JYVÄSKYLÄ STUDIES IN COMPUTING

11

Tero Päivärinta

A Genre-Based Approach to Developing Electronic Document Management in the Organization

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UNIVERSITY OF JYVÄSKYLÄ

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ABSTRACT

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Electronic document management (EDM) has emerged as a technology-centric area of research within the discipline of information systems (IS) during the last two decades. In the new millennium, the practical importance of EDM in the organization is continually growing as the amount of recorded information is exploding and new technological opportunities and organizational changes set continuous challenges to the development of EDM. However, little research exists on the development of EDM from the viewpoint of the organization, which must integrate several IS applications, user needs, and organizational issues into an integrated EDM system in an organizational context. This dissertation motivates, elaborates, describes, and reports experiences from a novel approach, which is based on the genre theory of organizational communication, to the requirements analysis for EDM in the organization. A genre-based method that instantiates the approach is described. The practical contribution of the genre-based approach to aid the requirements analysis for EDM systems is illustrated with research reports describing practical experiences from action research efforts and a consultancy company that had used and elaborated the initiated method independently of the researcher for two years. The approach and method are also compared to the existing methods in the field of EDM and the most well known approaches to IS development in general. This theoretical discussion and comparison indicates that the genre-based approach complements the previous IS development approaches and, as well, methods for EDM development.

Keywords: digital document, electronic document management, genre of organizational communication, IS development approach, critical social theory, structuration theory, requirements analysis

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II Tyrväinen, P., & Päivärinta, T. 1999. On Rethinking Organizational Document Genres for Electronic Document Management. In R.H. Sprague, Jr. (Ed.) *Proceedings of the 33rd Annual Hawaii International Conference on System Sciences (HICSS); Digital Documents Track.* Los Alamitos CA, IEEE Computer Society, CD-ROM.

III Karjalainen, A., Päivärinta, T., Tyrväinen, P., & Rajala, J. 2000. Genre-Based Metadata for Enterprise Document Management. In R.H. Sprague, Jr. (Ed.) *Proceedings of the 34th Annual Hawaii International Conference on System Sciences (HICSS); Digital Documents Track.* Los Alamitos CA, IEEE Computer Society, CD-ROM.

IV Päivärinta, T., Halttunen, V., & Tyrväinen, P. 2001. A Genre-Based Method for Information Systems Planning. In M. Rossi & K. Siau (Eds.) *Information Modeling in the New Millennium*. Hershey PA, Idea Group. 70-93.

V Päivärinta, T. 2001. The Concept of Genre within the Critical Approach to Information Systems Development. *Information & Organization* 11 (3), 207-234.

VI Päivärinta, T., & Peltola, T. 2001. Engineering of a Genre-Based Method for Developing Electronic Document Management: The Consultant's Viewpoint. In J. Krogstie, K. Siau, and T. Halpin (Eds.) *Proceedings of the Sixth CAiSE/IFIP8.1 International Workshop on Evaluation of Modeling Methods in Systems Analysis and Design (EMMSAD'01).* XIII 1-14.

INTRODUCTION AND OVERVIEW

1 ELECTRONIC DOCUMENT MANAGEMENT IN THE ORGANIZATION

"When you come… bring the books too, and especially the ones made of parchment."
(Paul's Second Letter to Timothy 4:13, in the 60s AD; Good News Bible)

"You have new mail!" (A pop-up window of an e-mail application in the 1990s)

"For more details, see <http://www…>"
(A typical proportion of an e-mail around the turn of this millennium)

Documents, alongside spoken communication and tradition, have been a basic means for storing and sharing information in mankind through millennia. Just let us think the times of "stone-based" documents, such as The Ten Commandments or the Rosetta Stone (with which the riddle of ancient Egyptian hieroglyphs could be solved), or the great library in Alexandria in 300 BC with its papyri and parchments. Since the 14th century, the discipline of archival science has dealt with the long-term storage and preservation of written paper documents (Dollar, 1992), mainly in the "public sector" of the contemporary Western World. Gutenberg's invention of the printing press in the 15th century and the diffusion of public postal services since the 16th century boosted the publication and dissemination of paper-based documents. The discipline of library and information science (LIS) has promoted public and institutional access to document collections since the 19th century (Rieusset-Lemarié, 1997). In the 1990s discussions about "what is a document" within the archival science and LIS were started along with the contemporary advances in information technology (IT) and digital media, which have had revolutionary impacts on the basic concepts, practices, and even the core functions of these disciplines (Brier, 1996; Buckland, 1997; Dollar, 1992; Schamber, 1996).

The first half of the 20th century expanded the number and size of business organizations thus consolidating the discipline of systematic management; including office work (in connection to the dissemination of contemporary IT in-

novations, such as the typewriter, carbon sheets, mimeography, micrographics, and facsimile), in which several emerging genres of documents and advanced manual filing and record-keeping techniques played a significant role (Koulopoulos & Frappaolo, 1995; Rowland, 1947; Yates, 1989). However, until the late 1970s still only the most important documents were published, printed, and disseminated in the organization, and the dedicated clerical and typing staff coordinated most of the document work (Bielawski & Boyle, 1997). At the turn of the 1980s, a number of novel computer-aided technologies for editing text and typesetting text and graphics for printing were introduced, including the centrally run applications, such as those connected to the UNIX operating system, and those that focused on the first "home computer systems", such as the WordStar™ text processing program on the CP/M™ operating system (Nievergelt, Coray, Nicoud, & Shaw, 1982).

The personal computer (PC) revolution was launched in the 1980s with the "killer" applications of spreadsheet and text processing and, later on, other personal software and hardware for producing documents. Along with the subsequent maturation of related new IT, e.g. Optical Character Recognition (OCR), fax, printers, copiers, Local Area Networks (LAN), Wide Area Networks (WAN), internet, e-mail, the World Wide Web (WWW), and mobile communication devices, the opportunities for producing, processing, and utilizing document information by human beings in and among organizations have changed drastically, continually, rapidly, and unforeseeably during the last 20 years (Bielawski & Boyle, 1997). These innovations originate partly in the disciplines of computer science and electrical engineering (being rather uninterested in the socio-organizational consequences from their technological innovations), partly in commercial businesses outside the research institutions, or, as the initiation of the WWW in CERN for disseminating research on nuclear physics shows, even in research institutions not primarily focusing on information processing nor organizational informatics. Nowadays, the person-level production, storage, and dissemination of documents in the digital form have become relatively easy to everybody with a little experience on PC applications. Paper printouts are still used for reading a great proportion of documents (excluding multimedia), whereas the existing digital data can, in turn, be reused as a basis for new documents. The plain amount of information is thus exploding: Lyman et al. (2000) estimate that mankind will produce and store more data, of which a significant proportion in the form of business documents, between 2001-2004 AD than before in its history altogether.

Anyhow, after the era of manual techniques, practices, and document archives possessed by the dedicated staff for office management (Rowland, 1947), none of the above-mentioned disciplines has mastered the field of effective "creation, storage, organization, transmission, retrieval, manipulation, update, and eventual disposition" of digital document information in the organization, i.e. *electronic document management* (EDM) (Sprague, 1995 p. 32). Obviously, EDM must rather have been a core field of a young discipline that focuses on *computer-supported production, processing, storage* and *human utilisation of informa-*

tion and IT applications for organizational purposes – i.e., the discipline of *information systems* (IS) (Davis & Olson, 1985 pp. 5-8; Hirschheim, Klein, & Lyytinen, 1995 p. 11; Keen, 1980; Land, 1992 p. 6). But has it?

Markus (1999) and Avgerou (2000) identify the origins of the IS discipline with the applied computer science of the 1950-60s and the systematic design of early data processing applications in organizations. Those applications focused on accounting, sales records, and other voluminous computing and transaction-processing tasks with a great potential for cost savings (Markus, 1999). Typically, the data processed in them was highly formalized and rather widely recognized as representing "objective facts" related to the business life (although the objective factuality of data was not always regarded as obvious (Kent, 1978)). The main point was to automate routine-like computing and data processing procedures as far as possible.

Since then, the very concept of an information system has most often represented several distinguished *technological* or *functional* fields, which have introduced information technologies to be applied in the organization in terms of that particular technology and/or organizational function (such as specific IT applications for accounting or engineering). For instance, Ein-Dor and Segev (1993), in their "classification of information systems", attempted to categorize the field into the technological and functional application areas they found from the contemporary IS literature. Unfortunately, this technology/function-based categorization of IS research has blurred the idea of document management from the organizational viewpoint as a whole. Numerous distinguished fields of IS research obviously involve processing of documented information. The instances include relational database management systems (RDBMS), computer-aided design (CAD) and manufacturing (CAM) systems, product data management (PDM) systems, geographical information systems (GIS), office automation (OA), computer-supported co-operative work (CSCW), executive information systems (EIS), enterprise resource planning (ERP), customer relationship management (CRM), eXtended Markup Language (XML) applications, e-business/commerce, and intranet applications. However, if research efforts are categorized plainly into such acronyms and categories, the holistic picture of EDM in an organization, which potentially utilizes a great many of IT applications and technologies, is never taken into account.

In their review of contemporary document management systems in 1978, Swanson and Culnan (1978) overestimated the visibility and weight of the document management field in its own right within the IS research, as denoted by Sprague in his review on EDM seventeen years later (Sprague, 1995). My review on four respected IS journals (MIS Quarterly, Communications of the ACM, Information Systems Research, and ACM Transactions on (Office) Information Systems)[1] clearly supported Sprague's claim by revealing that the gen-

[1] These four journals were regarded as the most high-quality IS journals at the Department of Computer Science and Information Systems in University of Jyväskylä by the time this study was launched in 1996. In addition, ACM Transactions on (Office) Information Systems was a representative publication of office information systems, which covered a great proportion of document management issues in the 1980s, for the purposes of this review. I reviewed

eral-level topic of document management received significant attention in the IS discipline no earlier than the mid-1990s indeed, excluding constructive research efforts that approached the issue from the viewpoint of technological innovations for, often vaguely defined, 'document management systems' (Arno, Norbert, & Nawjin, 1985; Newcomb, Kipp, & Newcomb, 1991; Schwartz, Fortune, & Horwich, 1980; Stonebraker, Stettner, Lynn, Kalash, & Guttman, 1983) and rare exploratory case descriptions from applying the contemporary IT applications, e.g. videotex (Kusekoski, 1989). Since 1995, the IS journals have increasingly included document management research. However, those articles have still largely adopted a technology-centric viewpoint, focusing, again, on constructions and conceptual discussions, which have attached new ideas and functionalities to the document management products (Binbasioglu & Karagiannis, 2000; Dourish et al., 2000; Dourish, Edwards, Lamarca, & Salisbury, 1999; Gaines & Shaw, 1999; Gordon & Moore, 1999; Heminger & Robertson, 2000; Kilov & Cuthbert, 1995; Lambrix & Padgham, 2000; Lamming, Eldridge, Flynn, Jones, & Pendlebury, 2000; Phelps & Wilensky, 2000) and/or describing individual cases of introducing a particular technological construction in a target organization (Balasubramanian & Bashian, 1998; Candler, Palvia, Thompson, & Zeltmann, 1996; Lamming et al., 2000; Rein, McCue, & Slein, 1997).

