archives. However, after 13 months all records are written to a flat ASCII-file (which is a format that has qualities which are suitable for the technical aspect of preservation), which makes it impossible to reuse the records e.g. to interpret and understand the records. Another example is from a public Swedish Organization (named organization 1 in this paper) which has implemented a digital archive system. In the digital archive system there are no connections between some of the records and the transactions, which is a key principle for the requirement of a record serving as evidence of an organization's actions. One example is when the organization 1 receives an application that is incorrectly filled in, a letter of need for change is written and sent back to the person who made the application. These letters are auto generated based on error codes. The system logs that a letter has been sent out, related to error codes. If error codes change, which happens occasionally, it may not be possible to recreate those transactions. Iacovino [2004] describes an Australian national electronic health record system, a system not following the recordkeeping requirements such as reliability and authenticity. The electronic health records system cannot create trustworthy records and lacks critical and necessary recordkeeping functions. For example the system does not manage to capture and preserve process records related to a more objectified record, yet Grimson [2001, p. 121] lists six different research issues given less attention, but which need to be solved in order to deliver electronic healthcare records of the 21st century, including "techniques for characterizing data quality and provenance, preservation of access to the record over time" are all research issues related to recordkeeping requirements. Holgersson [2001] reports that some of the information systems managing electronic records in the Swedish police, filter information which negatively influences possibilities to trust records and make correct decisions. Bearman [1994], makes a clear distinction between a recordkeeping system and an information system. The difference is that a recordkeeping system captures, manages, and provides access to records through time and meets records requirements. In this paper computer-based information systems are of interest, not because they are different from recordkeeping systems, but because record requirements must be fulfilled even in them. Records are created electronically in information systems, and it is important that the requirements are captured even at creation to be able to maintain them through preservation.

In design and development of information systems for management of electronic records, we propose a proactive approach. Within a proactive approach requirements and needs for trustworthy management of electronic records must be designed and implemented when the system is developed, a proposal implicitly supported by both the standard ISO 15489 [International Standards Organization, 2001a, 2001b] and by the European Commissions Model Requirements for the Management of Electronic Records, MoReq [European Commission, 2002]. ISO 15489 recommends a careful analysis, and identification process of both requirements and strategies for electronic record management before the actual information system is developed. Even as early as 1992 Charles Dollar discusses why archivists should have knowledge of how object oriented computing works. An archivist may not be able to deliver archival and record requirements during information system design and development projects,

without knowledge of how such a process works, and how system developers work [Dollar, 1992]**.** Two years later David Bearman suggested a proactive approach, which he described as planning in risk management [Bearman, 1994].

Standard procedure when new information systems are designed and developed is to perform an analysis of the business activities and to capture requirements from businesses, legal aspects, users, customers and others involved. A component in this procedure is to define and make information intelligible, information of different types that the future information system is supposed to manage or process. This work is described as the formalization of information. According to Shipman & McCall [1994, 1999] information must be formalized so that it can be managed by information systems. In order to perform formalization, knowledge of the characteristics of the information is needed according to Shipman & McCall. In other words knowledge about the possible information types, properties, and interrelationships is needed. It is possible to grade the amount of formalization from less formal to most formal when more functionality is required and a higher level of formalization is needed [Shipman & McCall, 1999]. A high level of formalization of records could for example enable automatic identification and detection of records within information systems.

'The record' as a concept in this paper should not be mixed up with the record concept used in database theory, where a record is a tuple[2] in a relation [e.g.Teorey, 1999]. ISO 15489 defines records as: "Information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in transaction of business" [International Standards Organization, 2001a, p. 3], a definition used throughout the rest of this paper. Examples of records are; healthcare records, project documentation, minutes of meetings and inspection reports.

Records are physical or virtual, have a content, a structure/form, are created in a context [Bearman, 1994; Hofman, 1998; McKemmish *et al.*, 2005], and are process bound information [Thomassen, 2001]. But these features do not make records unique in relation to other forms or sorts of information. According to Thomassen [2001] a record has several criteria, which makes the record unique in relation to other types of information.

1. Records are evidence of actions and transactions;
2. Records should support accountability, which is tightly connected to evidence but which allows accountability to be traced;
3. Records are related to processes, i.e. "information that is generated by and linked to work processes" [Thomassen, 2001, p 374];
4. Records must be preserved, some for very short time and some permanently.

These four characteristics of records make them different from other types of information. In an organization records are part of the organizational memory and are used to support organizational management. Cox [2001] has stated that the evidential value of a record can only exist if the content, structure and context are preserved. The context is the link between different records that belong together, and also to the process where the record was created. The above criteria are defining what a record must achieve, but the criteria do not explain and exemplify what characteristics are needed in order for records to be formalized in an information system.

[2] Simplified a row in a table

The aim of this paper is to describe the characteristics of records based on empirical data and archival theory. Accordingly the research questions are:

a. What is defined as a record in organizations?
b. What are the characteristics of these records?
c. Are there any differences between the empirically grounded characteristics of records and the characteristics described by recordkeeping and archival theory?

This paper is addressed to both practitioners and scientists. Researchers within information systems, archival science, and records management as well as information systems designers, information systems architects, records managers, archivists, and information managers can be described as the target group of our contribution, which can be summarized as:

Identifying empirically grounded characteristics of records, which are compared with theoretical findings from archival theory and recordkeeping literature.

The application area is mainly development of new information systems managing electronic records.