With regard to the related research beyond the major IS journals, I naturally recognize that a significant literature base drawing on the concepts of document and document management has been created since the 1980s. However, this research again mostly adopts a particular technological standpoint within which the concepts of a document and document management are defined. The most prominent examples are the fields of structured document systems and text databases (Böhm, Aberer, Neuhold, & Yang, 1997; Chin, 2001; Jones, 1991; Levy, 1993; Salminen, 1989) that are based on document mark-up languages, standards, and related technologies, such as (nowadays almost forgotten) open document architecture (ODA) (Appelt, 1993), standard generalized mark-up language (SGML) (Goldfarb & Rubisky, 1990) with experience from its application to selected domains such as technical and legal documentation (Fahrenholz-Mann, 1999; Salminen, Lyytikäinen, Tiitinen, & Mustajärvi, 2001), and, most recently, XML (Bray, Paoli, & Sperberg-McQueen, 1998; Fisher & Gangolly, 2001). In addition, a number of other specific areas of IT, often related with a constrained functional application domain of IS in the organization, have focused on a number of technological/functional document management

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these journals systematically from the year 1980. In addition, I systematically reviewed electronically the articles provided in the ACM digital library (the phrase "document management" in the article's title or abstract) since 1985. One should note that there is no general agreement on "the" most important IS journals for general-level literature reviews in a particular field of IS research. For instance, Boudreau, Gefen, & Straub (2001) chose MIS Quarterly, Information & Management, Journal of MIS, Management Science, and Information Systems research for their recent literature review on instrument validation in quantitative IS research, whereas Orlikowski & Iacono (2001) reviewed only one journal, Information Systems Research, for their general-level research commentary within the discipline. Hence, to get a rough overview, I considered the four aforementioned journals as a sufficient basis for the purposes of this thesis, as the aim was to roughly estimate the general visibility of document management research within the IS discipline.

issues in their own right. Examples of this huge body of literature include such research topics as office systems / automation (Culnan, 1980; Ellis, 1986; Woo, Lochovsky, & Lee, 1985), information retrieval (Gordon, 1997; Teufel, 1988), computer-supported co-operative work (Bair, 1995), medical multimedia document systems (Ip, Law, & Chan, 1995), manufacturing (Balakrishnan, Kalakota, Ow, & Whinston, 1995), engineering projects (Hameri, Nihtilä, & Rehn, 1999; Joia, 1998), and autonomous agents in intranets (Ginsburg, 1999, 2000). As Murphy (2001) instinctively puts it (without an explicit literature review): "... much of current literature reflects a technology-centric focus in which the tool itself takes center stage".

Interestingly, the mid-1990s was also a turning point in the practice-oriented literature on EDM. Several consultancy-based books have been published since then (Anttila, 2001; Bielawski & Boyle, 1997; Koulopoulos & Frappaolo, 1995; Megill & Schantz, 1998; Sutton, 1996; Wiggins, 2000; Wood, 1995). Typically, these books include valuable practical experience and expertise of the respected consulting figures with information about contemporary technological opportunities in the field as such, but, on the other hand, involve rather weak theoretical, conceptual, and methodological foundations, let alone comparisons to the previous literature, to be regarded as serious research efforts.[2] The emergence of the document management field was also noticed in practice-oriented magazines in the late 1990s, which wrote about such topics as "Document management ripens" (Fusaro, 1998) or "Document management finally gets some respect" (Rowe, 1998).

Sprague's work (1995), however, represents a seminal contribution by establishing another viewpoint, which I would label as *the organizational view*, to EDM and its development. Especially, he points out how the development of EDM in the organization requires parallel and intertwined consideration of:

1. a number of information technologies, from the infrastructure issues to a number of end-user applications, that should form a satisfactorily functioning whole in the organization,
2. several application areas, i.e. business tasks and processes, among which the development initiatives must be coordinated and prioritised in the organization, and
3. several organizational stakeholders, e.g. the traditional IS department, records management, office management, library, reprographics and printing, and training and education, who must revise, share, and coordinate their responsibilities in the development efforts together with the end users of the EDM systems in the future (Sprague, 1995).

After Sprague's demarcation of the research field of EDM from the organizational viewpoint, followed by a conceptual paper by Meier and Sprague (1996)

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[2] Section 4.2 presents a comparison of this research to other systematic development approaches to EDM, including those consulting books identified by the author that present methodical recommendations and practices for developing EDM in the organization.

denoting the roles documents play in the organization, little further research delving deeper into EDM in the organization has been reported. Wakayama et al.'s (rather practice-oriented) edited book focusing on interrelationships between documents and organizational processes (Wakayama, Kannapan, Khoong, Navathe, & Yates, 1998)[3], Schoop's (2001) recent work on language-action perspective on collaborative document work in healthcare, Uijlenbroek and Sol's (1997) case study on process improvement with document management in the public sector, Tiitinen et al.'s case study on user needs for EDM in the public sector (Tiitinen, Lyytikäinen, Päivärinta, & Salminen, 2000), and Murphy's (1998) conceptual work on organizational metadata of digital documents followed by her recent case study on the role of documents in organizational communities of practice (Murphy, 2001) represent the rare exceptions.

The research area of this dissertation can be located on the development of EDM from the viewpoint of the organization within the discipline of IS.

Let us next scrutinize the basic concept of a "document" to clarify the research area further. Traditionally, documents in the IS research have been regarded as representing unstructured information distinguishable from somewhat "more structured" information typically stored in relational (and other kinds of) databases (Gordon, 1997; Meier & Sprague, 1996; Sprague, 1995; Swanson & Culnan, 1978; Teufel, 1988). Documents in this sense have been said to cover even 80-90 % of recorded information in any typical organization (Koulopoulos & Frappaolo, 1995; Sprague, 1995). By this technical distinction, the document management researchers in the IS field have underlined the importance to manage also "unstructured" data in addition to strategic business applications built on voluminous structured databases that have been highly visible in the mainstream IS research. For instance, Sprague (1995 p. 32) states that a document is something "... stored as a unit" despite of his otherwise organization-centric view to EDM. This distinction, however, leads to the above-described standpoint of IS research in which EDM is still regarded as somehow technologically separated field from "the rest of" IT and recorded data in the organization. Moreover, the technology-centric fields of document mark-up languages, multimedia, and hypermedia had already questioned the idea of a document as one physical unit (Goldfarb & Rubisky, 1990; Gruber, Vemuri, & Rice, 1997; Levy, 1993; Maler & El Andaloussi, 1996; Newcomb et al., 1991; Thüring, Hannemann, & Haake, 1995). The relationship between the concepts of the document and data becomes yet more problematic along with XML documents, which can be used for integrating and presenting information extracted from structured databases (Fisher & Gangolly, 2001; Li, 2000).

Ellis (1986), however, suggested that "abstract documents" representing the logical content of a document in a particular office context should be distin-

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[3] The book originates in the conference proceedings of the International Working Conference on Information and Process Integration in Enterprises (IPIC'96) held at Massachusetts Institute of Technology on November 14 15, 1996.

guished from "concrete documents" instantiated by a certain technological implementation. I.e., he denoted a document as a logical unit of interest independent of any connotations related to the technological implementation of document storage. Since the mid-1990s, the logical and socio-organizational meaningfulness has increasingly characterized a "document" in a proportion of the document management literature (Brown & Duguid, 1996; Gordon & Moore, 1999; Päivärinta & Tyrväinen, 1998; Schoop, 2001; Wakayama et al., 1998). This dissertation adopts the following definition based on this viewpoint:

A *document* is a logical unit of recorded data, which can be presented meaningfully for one or more human beings in at least one socio-organizational context. If the data are recorded on digital media, we can speak of a *digital document*.

In the light of the above definition of a document, it is useful to repeat the working definition for EDM here; adopted from Sprague (1995, pp. 31-32).

Electronic document management (EDM)[4] involves the utilization of IT for the functions for "creation, storage, organization, transmission, retrieval, manipulation, update, and eventual disposition" of digital documents "to fulfill an organizational purpose".

A plethora of commercial IT products, services, and their vendors can be identified with the domain of EDM (Cimtech, 2001). Yet another number of other IT products relates to the field, such as the infrastructure-level technologies highlighted by Sprague (1995), which must be taken into account in any organization pursuing effective EDM. Hence, the development of EDM should not be regarded as "just another technological fad" or a particular IT application to be discussed by the IT experts only. Instead, it would be more fruitful to consider the development of EDM as a comprehensive program to develop the management of a major proportion of organizational information resources for effective human consumption and communication. In the contemporary jungle of commercial software packages and services provided by an army of vendors and consultants, organizations need practical development approaches and methods for developing EDM from the viewpoint of the organization – so that a viewpoint of any particular technology could be comprehended in relation to the socio-organizational needs, not vice versa.

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4 In some references, practical language, and in one of the articles included, the acronym EDM stands for the phrase "enterprise document management". The use of the word "enterprise" in this context is aimed at distinguishing between the need to manage all documents in an organization holistically, had their data been recorded either digitally or otherwise in a particular organization (Sutton, 1996), whereas electronic document management focuses on digital documents. I usually refer to the development of EDM with the idea that the use of modern IT for document management is promoted in those initiatives. Hence, the acronym EDM stands for "electronic document management", unless stated otherwise.

2 RESEARCH GOAL AND METHODOLOGY

"If you answer a silly question, you are just as silly as the person who asked it."
(Proverbs 26:4, King Solomon, c. 900 BC, Good News Bible)

"By the way, in your opinion, what's the best document management system?"
"I don't know."
(A question of a CIO I once met during a practice-oriented seminar on modern IT in industrial organizations, followed by my answer, autumn 1999)

2.1 Research Goal

The research process leading to this dissertation has actually its roots in the technology-centric viewpoint that has dominated the document management research, as illustrated in the previous section. A small-scale collaborative project among the University of Jyväskylä, the Finnish Technology Development Centre, and an energy corporation was started in autumn 1995 and entitled as "Docu9000 - Quality Criteria for Electronic Document Management". The aim was to search for a set of quality criteria to be used as a basis for requirements analyses concerning commercial software packages labelled as "electronic document management systems" (EDMS) to be acquired in the organization. The target organization of this small-scale study was a maintenance organization of a power plant. The initial phases of this research were reported by Päivärinta, Salminen, and Peltola (1999) (which is not attached here) and the effort was continued to form a longitudinal study; i.e. Article I attached to this dissertation.

However, the experiences from this initial intervention concretised Sprague's (1995) conclusion that EDM, indeed, involves several information technologies, application areas, and stakeholders in the organization; it was not a clear area of IT to be easily demarcated for further research. Furthermore, although a set of general-level quality criteria for organization-wide EDM were

defined as a basis for requirements analysis in this case (Päivärinta et al., 1999), the experiences implied that, rather than scattered answers to highly focused research problems concerning a narrow set of technologies or functions at a time, organizations would need well-formulated, still practical, general-level approaches to developing EDM from the organizational viewpoint as a whole. For this purpose, a three-year research project named METODI (MEthods for TOtal Document management in Industry, standing also for the Finnish concept of a "method") was launched in January 1997; again, in collaboration among the University of Jyväskylä, the Finnish Technology Development Centre, and a number of representatives from Finnish industry. This dissertation forms a part of the project's results.

Iivari, Hirschheim, and Klein (1998) have defined an *approach* to information systems development (ISD), which is applied to the development of EDM here, as: "goals, guiding principles, fundamental concepts, and principles for the ISD process that drive interpretations and actions in ISD" (p. 166). An ISD *method*[5] is "a predefined and organized collection of techniques and a set of rules which state by whom, in what order, and in what way the techniques are used" (Smolander, Tahvanainen, & Lyytinen, 1990; Tolvanen, 1998, p. 33), whereas a *technique* is "a set of steps and rules which define how a representation of an IS is derived and handled using some conceptual structure and related notation" (Smolander et al., 1990; Tolvanen, 1998, p. 33).

The main goal of this dissertation is to construct a practical, still theoretically sound, approach to (including a method for) requirements analysis for EDM from the viewpoint of the organization.

Especially, following the definition of the ISD approach, the work has focused on the following questions and goals:

1. What goals, fundamental concepts, guiding principles, and principles for the development process would be adequate to be taken into account in methods, techniques, and practices aimed at supporting the development of EDM in the organization; i.e. what should be included in a reasonable approach to develop EDM in the organization?
2. How could a method, which was to be engineered for instantiating that approach, actually support the practical development of EDM?
3. How does the established development approach to, and method of, EDM relate and contribute to the other methods in the field of EDM and the most common ISD approaches in general?

Questions 1 and 2 are discussed in the six attached articles. Question 3 is scrutinized in section 4 of this introductory part.

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5 Iivari, Hirschheim, and Klein (2001) denote that the terms "ISD method" and "ISD methodology" are used differently in Europe and North America. In North America, the term "ISD methodology" corresponds to the notion of "ISD method" as it is used here, whereas in Europe "methodology" most often means the study of methods.

2.2 Metatheoretical Assumptions

Before declaring the research methodology, it is necessary to sketch the (meta)theoretical background that has guided my selection of the research approach as a whole, as well as the particular research methods used. The initial experiences from the intervention to the first target organization mentioned above (Päivärinta et al., 1999) guided the subsequent adoption of theoretical influences. Especially, Jürgen Habermas' Critical Social Theory (Habermas, 1984, 1987; McCarthy, 1978) and Anthony Giddens' Structuration Theory (Giddens, 1984) have since then influenced my world view and the handling of the research questions. Let us next clarify their impact on this thesis.

2.2.1 Critical Social Theory

Jürgen Habermas' Critical Social Theory (CST) (Habermas, 1972, 1984; McCarthy, 1978) has contributed to the ISD research since the 1980s. Together with General Systems Theory and its applications, such as Checkland's seminal "Soft Systems Methodology" (SSM) (Checkland, 1981), CST problematized the "scientistic" tradition in which goals and values of systems development were simply accepted as given and rational as such, based plainly on the technical interest in their implementation (Avgerou, 2000; Lyytinen & Klein, 1985). Instead, mutual understanding on the relevant problems and the means to solve them among the stakeholders should be communicated and reached during the ISD process before the technological system implementation (which was also highlighted in SSM).

In addition to this communicative interest seeking mutual understanding in itself, the CST standpoint highlighted that the ISD process, which represents a kind of social interaction among the stakeholders who strive for improvements in work life, should pursue the emancipation of all stakeholders. Those affected by the future system thus should be able to participate in the critical debate so that it would satisfy all stakeholders to the greatest possible extent by emancipating them from misunderstandings, delusions, and other physical and social factors hindering personal satisfaction on their daily work, without forgetting those responsible for the organization as a whole (Ngwenyama, 1991). This critical debate should also pursue "the ideal speech situation" in itself, i.e. all stakeholders should ideally have equal rights and opportunities to participate in the argumentation on things under development that affect their work (Lyytinen & Klein, 1985). The resulting information systems (which are aimed at supporting communication at work), as well as the social interaction taking place during the ISD process, should strive for "universally valid communication", i.e. communicative actions taken by the stakeholders should ideally be comprehensible, honest, accurate, and socially appropriate within the community in question and with regard to the surrounding society (Hirschheim, Klein, & Lyytinen, 1996).

The application of CST and the emancipatory principles for the ISD process have also been criticized in the literature, most ardently by Wilson (1997). Especially, he states that the emancipatory ideals as such form a metatheory based on faith in the "goodness" of its interests rather than rational reasoning. He also addresses the failure of the CST approach to explore power relations that are inherent in social relationships. Moreover, the CST approach fails to consider the hidden, still always existing, individual interests conflicting with the "common good". Finally, Wilson (1997) argues that the promotion of these ideas as such requires a group of faithful disciples who would steer the development processes towards these ideals, hence dividing people to those who still can dominate others – now just by means of better reasoning against those who are not so skilled in argumentation.

Despite of this criticism, however, I adopt the philosophical standpoint that the emancipatory and communicative interests with the ideals of "the ideal speech situation" and "universally valid communication" represent something worth to be *pursued* – altogether, equally, and simultaneously among an assembly of relevant stakeholders – in the development of EDM (despite that they can probably never be "absolutely" reached) in addition to the technical interest to achieve technologically well-functioning systems with reasonable development resources.[6]

2.2.2 Structuration Theory

The basic idea adopted here from Anthony Giddens' Structuration Theory (ST) (Giddens, 1984) goes actually back to Berger and Luckmann's seminal argument according to which social reality is intersubjectively constructed by continuous interaction among individuals and the more or less commonly identified, and "reified", social structures of the community in question (Berger & Luckmann, 1966). According to Giddens, these structures play a dual role in organizational change: they are simultaneously enabling and constraining the stakeholders to think and act in the social environment. Individual human beings can also affect those structures with their own actions, either deliberately or implicitly. These actions can reproduce the enacted structures in the community in question, e.g. in an organization, or contradict them in such a way that the degree of their enactment decreases (Giddens, 1984). Along time, all observed structures of the organizational reality and concepts to construct, discern, and (re)produce them among the stakeholders are likely to change; some incrementally, others more radically.

Based on two of Jones' (1999) altogether four categories describing the influence of ST in the IS literature, ST has informed this dissertation in two ways. Firstly, ST is regarded as a *meta-theory*, which explains how research and theories on ISD approaches and methods interact with ISD practice and vice versa.

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6 This idea emerged strongly from Rudy Hirschheim's and Heinz Klein's speeches in a panel discussion at the 1st Critical Management Studies Conference, Manchester, 16 July 1999, in which they defended their works against the criticism originating in Wilson's (1997) article.

That is, IS development approaches and methods, and even theories concerning ISD, are more or less socially constructed artifacts, being under continuous process of structuration by several stakeholders involved in the elaboration of those approaches, methods, and theories. These stakeholders include at least IS researchers, IS developers, decision-makers on ISD, and end-users. The current state of any ISD approach should thus be seen as representing the current state of social structuration of that particular area of ISD as interpreted and affected by the stakeholders involved, with several influences from both scholarly and practical stakeholders carrying interests in the area in question. Hence, ST has clearly affected the research process of this dissertation as a whole, as declared in section 2.3.

Secondly, the development approach to EDM constructed in this thesis attempts to *integrate the idea of intersubjective social structuration* among the stakeholders *with the selected ideals of CST* to guideline the deliberate development efforts on EDM in the organization. In addition to the research process, ST has thus affected the results of my research as well.

2.3 Research Process and Methods

To create a valuable contribution to the organizational viewpoint to develop EDM, research efforts involving real-life organizations are most probably required. Hence, purely theoretical or technological constructions were considered inadequate as the primary means for reaching the research goal. As the development of EDM in the organization was seen as a complex phenomenon (intertwining a number of application areas, contemporary information technologies, and organizational stakeholders), quantitative and statistical research methods, such as those using *a priori* theory-based questionnaires with large populations of organizations, seemed rather inadequate as well. Another reason for rejecting a large-scale quantitative orientation originates in the fact that the field of EDM has been under tremendous and unforeseeable technological evolution without a commonly accepted set of concepts to construct a valid system of quantifiable variables whose interdependence could be adequately surveyed.

Furthermore, the philosophical standpoints suggested by CST and ST oppose the supposed dichotomy between "pure" research efforts and "objectively observable" practice in the disciplines researching phenomena that take place in human communities, such as EDM. Rather, I regard my role of the IS researcher as an agent acting in the complex socio-organizational world (in which the phenomena of EDM and EDMS are researched, designed, consulted, acquired, delivered, implemented in organizational contexts, and used) in collaboration among various other stakeholders, such as other researchers, end users, software vendors and consultants, organizational decision-makers, and IT personnel. Such researcher pursues theoretical and abstracted knowledge in a mutually constitutive process that intersects research and practice, trying, in turn,

also to achieve an impact on contemporary practice of EDM development with that knowledge. Miller and King, drawing on Giddens' ST, call this research orientation "practical theory" in the field of public administration (Miller & King, 1998). In the field of general systems theory, Checkland's seminal construction and long-term development of the "Soft Systems Methodology" (SSM) for systems analysis has adopted this research approach to produce both practical and theoretical contributions since the 1970s. Checkland's research approach in the field of systems analysis in general has already been recognized as a relevant research orientation within the IS discipline as well (Checkland, 1981, 1991). Although this orientation is sometimes labelled plainly as "action research" within the IS discipline (Checkland, 1991), a general-level research program involving the orientation of practical theory can also include other research methods within the general-level goal of reaching an impact to practice as well as research, as is the case here. Hence, rather than pursuing scientifically "objective" method knowledge of ISD, this dissertation aims at in-depth understanding of the complex problem area of EDM development, from which useful and illustrating (but not necessarily scientifically "best") method knowledge could, however, be inducted and abstracted.

Within this research orientation, research activities on and between four "stages" formed a continuous cycle of learning during the five-year research period (Figure 1). The first stage represents efforts on delving into existing research and theories on EDM, IS, and the schools of scholarly research in general. The existing literature provides values, assumptions and more detailed theories for research and construction on development approaches to EDM on the second stage. The existing theoretical knowledge absorbed from the literature also provides the framework to make sense of the observations from practice, and to let the practical observations, in turn, influence further to the selection of theories that would guideline subsequent research. The second stage is based on the concept of the ISD approach, and the conceptual distinction between ISD approaches and methods to improve the comparison between different schools of ISD and their development recommendations (instantiated in the form of detailed methods and techniques), which were recently established by Iivari, Hirschheim, and Klein (1998, 2001). Research on the stage of development approaches provides goals, guiding principles, fundamental concepts, and principles for the development process for the third stage; on which detailed methods and techniques to test the approach-level ideas in practice are engineered. Finally, on stage four I have participated in practical development initiatives on EDM in organizations, and gathered experience-based data also from other actors that have done so elsewhere, to have a flavour of practice to inform the efforts on stages one, two, and three.

The details of the particular research methods are reported in the articles. However, the choices of the methods are explained in the following from the viewpoint of the research process as a whole.