2. Research method and research sites

This paper is based on a qualitative study, which has an underlying interpretative approach. In this research understanding and knowledge of the nature of records was our interest. According to Hartman [1998] qualitative research can support such needs and also increase the knowledge of phenomena in their natural environment. The chosen qualitative research method is the case study, a method well suited for information systems research where a phenomenon is supposed to be studied in reality and in its natural environment [Myers & Avison, 2002; Yin, 2003]. The research can be described as interpretative, where an iterative interpretation process takes place during the analysis phase [Walsham, 2002]. As recommended, different data collection techniques have been used in this research in order to capture the complexity and uniqueness of the settings of interest [Eisenhardt, 1989; Yin, 2003].

Qualitative research methodologies have been criticized for producing results with low quality, when the results are seldom generalizable [Lee, 1989]. However, according to Guba & Lincoln [1989] results from qualitative research can be transferable to other organizations and settings and therefore be of high quality and usefulness. The aim of this paper is to present a description of the concept of records and their adherent characteristics, which is a first step towards a more transferable knowledge.

The research was carried out in four different organizations, which were chosen by three different criteria:

1. The organization must have a widespread use of records;
2. The organization must have information systems managing electronic records;
3. The organization must have an archive, for preservation of records.

The selection can be described as an adapted selection process [Hartman, 1998]. An adapted selection process is suitable if the selection of research sites is assessed to answer the stated research questions [Hartman, 1998]. The choice to select only four organizations was governed by the time available to perform this research. The selection process also aimed to get a selection that was a range of representative organization types, with only four organizations. The organizations were:

- Org 1. A Swedish public company, under the control of the Swedish government. The company has a large physical archive with more than 20000 running meters of records. It has a large case flow of approximately 600000 cases per year, which produce many records. Since 2004, it manages all its records in electronic form.
- Org 2. A multinational enterprise. The enterprise is producing goods, and the production facility is vulnerable for unforeseen stoppage of production, which force the enterprise to manage their records with good structure.
- Org 3. A Swedish municipality. A municipality has a variety of different types of records, dependent on the variety of tasks obligated for Swedish municipal government organizations.
- Org 4. A Police authority in Sweden[3]. The Swedish police both create and receives many records. The majority of the records are also going to serve as evidence in the courts of law. The police have several information systems managing records, which should be preserved forever.

2.1. Course of action

The research was designed to be performed in two stages at each research site, and was carried out during January and February in 2005. The first step was to study the archives, where records were stored and preserved. The empirical data were collected by physical reading and study of paper based records, electronic records, and official documents. During this data collection, interviews with archivists, records managers and even other employees working with records on a regular basis, were carried out. The second stage was to study records management in general, which includes both manual records management and use of electronic records and document management systems. This stage also contained studies of information systems within the four organizations that managed information in a stipulated way.

The empirical material was analyzed in two steps. The analysis of the empirical material has similarities with the hermeneutical analysis described by Svensson & Starrin [1994] where the analysis went from a holistic view to a detailed perspective iteratively. The analysis started by identifying detected record types. Each detected record was named after its content, or as the organization had named them.

The next step of the analysis process was to identify potential characteristics of the records, a methodological step similar to what Orlikowski [2002] and Strauss & Corbin [1998] describe as defining concepts. The potential characteristics were given descriptive names, and the names are not grounded in theory. A set of five characteristics was then further analyzed and compared with characteristics described within archival and recordkeeping theory.

3. Presentation and discussion of the results of the empirical and literature study

This section aims to answer the three research questions. First a summary of what organizations define as records is presented, followed by a presentation of the

[3] There are 21 police authorities in Sweden, which together with the National Police Board and National Laboratory of Forensic Science, form the National Police Service.

characteristics of these identified records. This section ends with a comparison between archival and recordkeeping theory-based characteristics and the empirically grounded characteristics in this research.

In Sweden no distinction is made between recordkeeping and archives in public organizations. A record is part of the archive at the moment it is created or received into an organization [Hörnfeldt, 1998]. Therefore most of the records that are presented in this section have been found in archives. It is also noticeable that Sweden also has a wider interpretation of public records. A public record in Sweden is all documents and records[4] made or received in a public organization. The public have free access to public records, which is declared in the freedom of press act[5]. In private organizations and companies the term 'record' is not used often, they mainly use the term 'documents' instead, even if they have a physical archive. The wider interpretation of records within Swedish public organizations adds some bias to the empirical material that the reader must be aware of. This broader interpretation of what constitutes a record makes it possible that records that are not clearly bound to transactions are preserved and treated like all other records.

3.1. Records identified

Table 1 presents a complete list of the records identified in the four different organizations.