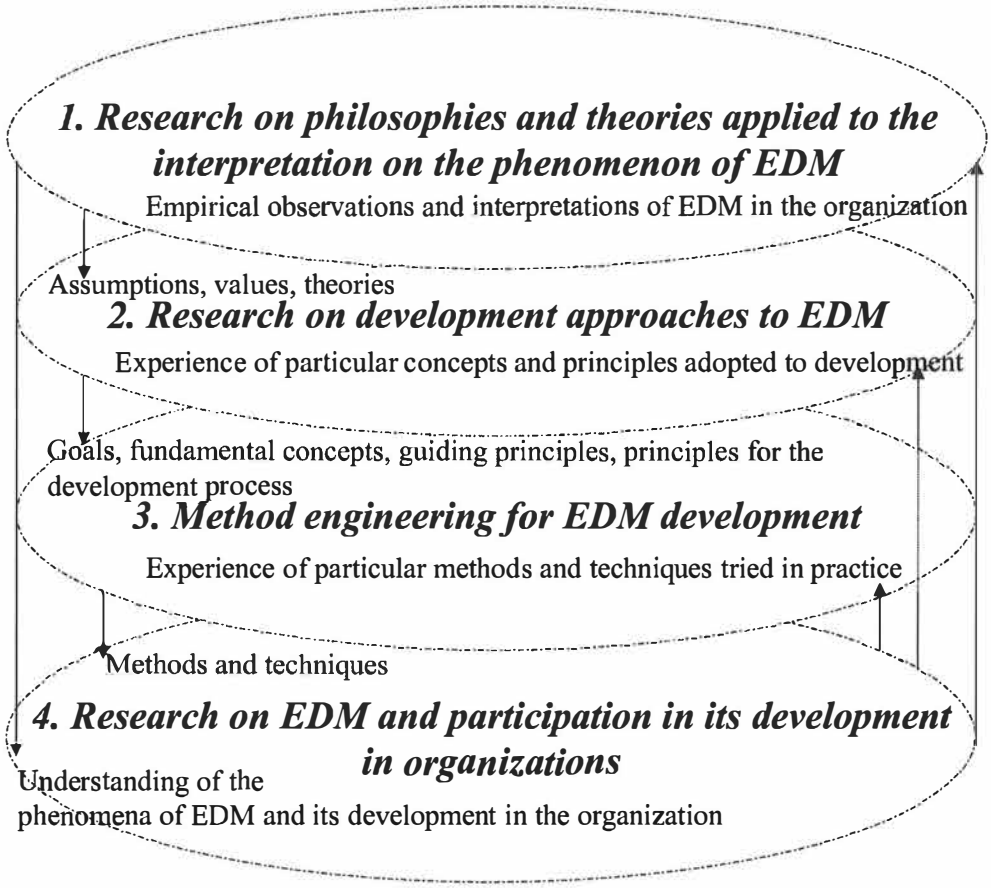

FIGURE 1 Four Stages of Research Activities Related to the Development of EDM

As no sufficient *a priori* theory of the development of EDM from the viewpoint of the organization to start with the research goal was available when this study was launched in 1996, an exploratory case study (with a piece of action research) to get in touch with the topic in practice was conducted, as recommended by Yin (1989). The first part of the study, which is reported elsewhere (Päivärinta et al., 1999), helped to formulate the research goal. The study was continued to create practical understanding of the development of EDM in the organization along time, which is reported in Article I. Based on this exploratory experience, the genre theory of organizational communication (Orlikowski & Yates, 1994; Yates & Orlikowski, 1992) was chosen as the theoretical and conceptual standpoint to guideline the subsequent research efforts to construct a development approach to EDM. Especially, genre theory seemed to provide a significant degree of natural *fit* (cf. Strauss & Corbin, 1990; Järvinen, 2001, p. 65) with our observations how people were actually structuring the domain of document management in relation to their work in the exploratory study, as explained in section 3.1.4.

A field experiment was next launched to gain preliminary knowledge of how a genre-based analysis of the organization's documents could contribute to the rethinking of document management among three persons responsible for coordinating the development of EDM in the target organization. The implications of the field experiment, reported in Article II, encouraged the author to continue with two streams of research on the questions 1 and 2:

- Research-oriented method engineering to promote the application of genre theory to the development practice (reported in Articles III and IV) followed by the analysis of experiences from business-oriented method engineering efforts conducted independently of the researcher in a consultancy that had adopted the method in question (reported in Article VI).
- An approach-level theoretical discussion on genre theory and Habermas' CST for establishing and discussing the potential of genre theory to contribute to the critically oriented ISD in general (including the field of EDM), which is reported in Article V.

Finally, to crystallize the theoretical and conceptual contribution of the genre-based development approach to EDM, section four of this introductory part reviews the EDM literature concerning reported methods and systematic practical recommendations for the development of EDM and compares other IS development approaches with the one established here.

All in all, according to Järvinen's (2001) categorization of the research approaches to construct new innovations, this dissertation represents an example of the construction of a normative ISD approach (instantiated by a practical ISD method), which is derived inductively from practice, still with a continuous reflection on, and thus growing theoretical awareness of, contemporary literature. The dissertation includes the parts, which Järvinen (2001, p. 103) recommends to be reported about this kind of research, as declared in the following. New technical, social, and informational opportunities for constructing the development approach to EDM from the viewpoint of the organization are motivated in section 1 of this introductory part as well as in Articles I and II. The construction and first results of the practical testing of the method are reported in Articles III-VI. A survey of earlier methods and approaches and the comparison of the new method with the old ones are reported in section 4 of the introductory part. Section 5 provides a concluding general-level discussion on the results reached thus far.

3 OVERVIEW OF THE ARTICLES

"My son, there is something else to watch out for. There is no end to the writing of books, and too much study will wear you out."
(Ecclesiastes 12:12, c. 900 BC, Good News Bible)

"Publish or perish!" (Anon.)

"Mostly, the article-based doctoral dissertations include four to six articles."
(H. Karsten, K. Lyytinen, E. Peltola, & M. Rossi, Kuinka tulla tohtoriksi ['How to reach a PhD']?, p. 40. University of Jyväskylä, Dept. of Computer Science and Information Systems, 1997. My translation from Finnish)

This section briefly describes the research objectives, methods, and results of each of the six articles attached to this dissertation, and declares their logical interrelationships that are not always self-evidently present in the articles themselves, which were published as individual pieces of research in two journals, one edited book, and three conferences. The publication details of the articles and co-authors are presented. The division of work and my contribution in the co-authored articles are clarified in subsection 3.7.

3.1 Article I: "Deliberate and Emergent Changes on a Way Toward Electronic Document Management"

Päivärinta, T. & Salminen, A. 2001. Deliberate and Emergent Changes on a Way Toward Electronic Document Management. *Annals of Cases on Information Technology* 3, 320-333.

3.1.1 Research objectives

As a dearth of theoretical and empirical knowledge of EDM from the viewpoint of the organization has continued to date, the aim was to gain a practice-oriented view on the development of EDM in the organization along time. The target organization (a maintenance organization of a power plant) was interesting for four reasons: firstly, heterogeneous document resources are needed in the maintenance processes; secondly, the organization had just started to move from paper-based document distribution towards EDM; thirdly, the limited number of user roles in the middle-sized power plant allowed an in-depth study on holistic EDM with moderate research resources; and fourthly, the organization was famous in the region of its quality system approach to practice long-term improvements in the business, which was expected to boost the coordinated development of EDM as well.

3.1.2 Research method

An exploratory and longitudinal case study on the deliberate development actions, as well as emerging encounters, affecting EDM along time was launched. The exploratory approach to grasp a research question that involves a thin base of existing literature is recommended, e.g., by (Yin, 1989).

3.1.3 Results

The paper describes the organizational and technological changes affecting EDM in the maintenance organization of the Rauhalahti power plant – a middle-sized power plant in Central Finland. The case shows that a shift from the paper-based era towards organization-wide EDM is a comprehensive change both affecting and affected by several components in the organization; such as organizational goals and processes, people and their roles, the mother corporation and the environment in general, documents needed at work, and information technologies.

Especially, the case illustrates that both deliberate development efforts and emergent events can affect the development of EDM as a whole in the organization. The development cannot, and should not, be idealistically deliberate all the time. Defined responsibilities and shared organizational guidelines, compatible with contemporary IT capabilities, are needed for coordinating the development and reacting to the emergent encounters to ensure effective EDM in the organization along time. Although the researchers first expected that the development of EDM in the target organization would emerge as a clear and concise system development project in the technological sense, the case implies that the development of document-based information systems would continuously require reactions to emergent business forces and technological opportunities in addition to those changes that can be thoroughly planned beforehand. Organizations familiar with the change management methods originating in the quality system approach – such as the ones used in this case (a feedback system,

influential development groups, systematic analysis of the current situation and future needs, explicit quality criteria, explicit responsibilities, and documented guidelines) – may already have a solid foundation to promote the deliberate and coordinated development of EDM and the capability of reacting to the emergent changes effectively.

3.1.4 Relation to the whole

In the initial phase of the case study, reported in more detail in (Päivärinta et al., 1999), organization-wide quality criteria to guide EDM development were pursued. However, the organization-level criteria defined had not been significantly utilized in subsequent development efforts after the acquisition of an electronic archiving system. This observation steered us to search for a more detailed theoretical basis to delve deeper into the development needs for EDM from the viewpoint of the organization. In the same initial effort, a document list of the organization, including c. 100 items, was collected from the interviewed representatives of 19 end-user roles.[7] A major proportion of the named "documents" on the list corresponded clearly to the concept of genre of organizational communication (Yates & Orlikowski, 1992), although no theoretical bases then had guided the naming of the documents. Hence, the concept of the genre of organizational communication seemed to represent a rather natural way, a *theoretical fit* (cf. Strauss & Corbin, 1990; Järvinen, 2001, p. 65), to structure information in the organization by those who produced and used documents in their everyday work duties. As a result from these practical experiences and continuously ongoing literature review, genre theory was thus chosen as a potential theoretical basis for the subsequent research and development efforts. Furthermore, the number of stakeholders, involved in the development of EDM with varying interests, as well as the continuous restructuring of EDM within the organization along with the deliberate development initiatives and emergent events suggested the philosophical backgrounds of ST and CST as meaningful metatheoretical bases for guiding subsequent research and development efforts.[8]

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7 This document list was attached to a project report delivered to the target organization in June 1996. As the organization-specific data is confidential, the list has not been included in the research articles of the project. However, the questionnaire that was used in those interviews, including the part for finding out what documents existed in the organization, was attached to the previous conference article of the project (Päivärinta et al., 1999).

8 The contemporary theoretical works of Hirschheim, Klein, and Lyytinen (1995, 1996), in which the theoretical schools of ISD were identified, categorized, and discussed, provided a basis for choosing the philosophical orientation of the subsequent research efforts, when compared to the practical experiences from the target organization of Article I.

3.2 Article II: "On Rethinking Organizational Document Genres for Electronic Document Management"

Tyrväinen, P. & Päivärinta, T. 1999. On Rethinking Organizational Document Genres for Electronic Document Management. In R. H. Sprague, Jr. (Ed.), *Proceedings of the 33rd Annual Hawaii International Conference on System Sciences (HICSS); Digital Documents Track.* Los Alamitos CA, IEEE Computer Society. CD-ROM.

3.2.1 Research objective

The research aim of this paper was to gain preliminary knowledge of the usability of the genre-based analysis of organizational document resources.

3.2.2 Research method

Before this research, a comprehensive repertoire of 524 genres of organizational communication had been extrapolated in an industrial target organization in connection to the definition of corporate information architecture. The paper reports a field experiment in which 11 document genres of those 524 were scrutinized by three IS developers of the target organization with a previously developed conceptual framework to analyze documents (Päivärinta & Tyrväinen, 1998) (which is not included in this dissertation). The IS developers were motivated to participate in the experiment as they were responsible for coordinating the development of EDM and related development issues in the organization at the moment.

3.2.3 Results

The genre-based information architecture initiative (that had formed the basis for the experiment in the first place) illustrated the great heterogeneity of organizational information resources, of which the major part involved documented information, for the researchers and the IS developers of the target organization. The experiment revealed that objective in-depth understanding of the needs for EDM among different stakeholders of the target organization could not be straightforwardly defined by those IS developers (who participated in the experiment) who, however, were in charge of coordinating the development of EDM and acquiring the related IT packages. This implies that separate stakeholders may have diverging knowledge of current situation in EDM and differing objectives for the future. Hence, EDM should be regarded essentially as a socio-organizational domain of interest within which technological solutions have to be critically discussed and enacted among the necessary stakeholders – such as IT experts, managers, and end users – before the acquisition and implementation of particular software packages. Furthermore, the participating IS

developers considered themselves rather incapable of comprehending development needs for all the (more than 350) document genres by themselves – despite of the fact that they were responsible for deciding on the technological recommendations for EDM. Rather, they highlighted the importance of "common language" and wide participation of the stakeholders during the development process to extrapolate relevant knowledge of the desired EDMS. They saw that the genre-based discussion could form a promising basis to delve deeper into the requirements analysis for EDM in collaboration with the stakeholders, if elaborated more towards practice.

3.2.4 Relation to the whole

The experiment supported the selection of the organizational viewpoint with the fundamental concept of genre as the basis for further research and encouraged us to elaborate it further towards a more concrete approach and method for developing EDM in a participative way. Moreover, the experiment, with the experiences enlightening the IS developers that they alone were rather incapable of analyzing the needs for EDMS properly without a wide participation, awoke the idea of researching the possibility to promote the principles of CST with the fundamental concept of genre to form a critically oriented approach for developing EDM in the organization. This field experiment thus inspired the research process that led to Article V.[9]

3.3 Article III: "Genre-Based Metadata for Enterprise Document Management"

Karjalainen, A., Päivärinta, T, Tyrväinen, P., & Rajala, J. 2000. Genre-Based Metadata for Enterprise Document Management. In R. H. Sprague, Jr. (Ed.), *Proceedings of the 34th Annual Hawaii International Conference on System Sciences (HICSS); Digital Documents Track.* Los Alamitos CA, IEEE Computer Society. CD-ROM.

3.3.1 Research objectives

The aim was set at elaborating a practical genre-based method for specifying requirements for EDM in the organization.

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[9] This study was the only empirical basis used in a conference article (Päivärinta, 1999), in which I first presented a preliminary theoretical contribution concerning the concept of genre within CST and which was elaborated further in Article V.

3.3.2 Research method

A preliminary method for identifying and analysing the genre repertoire of an organization with regard to EDM was constructed and tested in a target organization by an action research cycle, which is regarded as an effective way to create practical and in-depth method knowledge (Checkland, 1981; Siau & Rossi, 1998). Saaren-Seppälä's (1988) diagonal matrix -technique was chosen for gathering genres from the participants because of its simplicity and familiarity in Finnish systems analysis practice for two decades (Iivari & Lyytinen, 1999). It was also used in the genre-based information architecture project mentioned in Article II. Now, the technique was used to extrapolate, in particular, document genres in relation to their producers and users as identified in the target organization. A "genre list" technique was elaborated for the purposes of this research effort. In addition to the method engineering as such, the research sought for additional practical experiences from the genre-based approach in general.

3.3.3 Results

The experiences confirmed usefulness of the genre-based conceptual approach to analysing requirements for EDM in the organization. The paper implies that, without an in-depth analysis, a great many of genres of organizational communication, including document genres, are, indeed, "soft" and implicit (Schultze & Boland, 1997; Yates, Orlikowski, & Okamura, 1999), carrying different connotations for different stakeholders, and being implemented by various technological means in slightly varying forms. The study also confirms that an extrapolated and analysed repertoire of document genres provides a useful conceptual means capable of bridging discussion about the socio-organizational aspects of EDM with potential capabilities provided by contemporary information technology. For this purpose, the paper outlines a preliminary method that was constructed at the outset of the study and reports feedback for elaborating the method further. In this sense, the article exemplifies and illustrates the potential of the genre-based approach in responding to the problems of EDM development caused by continuously evolving information technologies and organizational processes. Hence, the effort provides a practical ground for additional method engineering efforts on the genre-based development of EDM.

3.3.4 Relation to the whole

Together with Article II, these practical experiences supported the theoretical elaboration concerning genres within the ideals of CST that is reported in Article V. As this research was a part of the three-year collaborative project with the Finnish industry (METODI), in which one of the participants was a consulting firm in the field of EDM, this firm adopted the method knowledge reported in this article and developed the method further independently for their own business activities, of which experiences are reported in Article VI. The paper

provided also the basis for the subsequent research-based method engineering efforts that are crystallized in Article IV.

3.4 Article IV: "A Genre-Based Method for Information Systems Planning"

Päivärinta, T, Halttunen, V., & Tyrväinen, P. 2001. A Genre-Based Method for Information Systems Planning. In M. Rossi & K. Siau (Eds.), *Information Modeling in the New Millennium*. Hershey PA, Idea Group, 70-93.

3.4.1 Research objectives

This paper focuses on crystallizing the contemporary experiences from the use of the genre-based analysis towards an abstracted method that could be used for information systems planning (including the requirements analysis for EDM) in the organization.

3.4.2 Research process

After the first action research effort to construct a practical, genre-based, method of developing EDM, which was reported in Article III, the method was applied and elaborated further in c. 10 organizations, including mostly small and medium-sized organizations with three companies involving more than one hundred employees. The method was used in connection of collaborative research and development projects between the local organizations and the University of Jyväskylä.[10] The companies in question mostly wanted their all information resources to be analysed for holistic information systems planning for the organization, which explains the general term "information systems planning" in the title instead of EDM. However, as the major part of communicative genres identified in those organizations were actually document genres (or they represented recurrent communicative actions that were desired to be documented more systematically in the future), and because the major part of genre properties under analysis in those collaborative efforts focused on documented information, I regard this article as suitable for presenting the genre-based method in the context of developing EDM that is the focus of this disser-

[10] The method was used for information systems planning in general in ten small- and medium-sized companies in connection with the GTCDoc Project in 1999-2001, which was funded by the European Union and conducted by Information Technology Research Institute (University of Jyväskylä) and the participating firms. In addition, the method was used for defining requirements for EDM in a corporate unit that participated in the METODI-project in 1999 and for information systems planning in two additional organizations along with individual research and development initiatives within the University of Jyväskylä in 1999. I participated personally the last three initiatives, whereas one of the co-authors had gathered experience from the method in the GTCDoc project, as he played the role of the project supervisor.

tation, despite of the more general scope of the genre-based method in this particular article.

3.4.3 Results

The article declares the basic concepts, development process, techniques and their notations, participation and roles, and the objectives of the genre-based method, by which method knowledge can now be disseminated for other potential users of the method, as well as those researchers willing to compare it with other methods. This description of the method demonstrates how a comprehensive, still easily analysable and maintainable, model of organizational information resources (including documents) can be constructed by extrapolating the genre repertoire of the organization in question. The article also discusses this particular method in the light of a set of philosophical maxims originating in ST and CST and, in the light of the experiences, suggests the potential of this genre-based method to fulfil these maxims in the field of information systems planning.

The method incorporates the following basic concepts. A *stakeholder* has interests in planning for the relevant portfolio of information systems in the organization (including EDM). A *genre* of organizational communication refers to a recurrent communicative action characterized by its communicative purpose and, to some extent, by its form within the community of people recognizing it as a valid way to communicate (Yates & Orlikowski, 1992). Organizational information resources (including documents) can be discerned, structured, and analysed according to the repertoire of genres identified. *PUI* (PUI = Producer or User of Information) *entities* produce and receive communicative utterances in the organization, more or less according to the explicitly identified genres. PUI entities can include organizational tasks, processes, units, groups, roles, teams, and even individuals - depending upon how the stakeholders wish to conceptually structure the organization under analysis. *Properties* of the extrapolated genres represent the topics of interest, under which *metadata* can be gathered, for the requirements analysis for the portfolio of information systems (including EDM).

The method process comprises six iterative steps:

1. Identify the stakeholders of IS planning (or the development of EDM). The step produces a list of participating stakeholders.
2. Identify PUI entities. The step produces a list of PUI entities related to the domain of the development effort.
3. Identify and name genres of communication taking place among the PUI entities. The step produces a diagonal matrix -model (Saaren-Seppälä, 1988) that consists of the PUI entities and genres, from which a genre list that describes the repertoire of genres that should be scrutinized further in the development effort can be formed.

4. Identify properties of the genres that are relevant to be analyzed of each genre in connection to the development effort. The properties are added as columns to the genre list, e.g. on a spreadsheet.
5. Gather metadata about the genres under the desired properties. The step produces an unanalyzed spreadsheet of genres and their properties.
6. Analyze and redefine the genre-based metadata to constitute an IS plan (or a requirements definition for EDM in the organization).

The method includes two particularly defined modeling techniques and notations: the diagonal matrix and genre list (as already introduced in Article III). The diagonal matrix is a specialized application of Saaren-Seppälä's (1988) manual "wall-chart" technique for gathering knowledge of the PUI entities and genres from participants, whereas the genre list simply tabulates the genres, PUI entities, and additional properties with the metadata analyzed of them for enabling their simple but effective analysis in a spreadsheet application.

A wide assembly of stakeholders, such as end users, IT experts, and managers, are expected to participate throughout the development process. The general-level scope of the method is to produce the requirements specification for the portfolio of information systems in the organization, which is a relevant scope in the development of EDM from the organizational viewpoint as well.

3.4.4 Relation to the whole

The continuous development of the genre-based method in 1998-99, whose version at the outset of the new millennium is described in this article, affected also the approach-level discussion of the concept of genre within the critical approach to information systems development reported in Article V. As well, during the METODI project, the target organization of Article VI was continuously represented in the board of the project, thus gaining the contemporary information about the recent elaborations of the genre-based method from the university-based method engineering efforts. Hence, the method engineering information reported here has affected, in part, the method of developing EDM that is used by the target consultancy of Article VI. Together with Article III, this paper provides the basis for comparing the genre-based method of developing EDM with the other development methods concerning EDM, which is conducted in section 4 of this introductory part of my dissertation.

3.5 Article V: "The Concept of Genre within the Critical Approach to Information Systems Development"

Päivärinta, T. 2001. The Concept of Genre within the Critical Approach to Information Systems Development. *Information & Organization, 11*(3), 207-234.

3.5.1 Research objectives

Jürgen Habermas' CST has been regarded as a potential approach to ISD. Especially, the CST approach regards mutual understanding, human emancipation, and technical interests in ISD as the three equally relevant rationality orientations that should guide the critical debate on the desired IS among a wide assembly of stakeholders. However, the critical theorists in the IS discipline have hitherto defined few fundamental concepts to be adopted in practical systems development methods involving the critical orientation. This paper aims at discussing the potential of the genre theory of organizational communication (Yates & Orlikowski, 1992) as a conceptual basis for modelling of the IS under development as well as the critical debate among the stakeholders during the development process.

3.5.2 Research process

The paper includes a conceptual and theoretical discussion that examines the concept of genre in the light of the maxims identified with CST in the IS literature. The theoretical suggestions are partially illustrated from the practical viewpoint with experiences from the two previous genre-based studies, reported in detail in Articles II and III, in which genre-based thinking was applied to the analysis and development of EDM in the organization. The concept of genre was also briefly compared to the concept of speech act, which represents the pioneering concept to model information and organizational communication within the critical ISD approach.

3.5.3 Results

From the viewpoint of this dissertation, this article discusses, in theory, the potential of the genre theory of organizational communication to serve as a conceptual basis for operationalizing the ideals and goals of CST in the development of EDM (and ISD in general). The article suggests and illustrates that the genre concepts have the potential to enhance the communicative, emancipatory, and technical rationality orientations to ISD; equally and simultaneously. The fundamental concepts of genre theory are introduced. The article also compares the concept of genre with the concept of speech act, and suggests the concept of genre to be more practical within the critical approach to ISD as the basic concept for modelling information (at least the "product-like" documents). Especially, the article illustrates the following theoretical suggestions provided by the genre-based approach, informed by CST, which can be applied to, and tested in, practical methods and efforts for EDM development in the future.