Table 1. A complete list of all records identified

Organization	1	2	3	4	Organization	1	2	3	4
Staff information	*x*	*x*	*x*	*x*	*Minutes of meeting*	*x*	*x*	*x*	*x*
Account	*x*	*x*	*x*	*x*	*Offer*	*x*	*x*	*x*	*x*
Agreement	*x*	*x*	*x*	*x*	*Orders*	*x*	*x*	*x*	*x*
Archival description	*x*	*x*	*x*	*x*	*Outer environment*	*x*	*x*	*x*	*x*
Complaint	*x*	*x*	*x*	*x*	*Policies*	*x*	*x*	*x*	*x*
Contract	*x*	*x*	*x*	*x*	*Postal giro and bank forms*	*x*	*x*	*x*	*x*
Copies of receipt	*x*	*x*	*x*	*x*	*Production*	*x*	*x*	*x*	*x*
Correspondence	*x*	*x*	*x*	*x*	*Propositions from the trade-union*	*x*	*x*	*x*	*x*
Decisions	*x*	*x*	*x*	*x*	*Purchases*	*x*	*x*	*x*	*x*
Document plan	*x*	*x*	*x*	*x*	*Regulations*	*x*	*x*	*x*	*x*
Documentation/Archiving	*x*	*x*	*x*	*x*	*Reports*	*x*	*x*	*x*	*x*
Forms	*x*	*x*	*x*	*x*	*Results/account documents*	*x*	*x*	*x*	*x*
Goals and work of Improvements	*x*	*x*	*x*	*x*	*Routines*	*x*	*x*	*x*	*x*
Instruction/Order	*x*	*x*	*x*	*x*	*Specification of traveling expenses*	*x*	*x*	*x*	*x*
Invoices	*x*	*x*	*x*	*x*	*Standards*	*x*	*x*	*x*	*x*
IT/Computers/Telephone	*x*	*x*	*x*	*x*	*Staff matters*	*x*	*x*	*x*	*x*
Joint instructions	*x*	*x*	*x*	*x*	*Statement of account*	*x*	*x*	*x*	*x*
Legal information	*x*	*x*	*x*	*x*	*Store*	*x*	*x*	*x*	*x*
Lists of diary	*x*	*x*	*x*	*x*	*Tenders*	*x*	*x*	*x*	*x*
Lists of employee	*x*	*x*	*x*	*x*	*Trade-union agreement*	*x*	*x*	*x*	*x*
Lists of staff	*x*	*x*	*x*	*x*	*Verification*	*x*	*x*	*x*	*x*
Maintenance	*x*	*x*	*x*	*x*	*Work of proposals*	*x*	*x*	*x*	*x*
Minutes	*x*	*x*	*x*	*x*	*Written report*	*x*	*x*	*x*	*x*
Accommodations, decoration, and equipment	*x*				*Laboratory reply*		*x*		

[4] The Swedish word "handling" is here translated to record instead of document.
[5] TF 2kap (SFS 1949:105)

Affirmation of grants			*x*		*Legal cases from Supreme Administrative Court*	*x*			
Application of allowance			*x*		*Liquidation*	*x*			
Ban on carrying on a business	*x*				*Lubricant instructions*		*x*		
Blueprints		*x*	*x*		*Machine follow-ups*		*x*		
Business cover paper	*x*				*Main Ledger*	*x*	*x*		
Care journals			*x*		*Maps*		*x*	*x*	
Certificate	*x*		*x*		*Nature conservation*		*x*		
Civil servant proposal			*x*		*Work/performance plan*		*x*		
Checklist	*x*	*?*	*x*		*Notice of attending...*			*x*	
Comments on a proposal circulated for consideration	*x*		*x*	*x*	*Official notes*	*x*		*x*	
Commercial advertising	*x*				*Outgoing request of…*	*x*			
Commissions about exercise of public authority	*x*				*Plans in detail*			*x*	
Education material		*x*			*Press cutting*		*x*		
Emergency plan	*x*				*Price lists*				
Environment analysis		*x*			*Process descriptions*		*x*		
Environment management instructions		*x*			*Process map/Master plan*		*x*		
Environment reports		*x*	*x*		*Project*	*x*	*x*	*x*	
Excursions		*x*			*Project documentation*		*x*		
Exemption	*x*				*Quality regulations documents*		*x*		
Forest inventory reports		*x*			*Random inspection compilations*		*x*		
Forest rejuvenation		*x*			*Refer to...for consideration*	*x*		*x*	*x*
Forestry documentation		*x*			*Register extracts*	*x*			*x*
Geo analysis		*x*			*Security and security management instructions/handbook*	*x*			
Grant/permission application				*x*	*Settlement of accounts*	*x*			
Information campaign	*x*				*Site Plans*			*x*	
Information/answers from Authority	*x*				*Staff accommodation*		*x*		
Inquiry	*x*				*Test results/analysis*		*x*	*x*	
Inspection reports			*x*		*Treaty revisions*		*x*		
International cooperation	*x*				*Utterance/statement to authorities and organizations*	*x*		*x*	*x*
Inventory lists		*x*			*Web structure*	*x*			
Lists of revision	*x*								

The fact that the number of detected general records is less than the number of detected organization-specific records, may not be remarkable, but it shows a large variation and complexity of records. Table one visualizes and answers the first research question in this research; what is defined as a record in organizations?

3.2. Potential Characteristics

During the analysis phase aimed at describing the characteristics of records the transcribed material was read and all possible potential characteristics were noted, then grouped with similar characteristics on different levels. Some were seen as potential characteristics of records, some were seen as values of characteristics. There were also examples of characteristics with subcharacteristics. Therefore it is important to give details about all values identified in this phase of the research.. The potential

characteristics, subcharacteristics, and their values are listed below in alphabetical order. In the following subsections all potential characteristics and their sub characteristics are presented. In the following subsections we answer the second research question: what are the characteristics of the records that organizations defined as records?

3.2.1. Cause

In this research different reasons for why records are preserved have been identified. This is sometimes explicit but often implicit. The identified causes are not mutually exclusive, and they are:

- Legislation;
- Business needs;
- Cultural and historical needs.

First all records preserved in public organizations are preserved because of legal demands. As mentioned above, citizens in Sweden have the right to access public records. We also found records which are preserved because of other legislation, for example legislation for finance management, and the environment. Records have also been found to be preserved because of their business value.