The genre-based approach sensitises the dual nature of documents by denoting, on the one hand, document genres as socio-organizationally enacted objects of interest, being still, on the other hand, capable of capturing technological requirements for processing, storage, and presentation of the data related to

those genres. The genre-based approach thus has potential of bridging the gap between the critical social debate and technological aspects of developing EDM.

Document genres are comprehended and enacted differently within different communities of people. The development of EDM does not need to be always debated among a wide assembly of stakeholders; those stakeholders involved in the use and development of particular genres can now participate in the development process in the focused way genre-by-genre. On the other hand, the genre-based approach can reveal those widely shared document genres that should be scrutinized, enacted, and possibly standardized among a great number of stakeholders. This increases understanding of who should participate in which debate concerning the development of EDM for particular document genres.

As a great number of document genres were found in the target organizations of Articles II and III, the genre-based approach seems to provide a detailed map of organizational document resources for the development of EDM. By this map, focused problems and challenges concerning EDM can be recognized, attached to, and discussed with regard to the relevant document genres involved. Instead of top-down, technological, and managerial viewpoints, the genre-based approach provides a conceptual aid to facilitate bottom-up argumentation and sense making on EDM apart from managerial or technological jargon. Extrapolated repertoire of genres steers the debate from plain managerial and technological topics towards those about the actual users and producers of that information know and have something to say. This enhances their participation in the development process as an equal stakeholder in addition to IT experts and management. Simultaneously, explicitly identified genres provide as well means for informed argumentation to those in charge of holistically coordinating the development of EDM in the organization; for instance, to discern areas of technological standardization that could bring commonly justifiable value to the organization as a whole. Document genres can also serve as a basis for anticipating wanted and unwanted effects of planned changes in IT applications or infrastructures in the organization beforehand.

The shortcomings of the genre-based approach are discussed. The paper concludes that the most evident role of the genre-based approach (also in the field of EDM) is that it provides a practical and easily comprehensible conceptual basis for identifying, debating on, and developing communicative routines (also those based on documents) so that people could be emancipated towards creative and satisfactory modes of work.

3.5.4 Relation to the whole

The three rationality orientations of the critical approach to developing EDM were used in Article VI to scrutinize whether the method used and development practices conducted by the target consulting organization were actually critically oriented. In general, the article sets a basis for discussion from which further research efforts (beyond this dissertation) can continue to test the empirical validity and practical usefulness of these theoretical suggestions in the

field of EDM and ISD in general. The article provides approach-level theoretical recommendations also for the development of EDM, which could be compared to other approaches in the field (in section 4 of this introductory part of my dissertation).

3.6 Article VI: "Engineering of a Genre-Based Method for Developing Electronic Document Management: The Consultant's Viewpoint"

Päivärinta, T. & Peltola, T. 2001. Engineering of a Genre-Based Method for Developing Electronic Document Management: The Consultant's Viewpoint. In J. Krogstie, K. Siau, and T. Halpin (Eds.), *Proceedings of the Sixth CaiSE/IFIP8.1 International Workshop on Evaluation of Modeling Methods in Systems Analysis and Design (EMMSAD'01)*, pp. XIII 1-14.

3.6.1 Research objectives

After the method engineering effort reported in Article III, a team of consultants had adopted the genre-based method for their EDM consultancy business in 1999. This team formed a unique research target, as it had used and elaborated the genre-based method of developing EDM for its business needs during two years independently of the initial method engineers. The research goal was to gain feedback covering their practical experiences with the method to elaborate it as such. In addition, practice-oriented insight into the usefulness of the genre-based development approach in general was sought.

3.6.2 Research method

Data about the consultants' experiences were gathered with four tape-recorded interviews. The interviews were semi-structured concerning the components of the ISD method knowledge that were found from the literature (Rossi, Tolvanen, Ramesh, Lyytinen, & Kaipala, 2000; Tolvanen, 1998). Actual models produced by the consultants in their customer cases were also reviewed. The team leader of the consultants compared the original method to its contemporary version in use and documented the observed differences.

The interviews were transcribed and analysed with a software package (Atlas™) for qualitative content analysis. The analysis leaned on a methodology based on grounded theory, in which *mentions* and *mention sequences*, i.e. such data fragments that provided meaningful information with regard to the research goals, were identified and categorized (Calloway & Ariav, 1991, 1995; Glaser & Strauss, 1967). "Seed categories" (Miles & Huberman, 1984) were used to start the categorization process. The mentions were connected to one to many seed categories, new conceptual categories were extrapolated from the anoma-

lous mentions, and relationships among the categories were built. The results were then compared with the original method and aims of the method engineers.

3.6.3 Results

The original method reported in Article III had been significantly altered by the consultants with regard to the original development objectives, concepts, process, and techniques within and beyond the field of EDM. However, the fact that the consultants had independently and extensively used and elaborated the method in the first place suggests the usefulness and flexibility of the underlying idea of the genre-based analysis approach as such.

In practice, the theoretical concepts of genre and PUI entity, which represent the fundamental concepts of the original method described in Articles III and IV, were not directly used in the everyday communication among the consultants and their customers. However, despite of slight theoretical impurity observed in the practical language describing information and the producers and users of information, the practical concepts and models mostly corresponded to the theoretical concepts of genre and PUI entity. Hence, the genre-based approach provides a practically useful "meta-conceptual" basis for analysing requirements for EDM. From an extrapolated repertoire of document genres, the consultants were able to proceed towards technology-specific concepts for modelling and prototyping of the particular EDMS application (Lotus Domino.Doc™), which had become the major scope of their EDM consultancy. The study thus highlighted the need for separating the socio-organizational concepts, such as genres and PUI entities by which requirements for EDM can be gathered effectively, from the organizational stakeholders from those technology-centric concepts that are needed for constructing a particular technological solution. Genres and PUI entities (i.e., their practical synonyms used by the consultants) seemed to form a promising conceptual basis to start the requirements definition for EDM, and to bridge the subsequent technology-centric modelling and prototyping (Domino.Doc™ in this case) with the socio-organizational requirements identified by the stakeholders.

With regard to the communicative, emancipatory, and technical rationality orientations highlighted in the theoretical genre-based approach that was elaborated in Article V, the genre-based method used by the consultants steered any particular orientation little *per se*. Rather, these rationality orientations had emerged in the customer projects according to the goals of each particular assembly of stakeholders. Sometimes, formal rationality orientation with the fixed objective of Domino.Doc™ implementation dominated the others, whereas communicative and even emancipatory orientations had been more evidently present in other projects, especially in those focused on general requirements analysis for EDM. However, the data implied that emancipatory rationality could be supported in the genre-based modelling sessions by improving computer-based tool support to enhance collaborative modelling actions (as was the case in the original manual modelling technique described in Article III). The

experiences thus suggest that the critical orientation can be only partially steered by the methodical and technical tools used for the development process: if the stakeholders did not consider the critical orientation relevant in the first place, the genre-based method could be used plainly rather technically as well. The theoretical and philosophical knowledge of the genre-based approach thus was not fully transformed to a practical method aimed at instantiating that approach in this case.

The study also shows that the strategic (i.e., business-centric) and aesthetic rationality orientations of a consultant can affect to the selection and elaboration of the methods and techniques used for the development of EDM, which were not taken into account in the research-based construction of the genre-based method and approach. Hence, the actual instances of methodical ISD practices, including methods for developing EDM, should be regarded partially as resulting in the particular social and cultural environment in which they are applied as well as in the contemporary features of related IT; ISD methods are neither purely technical nor objective artefacts to be engineered in a vacuum, despite the mainstream reports on ISD methods seemingly assuming so (Russo & Stolterman, 2000). The research approach selected for this dissertation as a whole thus represents a relevant complement to the "purely scientific" method engineering research, such as conceptual and technological constructions, conceptual comparisons, laboratory experiments, and surveys, that have played a major role in the contemporary method engineering literature (Siau & Rossi, 1998; Tolvanen, Rossi, & Liu, 1996).

3.6.4 Relation to the whole

These practical experiences were taken into account in section 4 of this introductory part of my dissertation, in which the genre-based approach and method was compared to other approaches and methods for developing EDM, which were found from the literature. Especially, these experiences highlighted the need for separating the approach-level discussion from that of comparing method-level knowledge with other methods.

3.7 About the Joint Articles

For Article I, I was an equal co-author with Airi Salminen, who held an outsider view to the study. I was responsible for planning and conducting the research process inside the target organization and gathering the data. The data were analysed and the paper was written collaboratively.

For Article II, I was an equal co-author with Pasi Tyrväinen (the names appear in the cover of the article in a random order). I constructed the idea and the first version of the "genre list" technique during my rather "business-oriented" efforts in this target organization for defining its information architec-

ture before the reported research effort, which formed a basis for the preliminary method in Article III. I also planned and conducted a major part of the research process and gathered the data. The conceptual instrument for the experiment, however, was constructed in a collaborative session with Pasi Tyrväinen, who also contributed to a large part of the obtained implications. The article was written collaboratively.

For Article III, I suggested the use of the genre-based approach in the target organization. I mainly established the genre-based analysis process (the preliminary method) that was elaborated in the study. I also participated in practical work in the target organization together with Anne Karjalainen and two additional researchers who did not participate in the authoring process. Anne Karjalainen, who was the first and corresponding author, Pasi Tyrväinen, and I wrote the paper collaboratively. Jari Rajala was in charge of the action research project from the viewpoint of the target organization.

For Article IV, I was the main author. I held the main responsibility for constructing the method description. Veikko Halttunen contributed to abstracting the method towards the field of information systems planning in general with his experiences from the GTCDoc project, as well as a couple of his other collaborative projects with industry, which were not participated by me. He also contributed to the introduction of the article; as well as to the brief comparison of the method with the most well known IS planning methods in the discussion. Pasi Tyrväinen contributed by formulating the concept of PUI entity and by his intensive comments and suggestions on the method description during the writing process. I formulated the maxims for the method from ST and CST and wrote the discussion drawn on them.

For Article VI, I was the main author. I designed the research process and conducted the data analysis. Tuomo Peltola compared the practical genre-based method elaborated in his organization with the previous reports (Articles III and IV), expressed comments on the report actively during the final authoring, and confirmed the accuracy of the interpretations I had drawn on the data. The report was written solely by me.

4 COMPARISON TO OTHER METHODS AND APPROACHES

"The wiser you are, the more worries you have; the more you know, the more it hurts."
(Ecclesiastes 1:18, c. 900 BC, Good News Bible)

"Put all things to the test: keep, what is good…"
(Paul's first letter to the Thessalonians 5:21, 50 AD, Good News Bible)

"That we disavow reflection is positivism."
(Jürgen Habermas, 1971, cited in (Ulrich, 1983, p.106))

The six articles summarized in the previous section include the motivation for, construction of, and practical experiences from the genre-based approach to developing EDM *in practice*, with a modest theoretical discussion on its potential for ISD in general in the light of the philosophical ideals of CST (in Article V). This section is thus needed for comparing the genre-based method and approach with the existing body of document management and ISD literature. That is, this section attempts to crystallize the *conceptual* and *theoretical* contribution of the genre-based approach in the field of EDM, and, more modestly, in the field of ISD in general.