Both the municipal and the multinational enterprise have examples of records which they think are unnecessary because they are never searched for again after their operational use has ended. Those records are saved because of legislation but obviously have low or no business value. In the municipality there were records about employees (Lists of employees), which record how many hours each employee has worked per month. The multinational enterprise declared that almost all long term preserved records were never used. For example, invoices were preserved due to legislation but some of the staff had difficulty seeing the usefulness of those records, when there was a copy of the invoice in the financial information system. This raises the issue of identifying and keeping the original as the archival record, but that is out of the scope for this paper. Even if evidence is one main cause for recordkeeping in archival and recordkeeping theory [e.g. Reed, 2005], this was not a stated reason within the organizations in this research.

3.2.2. Context

Context arises from the connection and coherence between the record and its creation, as well as connecting transaction to other related records. Context can be described with metadata.

The maturity of metadata use differs between the research sites. There were examples of no use of metadata, to fully automatic labeling of metadata. Every record contains of metadata. For example when filling in a formula every description of each field is metadata, i.e. data about the data (information) you are filling in. This leads to the conclusion that ‘no use of metadata’ is really no use of ‘additional metadata’.

The ‘context’ and its sub characteristics can also be found as metadata elements in metadata standards e.g. VERS [Public Record Office Victoria, 2003], which also includes many other metadata elements, for example language, preservation history, and coverage.

The subcharacteristics within ‘context’ are:

- administrative process;
- transaction;
- general;
- what;
- when;
- where.

The ‘administrative process’ includes registration number, actions and case numbers.

The idea of the transaction is in recordkeeping and archival theory [International Council on Archives, 2000; McKemmish, 2002; McKemmish et al., 2005; Thomassen, 2001] almost a requirement for records. In this research both examples of a clear connection to transaction and almost no connection whatsoever have been found. For example, in police records, connections to transactions are visible, due to demands from the legal system. Both at the public company and at the multinational enterprise records were found with no connection to specific transactions. The subcharacteristic ‘general’ indicates the extent of metadata implementation. ‘General’ can take the values between the extremes ‘no metadata use’ to ‘fully automated metadata use’. The name ‘general’ was chosen when metadata has been used as a tool to preserve the content at a general level. The subcharacteristic ‘when’ is related to time and had also been used for purposes other than recording when some action happened. There are examples of records including many ‘when’ values, for example when the record was created, when a person is born, when a specific situation occurred, etc. The subcharacteristic ‘where’ is a spatial value, and ‘what’ often contains descriptions of content. For example in the police, many records are based on standardized forms, where fields can be filled in or marked to tell the reader what the record is about. The ‘what’ characteristics can be used in some automated identification of the record’s type.

3.2.3. Type of content

This potential characteristic is about the type of the content in records. The records that were found in this research had a variety of content types. In this research three values of ‘type of content’ have been found:

- original (raw);
- ordered;
- analyzed.

‘Original’ is when the information is saved as it appeared when it was created. Examples are test results from an analysis of chemicals or a hearing. In some cases the organization has ‘ordered’ the information for example an alphabetically ordered list of employees. There were examples of ‘analyzed’ information such as statistical analysis presented as tables and graphs but with no connection to the original data. In the cases where the records are in raw form the connection to a transaction often is clear. A record with ‘original’ content is a record that is derived from a business transaction and the information has not been refined in any way. When information is ‘ordered’ or ‘analyzed’ there has been some kind of refinement involved. Those records are often composed from many information/data sources and in some case also several records. Those records have not always a clear connection to their main sources. For example the multinational enterprise can decide to either preserve the data from specimens taken, or to preserve the analysis. There is also an option to preserve both the raw data and the analysis of the data. If there has been an action of

refinement there should also be a description of how, why, and by whom it has been done. As a potential characteristic, type of content is about differences in the origin of the contents, something that might not be specifically remarkable but can be important when, for example, the need for connection to the original source is needed.

3.2.4. Frequency of use

This potential characteristic consists of the following values:

- never used;
- annually used;
- used often;
- used daily;
- used very often.

All the studied organizations had separated their preservation of records physically. For example, in many organizations it was more or less a standard procedure that paper records created during the current year are kept within easy access. This construct was also used in the electronic system, where for example financial records follow the account period.

Records that are not used so often can be separated from one information system and kept in another information system (for example an e-archive). There will always be example of records that won't be used again. When looking at similar types of records their usage may also differ. For example, not all environment analyses may be used again, but a few might. This depends on the situation and it is impossible to know exactly which record will be used again on that level. But this research shows examples of groups of records that are never used again, an example being the lists of employees in the municipality. The use discussed above is a record's primary use, i.e. to support some business activity. Whether or not a record can be used by future researchers (secondary use) has not been taken into account here. A relevant question here is why organizations keep records that are never used, and in some cases when no person knows why they are preserved. In some cases it is because of legal regulations, and by regulations from the Swedish National Archives, which look after future researchers' needs. When people in organizations are unaware of why records are preserved it highlights a lack of understanding of the archival value of the records by the employees concerned. In the multinational enterprise they reported that they feel insecure about whether or not they have a future need for those records, which results in more records than necessary being kept, which makes it harder to find records that they want to find.