A detailed method-level comparison with the jungle of all ISD methods is not attempted here. In fact, Iivari et al. (2001) suggest that this kind of in-depth comparison might be rather impossible, as it has been estimated since 1994 that over 1000 ISD methods exist in the world (Iivari et al., 2001; Jayaratna, 1994). The first part of this section thus pursues an *approach-level* comparison between the genre-based approach and those of the well-known ISD approaches established in the IS discipline that have been identified by Iivari et al. (Iivari et al., 2001), to declare the potential conceptual and theoretical contribution of the genre-based approach within the discipline of IS in general. To crystallize the conceptual contribution of the genre-based *method* with regard to the existing

development methods reported in the field of EDM, the second part attempts to compare those.[11]

4.1 Comparison with Other ISD Approaches

This section attempts to declare by which aspects the genre-based approach (GB) would contribute to the existing ISD approaches in general, if any, or whether it falls under an already existing approach (in the latter case, the genre-based approach to EDM would potentially contribute only on the level of ISD methods in the field of EDM).

4.1.1 Basic concepts and process of approach-level comparison

An approach to ISD, including the development of EDM, was defined as: "goals, guiding principles, fundamental concepts, and principles for the ISD process that drive interpretations and actions in ISD" (Iivari et al., 1998, p. 166). Recently, Iivari et al. have continued their theoretical efforts for classifying and comparing ISD approaches (Hirschheim, Iivari, & Klein, 1997; Iivari & Hirschheim, 1996; Iivari et al., 1998) by suggesting a conceptual framework for this purpose, which includes a general-level description and comparison of eleven ISD approaches (Iivari et al., 2001). In the following, those approaches are listed, and each of them is illustrated by one method that instantiates it, if such methods exist according to Iivari et al. (Hirschheim et al., 1997; Iivari & Hirschheim, 1996; Iivari et al., 1998, 2001):

1. SA - Structured approach, e.g. Yourdon's Modern Structured Analysis (Yourdon, 1989), a comprehensive survey of the structured systems analysis methods can be found in (Wieringa, 1998)
2. IM - Information modelling, e.g. Martin's Information Engineering (Martin, 1990)
3. DSS - Decision support systems (no detailed ISD methods established (Iivari & Hirschheim, 1996))
4. SoT - Sociotechnical approach, e.g. Mumford's ETHICS (Mumford, 1983, 1993, 1995; Mumford & Beekman, 1994)
5. OO - Object-Oriented approach, e.g. Jacobson et al.'s OOSE (Jacobson, Christerson, Jonsson, & Övergaard, 1992), a comprehensive survey of the object-oriented methods can be found in (Wieringa, 1998)
6. Infological approach (Infol.), e.g. Lundeberg et al.'s ISAC (Lundeberg, Goldkuhl, & Nilsson, 1981)

[11] Note that only the original method described in Articles III and IV is compared to the others here, since the method elaboration in the target organization of Article VI was not my contribution to the field. Rather, from the viewpoint of this thesis, Article VI demonstrates the flexibility of the original method and its potential usefulness in proceeding towards the implementation issues.

7. IA - Interactionist approach (established by Kling, no detailed ISD methods elaborated (Iivari & Hirschheim, 1996))
8. SpAct - Speech act based approach, a comprehensive survey of the speech act based methods can be found in (Auramäki & Lyytinen, 1996)
9. SSM approach, e.g. Checkland's Soft Systems Methodology (Checkland, 1981, 1989)
10. TU - Trade unionist approach (established by Nygaard, Sandberg, Ehn, and Kyng (Iivari & Hirschheim, 1996))
11. PWP - Professional work practice approach (established by Andersen, Kensing, Lundin, Mathiassen, Munk-Madsen, Rasbech, and Sørgaard (Iivari et al., 1998))

It should be noted that Iivari et al. have not yet included the theoretical discussions on the roles of CST (Critical Social Theory) and ST (Structuration Theory) in their review of existing ISD approaches, although they mention these theories as the potential bases for new alternative approaches in addition to those they have thus far compared (Iivari et al., 1998). In this sense, the following comparison of the genre-based approach, together with the maxims that originate in CST as discussed in Article V, can also outline a general-level contribution of CST with regard to the eleven ISD approaches listed above. However, the approach-level discussion of the genre-based approach does not yet include the elements of ST to the extent that I could claim the following comparison to declare its potential role among the ISD approaches, although it has also clearly influenced the method engineering efforts of this thesis.

Firstly, the *goals* (i.e. the general purposes of the approach in question) of the eleven approaches as interpreted and defined by Iivari et al. (Iivari et al., 2001) are reviewed together with the goals of the genre-based approach. Secondly, the *fundamental concepts* (which define the focus and units of analysis in ISD and the nature of an IS implicit in the approach) of the eleven approaches are compared to the genre-based approach. I have considered these elements of an approach as the most fundamental in characterizing the overall contribution of the genre-based approach with regard to the others. Hence, I categorize the eleven approaches into those whose goals and/or fundamental concepts are close to the genre-based approach (to analyse their similarities and differences in more detail) and into those obviously intended for different purpose being conceptually distant from the genre-based approach. The latter set of these eleven approaches are not analysed further, since it is assumed that if their goals and fundamental concepts are totally different, the further comparison of the guiding principles and principles of the ISD process would also be meaningless.

Thirdly, the *guiding principles and beliefs* that form the common "philosophy" ensuring that the methods form coherent wholes are compared. Finally,

the *principles of the ISD process* that express the essential aspects of the development process are scrutinized among the genre-based approach and the others.[12]

4.1.2 Goals

Table 1 summarizes the goals of the ISD approaches under comparison. The goals of the other than the genre-based approach in table 1 are directly cited from (Iivari et al., 2001, pp. 192-194). The goals of the genre-based approach share common features with IM, ST, Infological approach, IA, speech act based approach, SSM, and TU. The goals of SA, DSS, OO, and PWP represent rather obviously differing areas of interest in the field of ISD: SA and OO focus primarily on software development, DSS represent a particular kind of IS in a technical and functional sense (which is, at best, only tangential to the field of EDM), and PWP concentrates plainly on the professional skills of IS designers.

IM denotes the organizational viewpoint and coordinated planning for a number of ISD efforts and IS applications in the organization, alike the genre-based approach. However, IM focuses clearly on one technologically dominating area of the era during which it was constructed: (structured and relational) databases and application-oriented analysis for them, whereas the genre-based approach attempts to cover all typified communicative actions in the organization supported by a portfolio of information systems.

IA involves no particular scope of development, as it has not been instantiated by any practical ISD method.

SoT, the Infological approach, the speech act based approach, SSM, and TU focus on one specific ISD initiative at a time. Their scope of development thus differs from the genre-based approach. Most probably, these approaches could be used *after* a general-level analysis of genres that would demarcate the domain of a particular ISD initiative. In fact, only SSM problematizes and starts with the demarcation of the relevant systems development initiative in the first place, which is regarded as essential in any critically oriented systems development effort (Ulrich, 1983), by providing a practical (CATWOE-[13]) technique for this task. The genre-based approach provides an alternative conceptual means (genres and PUI entities) for that purpose. The other approaches take the problem area of ISD as given. Still, these "one system"-based approaches share certain other goals with the genre-based approach.

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[12] With regard to the components of goals, guiding principles, fundamental concepts, and principles of the ISD process, each approach under comparison the following discussion relies on the interpretations present in Iivari et al's articles (Hirschheim et al., 1997; Iivari & Hirschheim, 1996; Iivari et al., 1998), because the primary goal of this thesis is not to validate their interpretations but rather to have a brief review whether the genre-based approach could potentially contribute to the field of ISD in general. Hence, I have not reviewed the original references of the other approaches in order to criticize Iivari et al.'s interpretations.

[13] The acronym CATWOE stands for the following components that need to be scrutinized in the demarcation of every systems development initiative. C = client, A = actors, T = transformation process for the whole system in question, W = "Weltanschauung", i.e. the world view of the stakeholders, O = owner of the system in question, and E = environment in which the system is embedded (Checkland, 1981).

TABLE 1 Goals of the approaches under comparison

GB	To provide a basis for participative, emancipatory, communicative, efficient, and effective (i.e., critical) debate on relevant IS requirements for information communicated in the organization; among relevant stakeholders.
SA	To produce reliable and maintainable software in a productive way.
IM	To support organization-wide planning and development of information systems and databases and to enable coordinated and long-term development of integrated applications.
DSS	To provide means for developing systems that support (semi-)structured decision making in the organization.
SoT	To enable future users to play a major role in systems design, to align job satisfaction and technical and operational interests, and to ensure that the information system is embedded in well-functioning organizational system.
OO	To ensure that easily maintainable software products are delivered on time, within budget, and according to user requirements.
Infol.	To ensure that relevant information systems are developed which contribute positively to the organization, that users comprehend the system, and that the system would be easily maintainable, portable, and efficient.
IA	To focus on complex social issues that surround organizational change and IS implementations.
SpAct	To model communicative action in the organization, especially speech acts and their role in creating, maintaining, reporting, modifying, and terminating organizational commitments.
SSM	To support learning and debate on desirable and feasible changes in the organization and its information systems.
TU	To ensure effective worker participation for enhancing democracy at work and quality of work.
PWP	To increase the professionalism of IS designers.

SoT shares the interest in wide participation of the workers to increase their job satisfaction, being close to the idea of emancipation (Hirschheim & Klein, 1994), as the genre-based approach. The Infological approach shares the interest in contributing to the organizational aspects with an IS and also in promoting the understanding of the end user on the system under development. IA shares the goal of analysing the socio-organizational side of the target IS with the genre-based approach. However, the genre-based approach involves an explicit aim towards emancipatory development process (ideally overriding the existing social structures hindering these goals), whereas IA focuses more comprehensively on the existing complex social relationships in the domain. The speech act based analysis focuses on modelling organizational communication, just as the genre-based approach. SSM shares the interest in continuous learning process of the socio-organizational requirements on IS. TU shares the interest in the emancipation of the workers (i.e., end users in the most cases) with the genre-based approach. However, TU focuses *plainly* on workers, whereas the genre-

based approach pursues a more consensual emancipation and democracy among all stakeholders.

To summarize, the genre-based approach provides an alternative to IM for comprehending requirements for a portfolio of ISs in the organization. It also provides an alternative to SSM for demarcating a particular ISD initiative. In this sense, the genre-based approach attempts to bridge the continuous and coordinated development of the IS portfolio in the organization with distinguished ISD initiatives. The "one system" approaches, including the software development approaches (e.g., SA and OO), can most probably be used in connection with the genre-based approach, after a genre-based requirements analysis, in order to produce system implementations.

4.1.3 Fundamental concepts

Table 2 summarizes the fundamental concepts of the approaches. The fundamental concepts of the other than the genre-based approach in table 2 are cited from Iivari et al. (2001, pp. 192-194). The genre-based approach shares conceptual ideas with SA, IM, SoT, OO, Infological approach, and speech act based approach. DSS, IA, SSM, TU, and PWP seem to include rather obviously different conceptual structure, which is unnecessary to scrutinize further here.

The concept of data/information flow of SA can be rather close to the concept of genre in several modelling cases. Still, a data flow can also represent something else than genre, e.g. in the cases in which one transformation process splits data collected by one "genre-like" form into two or more data stores. Hence, the concept of data flow can also be implementation-specific inside a computer in addition to genre-like data flows aimed at communicating something to humans. The concept of PUI entity in the genre-based approach may instantiate as a process (among a number of other options), depending on how the organizational side of system analysis is structured. Hence, PUI entity is a wider concept than that of process/transformation of SA.