3.2.5. Organizing

The organizing (i.e. intellectual control) of records has been a central concept for archival science. Here, 'organizing' is how records are organized in preservation both in the short term, middle term, and long term. The reason for this is that organizing has been the key to accessibility. In Sweden the use of the general archival register plan is widespread [e.g. Nilsson, 1983]. Examples from the plan are that minutes of meetings are labeled with A, and economics labeled with G. Two problems that can often be detected in category F (documents ordered after business tasks) are that this category can be extensive and that it could include records from other categories. This category covers all records that are organized by case. All the organizations in the study have examples of records organized as case files. For example, in the municipality a case consisting of an official report regarding a school playground could include financial records, minutes of meetings, maps etc. In designing

information systems it would be possible to organize the records in different ways depending on the situation. By using different interfaces the same record could be accessed both by content and by case.

The research has shown that organizations use different variants of organizational criteria for managing their archives. The Swedish National Archives' register plan is not mandatory for public organizations, it is only a recommendation. The differences in organizing are found both within the archives and in middle term preservation outside physical archives. The reasons for the choices sometimes seem to be random. In some divisions in the multinational enterprise there were individuals that kept and organized records on their own personal hard drives or in systems that are not formally part of the recordkeeping systems of the organization. This is seen as a problem by the organization because it limits access to records. Organizing has the following subcharacteristics:

- By cause;
- By types;
- By content;
- Personal;
- Multilevel.

The use of the register plan is placed within the subcharacteristic 'By content'.

3.2.6. Searchability

This characteristic consists of following values:

- No searchability (no search criteria);
- Low searchability (few search criteria);
- Good searchability (several search criteria);
- Group-based searchability;
- Indirect searchability.

This potential characteristic is dependent on computer-based information systems, either as an indexing system for paper based records, or as the system managing the electronic records.

There were no records found with unlimited search criteria as in a Google-search. A Google perspective influences expectation of searchability. In several cases the only possibility to access a record was by its unique key, which gives low searchability. In Sweden, for example, every organization has a unique id for their organization, and every citizen has an id-number which uniquely identifies every person. The experience of searchability is dependent on the users' experiences of search tools and archives. The recordkeeping staff may know exactly how to find a specific record but an external user may have serious trouble. In several of the studied archives searchability is indirect, which means that the end user has no access to archival records without help from archival staff. The values added to the characteristic have nothing to do whether full text searchability or search by controlled vocabulary is preferable. This debate is not within the content and aim of this paper.

Records are usually organized in groups. An example is that all minutes of meetings from a certain year are grouped together, sometimes with no possibility to search for a specific minutes of meetings.

3.2.7. Structure

Within this characteristic two extreme values have been found:

- full flexibility;
- standardized structure.

Structure can be seen as the level of formalization, and is about the structure of the records themselves, not of the system managing the records. For example the information system within the police service the system managing police reports compels the user to write different types of information in different fields, for example the system does not accept a string of text in a field which should contain a telephone number. This makes all records of this type (police reports) in the system conform to this highly formalised structure. Within the police systems these constraints also existed when police reports were written on paper. The other value can be found in the municipality, which has no mandate to influence how received records are structured. For example, a citizen can handwrite a complaint about some matter as well as use some formalized templates. Both these types of records structures have to be dealt with, even in an electronic information system.

In this research those extremes were also found in electronic records. But the majority of the electronic records had a more or less standardized structure. In the organizations within this research the majority of electronic records were in the form of electronic documents and formula.

3.2.8. Version and copy

Some records are copied and are in that case labeled with a clear indication of this. Copies of records were for example found when one record served as the basis for decision. Added to the newly created record about the decision taken, a copy was laid, to increase the understanding of the decision. Normally this is a conscious action, e.g. when the organization wants to distribute multiple copies of a record. Creation of multiple copies is not necessary when the record is electronic. It is possible to access the original record from many places, and limitations are only dependent on the information system. But if the system is to meet recordkeeping requirements, the system design must ensure that contextual connections are clearly maintained. Regarding version control, the present study has identified three different values in the research sites:

- Complete traceability of version;
- Partial traceability of version;
- Non-traceability of version.

Complete traceability includes all versions of records, even if there are records that are not correct. For example, if the minutes of a meeting fail to correspond to what was decided in the meeting, both the original and the revised versions of the record are preserved. In the organizations where no traceability was found, only the valid and latest version of the record was preserved.

3.3. Analysis of potential characteristics

From the empirical material eight different potential characteristics were identified, which are all presented above. This presentation of potential characteristics also answers the two first research questions in this research: What is defined as a records in organizations? and what are the characteristics of these records? The characteristics are based on analysis of the empirical data. After a careful analysis of each of those

characteristics it was found that it was only possible to name five of the above as general characteristics of records. Those were:

- Context
- Form
- Structure
- Organizing
- Version/Copy

These characteristics can help to identify, tell apart and make records recognizable.

The other three, 'searchability', 'frequency of use', and 'cause' were not possible to define as characteristics. 'Searchability' and 'frequency of use' are both affected by how well the above five listed characteristics are implemented. 'Searchability' for example is both dependent on how records are organized, to what degree metadata is used and how structured a record is. 'Frequency of use' is dependent on the content and users' interest in using the record, and can hardly be defined as a characteristic. 'Cause' is possible both to interpret as embedded within the characteristic 'context', but can be interpreted as implicit metadata.

As mentioned earlier, one of the tasks for a record is to serve as evidence about means of actions or transactions. The evidential value of a record is a function or effect of the presented characteristics. Evidentiality can be better described as a metacharacteristic of records. Evidence is a product of good recordkeeping.

3.4. Comparison of findings with archival theory

Which of the empirically identified characteristics can also be found in archival theory? And are there any characteristics found in this research that are not to be found in the literature of archival theory? This is the last research question in this paper. Table 2 visualizes this comparison. Only the first and second level characteristics are presented in the table, even if the comparison was made with all levels.

Table 2. A summary of empirically based findings compared with theoretically identified characteristics of records

First level	Second level	Reference
Context		Thomassen [2001], Hoffman [1998], Shepherd and Yeo [2003], Duranti [1997, 2001b], Guercio [1997], Bearman & Trant [1997], Bearman [1997], Duff & Harris [2002],Upward, McKemmish (2001), Hartland *et al [2005]*, Gilliland-Swetland [2000]
	Transaction	Thomassen [2001], ICA [2000], ISO15489 [2001a], Duranti [1997, 2001b], Guercio [1997], Bearman & Trant [1997], McKemmish & Upward (1990, 2001), Dollar [1992],Gilliland-Swetland [2000], Reed [2005], Menne-Haritz [2001]
	General	Bearman & Trant [1997], Bearman [1997]
	Administrative process	Duranti [1997, 2001b], Guercio [1997], Bearman (1993), Reed [2005], ISO 15489[2001a], Gilliland-Swetland [2000]
	What	
	When	Duranti [1997]
	Where	
	Who	Guercio [1997], Duranti [1997]
Type of content		Gränsström *et al*[2000]
	Original	
	Ordered	
	Analyzed	
Structure		Duranti [2001b], Bearman & Trant [1997], Bearman (1993), Bearman [1997], Gilliland-Swetland [2000, 2005]
	Standardized	
	Full flexibility	
Organizing		Reed [2005], Bearman (1993), Gilliland-Swetland [2000]
	By Cause	
	By Types	
	By Content	
	Personal	
	Multilevel	
Version/Copy		Duranti [1997]
	Complete Traceability of version	
	Partial traceability of version	
	Non-traceability of version	Reed [2005]

4. Conclusions

4.1. Naming the characteristics

The empirically grounded characteristics were given descriptive names without any reference to theory or standards. When comparing these identified characteristics with characteristics discussed in the theoretical literature, it became clear that there are discrepancies in the labeling of characteristics of records. In this section those differences will be discussed. It is important to note that, irrespective of differences in labels, the comparison is based on the underlying meaning and content of a

characteristic and not merely on the literal labels. Discrepancies in naming have been identified with regard to structure, organizing and type of content.

Reed [2005] uses different labels to describe what we have called organizing. She uses the terms 'grouping', 'classification arrangement' and 'sequencing'. However the difference, if any, between those concepts is not clearly stated. Reed gives examples of sequencing which includes serial, sequence, and dossier. Further she states that which type of grouping/sequence/arrangement to use depends on the situation and different types have their benefits and weaknesses. Classification, arrangement and grouping are also the concepts that are used by Gilliland-Swetland [2000]. She gives an example of classification by subject content, which has also been identified in our study in the characteristic 'organizing' with subcharacteristic 'by content'. Gilliland-Swetland [2000] also writes about hierarchies to build structures to provide access to material. To sum up this discussion, two main reasons can be identified as to why this concept of organizing is important within recordkeeping. The first is to make it possible to retrieve records, which requires some sort of index or classification. The other reason is managing organized records that can be demonstrated to be trustworthy enables interpretation of the records authenticity and reliability.

Regarding the characteristic structure, Bearman [1997, p.272] also used this term in the following citation: "Records are evidence when they are bound to appropriate metadata about their content, structure and context". This is a rather common view within archival science. The question is what is meant by 'structure' in this context. Structure is a concept that deals with appearance of a record, which includes the material of a document, character sets and how the record is arranged with headings and paragraphs. Our view of structure is a little bit narrower than this more general description of structure. Gilliland-Swetland [2000] writes about structure in the same sense that we do. She writes that XML has been used to develop structures that are more predictable, which could be helpful for example with web resources. Her discussion also includes a description of how diplomatics uses structure to investigate the authenticity of records. Some records have been found to consist of the same type of elements and are built up the same way. But she also writes that structure could be both intellectual and physical, particularly in the sense of hierarchies with series and subseries. The latter is not included in our definition of structure but rather connected to our concept of organizing.

4.2. Comparison of characteristics

The empirically grounded characteristic 'context', with its sub levels 'transaction' and 'administrative process', together with the empirically grounded characteristic 'structure' have been found to correspond with recordkeeping and archival theory. This correspondence was not surprising since records are often described as consisting of context, content and structure and these characteristics are parts of both the ISO15489 and ICA definition of records [International Council on Archives, 2000; International Standards Organization, 2001a].

'Context' has been in focus in several research and standardization projects. This has resulted in several existing metadata schemas that cover different aspects of context (for example what, when and who). The present study has not made any attempt to compare different metadata schemas to find out which one most closely corresponds to our empirical result. The theoretical viewpoint regarding 'structure' is that computer-based information systems require a higher level of formalization of the structure than paper-based solutions. But some theoreticians emphasize the need for preservation of the original structure see e.g. [Bearman, 1994, 1997, 1999; Bearman

& Trant, 1997; Duranti, 1997, 2001a, 2001b]. Some organizations are obligated to preserve records even if they are unstructured and miss important metadata such as author, and date. One example of this is a municipal organization that has to preserve an anonymous letter from a citizen. If the municipality has implemented a digital recordkeeping system which requires some metadata that is not present in this kind of record (in this case the author, since it is an anonymous letter), should the organization decide not to preserve this record? The authors argue that the formalization process should not allow this kind of development. It must be possible to manage even records that are unstructured in a digital environment. The system should not force the organization to make changes to the record. An important question is; if the original structure is affected by formalization that is required by a digital system, will it influence the trustworthiness of the record? This issue is one part of the debate concerning the preserving of records with their original look/appearance. Is it good enough to preserve the content of the record or must the appearance remain exactly the same as the original? Formalization has both positive and negative aspects. The positive aspect is that it forces organizations to work with standardization of records and even standardization of working procedure. This situation is feasible in organizations striving to handle all citizens or customers the same way. Formalization is also a key in situations where organizations want to exchange information with each other. One negative aspect is that the formalization process may influence decisions about destruction and preservation. Maybe this could force organizations to base decisions about destruction on what kind of records can be part of an electronic document and workflow system, instead of be based on traditional appraisal methods. It would then lead to earlier decisions about destruction, which according to ISO 15489 and confirmed by the authors observations, has to be done early in system development. Another negative aspect is that formalization may lead to a situation in which content that earlier was part of the records, such as hand written notes, will not be preserved in the future. Regarding the characteristics 'organizing', our reflection is similar to that which McKemmish *et.al* [2005] argue. That is, within a computer-based information system it is possible to use several simultaneous methods of organization. By adding metadata (preferably automatically) it could be possible to design a system that lists all records by content or by types depending on what the user wants to do. Gilliland-Swetland [2000] writes about a logical method of organizing which replaces the physical way of organizing records.

Concerning the characteristic 'type of content' there are few examples about this phenomenon in the literature. This is however not surprising, because recordkeeping is about recording transactions in an organization, giving different content. If the record is a presentation of a statistical analysis without reference to the raw data upon which the analysis was based, the record is evidence only that the organization has made this analysis. If the record includes the raw data and the methodology by which the data upon which this fictive analysis were obtained, the record provides evidence of the transaction in which the organization has made some sort of investigation. A possibility is of course also that both those records are preserved based on the decision that the organization wants to preserve both. The recordkeeping system is in this sense caring about how the record looked originally, not only about the way it has been refined. But, information systems very often include different combinations of data, extractions of data, various types of presentation of data and so on. In Sweden there is currently an ongoing debate that relates to this characteristic and it is about potential records. Digitization has thus revealed a problem that needs to be discussed during appraisal. Gränström *et al* [2000] have a discussion about potential records in

electronic environments in their book. They emphasize the need for decisions about preservation in the design phase of information system.

The present study shows that several organizations are concerned about problems with version and copy control. In many organizations there is a big proportion of the staff that have rights to create records. The multinational enterprise was a good example of this. About ten years ago there were a lot of records that were classified as correspondence. Most often the letters were written by a secretary and on letterhead papers with signatures. Today most of the employees write those types of letters themselves, often by e-mail. Version and copy control is something that is everybody's responsibility. It is important that any system that includes records is designed to ensure control over versions and copies.

Reed [2005] argues that whether an organization chooses to preserve drafts, final versions and copies is a decision has to be made based upon the organization's needs. There is nothing within the archival theory that clearly states which one is the right way to do it. Duranti [2001a] argues that authenticity partly depends on the state of transmission (i.e. draft, original or copy), which has to be clear.

The results of this study show that the four organizations have reached different levels of implementation of recordkeeping requirements. The recordkeeping requirements have, as shown, a theoretical base, sometimes founded upon a viewpoint derived from paper-based records. As discussed above there are reasons to question some of those theoretical requirements, but there are also reasons to point out weaknesses in the organizations studied. There are several examples of unwanted recordkeeping practices in the studied organizations. One example is personal organizing of records that was found in the multinational enterprises and something that is not recommended and not even mentioned theoretically. Other similar unwanted recordkeeping practices are; examples of no added metadata, no separated metadata, no connection to transaction and lack of full traceability of versions.

A general conclusion is that the empirical data are based on more detail than is presented in recordkeeping and archival theory. Table 2 clearly visualizes that 'context' stands out as the most described and scientifically penetrated characteristic in recordkeeping and archival theory.

4.2.1. Connections to transactions.

Table 1 is a summary of the different records that were detected in the four different organizations that were studied. According to e.g. Thomassen [2001] archives consist of records and, implicitly, only records should be found in archives. Many of the records listed in table 1 have been found in archives. A record is supposed to be created in a work process and should have a relation to transaction of business [International Council on Archives, 2000; McKemmish et al., 2005; Thomassen, 2001], see Table 2 for more references. In this research some records which can be questioned if one literally uses the definition of records have been found in archives.

For example:

- Educational material in covers, materials from courses in which some employees have participated.
- Postal giro and bank forms.
- Lists of staff, a summary of all employees at a specific time.
- Information campaign material. Material produced by an advertising agency. Web structure, documentation over the internal web structure. Press cuttings, where the archive owner were mentioned.
- Legal information, produced by the ministry of Justice

- DAFA Announcements. DAFA is a Swedish company supplying and selling public information from different public databases.
- Copies of legal cases from the Supreme Administrative Court.
- IT/Computer/Telephone equipment descriptions, for example information about which equipment is installed within the organization and where.

Based on previous presented criteria, and record definitions it is not fully obvious that the list above can be to defined as records. They were found with no visible connection to any transaction or work process. Within the studied organizations such connection might exist, but the context was not clear and visible by just studying the record. For example the educational material could have been the result of a procurement performed within the organization, but this example had no such contextual connection, which made such interpretations impossible. Another example is the information concerning IT/Computers/Telephone. Those records should have their justified existence in the archive if they had any connection or relation to for example offer, order, decision, and the invoice. By following archival definitions from e.g. ISO15489 [International Standards Organization, 2001a] or ICA [International Council on Archives, 2000] the relationship to a transaction is one of the components that separates records from documents and information.

The identified difference between practice and theory has several explanations. One thing that influences this is the discrepancy between what theories would define as a record and what is preserved in Swedish archives. The Swedish archival register plan has in some cases lead to organizing of archival material that does not keep links between records and transactions. There is, however, a changeover to an enterprise and process-oriented view of record keeping in Sweden that has similarities to the development in for example Australia. The Swedish National Archives[6] is working on a new archival description, which will strengthen the contextual cohesion between a record and the processes wherein the record has been created. This is dependent on legislation in Sweden. Another possible explanation is that we have studied organizations, which do not meet best practice standards in recordkeeping. Bearman and Trant [1997] write about better/worse record, which is dependent on complete/incomplete metadata. Further, they write that a solution might be to make those responsible for record creation aware of the consequences of bad records. Some organizations in this research have mentioned problems with employees that do not understand the importance of good record keeping. They think that it is a matter that takes too much of their time. Which of these explanations is nearest to the truth is irrelevant to this discussion. The scenario is rather that both the explanations given above contribute to making the discrepancy between theory and empirical data clear. One thing that we want to emphasize is that organizations that plan to make parts of their recordkeeping digital should take into consideration those differences between theory and the practices observed in this case study. Standards or other tools can require that recordkeeping systems are designed in a certain way, which may not be the case.

4.3. Characteristics and the proactive approach

The characteristics of records presented above are implicitly also characteristics that make a record unique in relation to other types of information, in other words recordkeeping and archival demands concerning records that must be fulfilled. This statement argues for, and supports, the necessity of working proactively when dealing

[6] http://www.ra.se/ra/index.html

with electronic records. In a paper-based environment it is possible to recreate some of these characteristics afterwards. But when records are electronic and are managed within information systems any such strategy is likely to be impossible. Even if such activities are possible, the benefits and positive effects of using information systems can be lost if administrative and manual tasks have to be performed just to fulfill archival demands. Therefore the proactive approach, compliant with ISO15489 and suggested earlier in this paper, is necessary. In a proactive approach these characteristics are possible to interpret as basic requirements which need to be fulfilled at the design stage of information systems that manage electronic records. The ISO15489 Standard is influenced by the records continuum model: a model that sees records in a continuum of space time without a linear time perspective, contrary to the life cycle model where time is linear. The continuum model implicitly proposes a proactive approach in which record appraisal must be performed during the design phase [McKemmish, 2002; Upward, 2004]

4.4. Demarcation

An important question to discuss here is how the selection of organizations has influenced the result. Organizations within the public sector have to follow a more extensive regulation than private organizations when it comes to archives. This study has had no intention of showing differences between private and public organization but this would be an interesting future research question. The results give a richer picture of public organizations than private organizations. The private organization that has been studied is ISO 9001 certified and it is impossible to say how this has affected the result. ISO 9001 includes routines for document control, which sometimes is in accordance with archival requirement but is sometimes contradictory.

4.5. Potential application

Within archival science this research might open up a creative discussion about the need for a more detailed investigation and description of the record and its characteristics. To be able to build information systems that manage electronic records the record it self must be formalized to some extent. The formalization is necessary for automatic computer based management and processing. When designing information systems that aim to take the full extent of archival requirements into consideration, knowledge about the characteristics of records could be helpful to achieve the objectives of records; to be reliable and authentic, be able to serve as evidence, and to support accountability. Table 1 also indicates the importance of carefully identifying general and organizationally specific records before a design and development process starts. By this discussion a potential application area could be the design and development processes of information systems that are going to manage electronic records.

4.6. Concluding remarks

The characteristics of records, based on this study are; context, type of content, organizing, structure and version/copy. The comparison with theory has shown that all characteristics except type of content are discussed within the literature. Although the characteristics have been identified both empirically and theoretically this research has shown some discrepancies when penetrating the characteristics. Those differences can be explained by different causes that have been discussed in detail in our paper. However, some of the main reasons are dissimilarities in legislation and recordkeeping traditions between countries and immaturity in implementation of

record keeping. Those explanations are also valid for differences in which kind of records that are preserved in the four organizations.

Influencing organizations to adopt archival requirements is an important mission and there is a need for further research to suggest solutions based on organizations' individual situations. Both the list of identified records (section 3.1) and the list of identified characteristics (section 3.3) indicate that recordkeeping is implemented differently in the four organizations. Our research shows both examples of recordkeeping that have high correspondence to recommendations in theory and standards but also examples that do not follow those recommendations. An important remark is that if an organization plans to develop a new recordkeeping system, it must not be based on an existing but poor recordkeeping system that does not comply with accepted standards. These kinds of discrepancies will, if not taken into consideration, make the system development difficult. The step from manual handling of records to digital handling, which includes new routines, can be a big step to take, especially if the organization is unaware of this problem. Situations like this could then lead to a more extensive need of education than planned.

This study has shown examples of organizations that work with digital information systems with automated capturing of metadata and other kinds of automated functionality. But there are also examples within these organizations' information systems that include records that do not meet recordkeeping requirements as well as manual systems with low maturity. The conclusion here is that in some senses, some of the organizations in this study have a lot to do before reaching good record keeping.

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