As mentioned, the genre-based approach shares with IM the interest in modelling organizational information holistically. However, the entity-based information modelling approach of IM differs quite often from the concept of genre. Entities represent rather objective things about which rather objectively comprehensible data is collected and represented, whereas genres represent recurrently existing and meaningful packages of information as such, being intersubjectively enacted as established purposes and forms to communicate within a certain community of people. A genre can include information about a number of entities. In database-based applications, forms and reports can most often be regarded as genres intended for producing and viewing data, whereas the identified entities most often form the basis for structuring tables for data storage. However, I have seen entity-based models of organizational information architectures, in which especially certain document genres have been represented as entities *per se*. Hence, the concept of entity can be sometimes more ambiguous compared to the concept of genre. If an entity corresponds to a genre, then the concept of attribute corresponds to the concept of property in

the genre-based approach. Sometimes the concept of entity can include several genres, for instance in a situation in which it refers to a large document collection. Hence, the concept of entity is a wider concept than that of genre, but entities and genres can be agreed on to correspond with each other, as necessary. Compared to IM, the genre-based approach thus offers an alternative, in a way more constrained, conceptual means for analysing requirements for a portfolio of information systems.

TABLE 2 Fundamental concepts of the approaches under comparison

GB	stakeholder, genre, PUI entity, property, metadata, system/technology-specific concept vs. socio-organizational concepts (for requirements analysis)
SA	essential model vs. implementation model, transformation (process), data/information flow, data store, terminator, module, cohesion, coupling
IM	universe of discourse, information/database, conceptual schema, internal schema, external schema, entity, attribute, relationship
DSS	semi-structured decision, database, model base, specific DSS, DSS generator
SoT	technical system, social system, variance, unit operation, technical needs, social needs (job satisfaction)
OO	problem domain vs. implementation domain, object and class, encapsulation, information (implementation) hiding, inheritance, polymorphism, communication between objects
Infol.	infological problem vs. datalogical problem, object system, activity, material flow, information flow, information/message set, precedence relation, file, file consolidation, process consolidation
IA	information systems as institutions, social use of information systems, complex and overlapping negotiation context, nonneutrality of IS resources
SpAct	speech acts, illocutionary points, propositional content, discourses/conversations
SSM	Weltanschauung, human activity systems, root definition, relevant system
TU	computers as tools (under the control of each worker)
PWP	performance vs. management, reflection vs. action, visions vs. present reality, product-oriented vs. process-oriented, analysis vs. design, planning vs. evaluation

The distinction between the social and technical system that characterizes SoT is also present in the genre-based approach. Genres and PUI entities are used for modelling the socio-organizational world and IS requirements, whereas their practical implementation requires additional technology specific concepts (as illustrated in Article VI). SoT does not distinguish between the socio-organizational concepts and technological concepts. Mumford's ETHICS includes the idea of the user's task-based analysis of information needs (Mumford, 1983), in which an "information need" can sometimes (but not necessarily) correspond to the concept of genre, and task represents a more precise subclass of PUI entities. The genre-based approach denotes the concept of

stakeholder that covers end users, IS analysts, and managers, whereas the concepts of "worker" and "job satisfaction" analysed and promoted by a separate analyst (i.e. as a kind of outsider from the actual context of the target system) in SoT represent somehow different ideas, which also relate to the recommendations for the ISD process.

OO's concept of the object can be defined to represent a genre, PUI entity, or property and object-oriented modelling techniques most probably can be utilized for modelling genre-based models, if considered useful. However, the concept of object can as well represent almost whatever else as well. Outside the specific goal of, and approach to, software engineering, OO thus contains a set of generic modelling techniques to be used for various purposes within various other ISD approaches, as illustrated by Jacobson et al.'s (1994) ideas of using OO for business modelling. OO could thus be a potential conceptual means for proceeding towards an IS implementation after a genre-based requirements analysis, and it could be used as a means for modelling within the genre-based approach.

The concept of information flow in the Infological approach most probably corresponds rather closely to the concept of genre. The concept of PUI entity can instantiate as an activity, but, again, the concept of PUI entity is a wider one. A comparison between the concept of genre and the concept of speech act is provided in Article V, which shows how these concepts relate to each other.

To summarize, the genre-based approach provides an alternative conceptual means to IM for modelling and analysing requirements for a portfolio of information systems. The concepts of the genre-based approach could bring a focused conceptual structure to the information needs analysis of SoT, whereas the concept of job satisfaction is missing from the genre-based approach. In this sense, SoT and the genre-based approach could complement each other, as necessary. The similarities to SA, OO, the Infological approach, and the speech act based approach imply that these "one system" approaches could be usable for proceeding towards the detailed implementations of specific information systems after a genre-based requirements analysis.

4.1.4 Guiding principles and beliefs

From now on, I have dropped the approaches of DSS and PWP out, because, according to the above discussion on their basic goals and fundamental concepts, they differ too substantially from those of the genre-based approach so that their further comparison would make sense. I have also excluded OO from further analysis, because its significance as independent ISD approach makes sense in the context of software engineering (as declared above), and it is rather artificial to compare it further on that level of discussion to the genre-based approach. As well, SA and the Infological approach are dropped out as they clearly represent the "one system" approaches that could be used for modelling the technical issues to implement a particular information system in connection to the genre-based approach. Table 3 summarizes the guiding principles and beliefs of the remaining approaches. The guiding principles of the other than

the genre-based approach in table 3 are cited from (Iivari et al., 2001, pp. 192-194).

TABLE 3 Guiding principles of the approaches under comparison

GB	ISD means modelling organizational communication conducted at everyday work, which is, to a great extent, mediated by instances of communicative genres. Socio-organizational purposes and technological opportunities to implement genre forms can be distinguished from each other, but they also affect each other in the continuous process of structuration, either deliberately or implicitly. ISD represents the deliberate and critical side of the open-ended process of social interaction, whereas individuals can affect the organizational IS also implicitly by acting differently from the deliberate plans. The scrutiny of various technological options and technical data models can be linked with identified genres to identify the appropriate means to implement them so that communication at work could be enhanced in the future.
IM	Data as a stable basis for IS. Separation of conceptual vs. internal schemas. Conceptual schema as a theory of the Universe of Discourse. Conceptual schema as the core model for an IS. Applications can be built on the conceptual schema. ISD is based on an engineering-like method.
SoT	Self-design of a work system. Minimal critical specification. Open-ended design process. Fit between the social and technical systems. Joint optimisation. Redundant functions.
IA	An IS is a social object with social meanings serving different interests. The infrastructure that supports the focal systems is critical. The controlling of the infrastructure is a political process. Commitments of the past constrain the future. ISD is social action of negotiation.
SpAct	An IS is a social system only technologically implemented. An IS is a communication system (mediating speech acts). ISD is formalization of professional (work) language.
SSM	Notional systems models called "human activity systems" are used for illuminating different world views (Weltanschauungen), which may be applied to any social system. An IS supports the truly relevant human activity system.
TU	Design of computer support means designing conditions of work. Craftsmanship is the ideal of work. A collective resource approach, which is based on trade union participation.

IM's principle of separating conceptual (logical) schema from internal (physical) schema of the conceptual model of IS shares the ideal of separating the meaning and actual implementation of data with the genre-based approach. However, IM's conceptual schema is still regarded as rather objectivist, whereas the socio-organizational concepts of the genre-based approach (genre and PUI entity) are essentially constructed and instantiated intersubjectively by the stakeholders in question, i.e., each genre (and PUI entity) needs to be enacted by those having interests in its development in particular.

SoT shares several principal ideals with the genre-based approach. The "end users" are regarded as essential experts on developing their own work. The development process is continuous, open-ended. IT solutions should serve the socio-organizational system, not vice versa, still fitting to each other to the extent possible. However, the major source of consistency in SoT resides in the

mission and key objectives of the organizational unit, which is selected under further analysis, and SoT includes no explicit means for the conceptual or infological modelling of information (Iivari & Hirschheim, 1996). The genre-based approach, in turn, regards the genres (identified by the representatives of the PUI entities by themselves) as the essential conceptual viewpoint to be scrutinized; otherwise those genres wouldn't have been identified in the first place. Hence, instead of high-level objectives of the organization, the logical consistency of the genre-based approach is based on the conceptual model of organizational information (communicative actions) with regard to its producers and users, identified by the end users – which can then be later on well scrutinized with regard to the mission and key objectives of the organization collaboratively between IS developers, managers, and other relevant stakeholders, as necessary.

IA, SSM, and the genre-based approach all share the viewpoint according to which different stakeholders have different interests in the development of the target system and that IT applications are not socio-organizationally neutral. However, IA concentrates more on explicating these political interests and power structures in detail, whereas the genre-based approach assumes that the stakeholders, when put together during the participative ISD process, would be able to debate on the target system constructively and critically (despite of their different positions in the organization), and to reach consensus on the target IS genre by genre, without *excessive* needs for delving into the issue who was dominating whom and why in the past – emancipation deals essentially with a question of a more satisfactory future, not with the existing, let alone past, asynchronies of power. In this sense, IA focuses more on analysing the current/past state of the socio-organizational conditions that affect IS, whereas the genre-based approach attempts to build something new (still starting from the existing communication structures). This is quite natural; since IA has been thus far instantiated by no concrete systematic means for ISD (Iivari & Hirschheim, 1996), it has remained as a theoretical viewpoint to analyse the existing conditions.

With regard to SSM, the major difference resides in SSM's systems-theory oriented approach, which requires the principal input and output of the target (socio-organizational) system be defined, and the transformation process in between. The genre-based approach does not necessitate that the development of IS (such as an EDMS) would need to be faithfully systems-theory oriented to be still a useful support for organizational communication. I.e., although the major input and the major output of an EDMS could probably be defined according to the guiding principles of SSM, all interrelationships of the IS components under scrutiny do not need to be fully declared – the human part of the organizational communication as a whole is so complex that it is at least unfeasible to pursue a detailed model of the internal transformation process of the whole genre-based communication system as a whole in relation to its major inputs and outputs. Rather, the identified genres and PUI entities, from the viewpoint of the general systems theory, represent some kind of recurrent "nodes" in a complex web of

communication that could be explicitly identified by that time, but, for the system analyst, there will always be a number of "black holes" of organizational communication between those nodes which prevent a systems-theoretical description; e.g., according to SSM's principles. Still, the basic idea of the genre-based approach highlights that if a number of those nodes can be identified and debated on, the humans will improvise and "do the rest" what is required so that the socio-organizational side of the organization supported by an IS will function and evolve satisfactorily in relation to its environment.

The only difference in the guiding principles of the speech-act-based approach and the genre-based approach seems to reside in the conceptual basis by which communicative information of the target organization is structured (a brief conceptual comparison between genres and speech acts is presented in Article V).

TU highlights trade unions and end users (considered as "craftsmen") as the essential stakeholder throughout the development process. This idea can well be included in the genre-based approach, as necessary, but it does not dominate the genre-based approach.

Hence, the genre-based approach shares a great number of guiding principles and beliefs with the others mentioned above, being most close to the speech act based approach.

4.1.5 Principles for the ISD process

Table 4 summarizes the principles for the ISD process. The principles of the other than the genre-based approach in table 4 are cited from Iivari et al., (2001, pp. 192-194). The genre-based approach shares no principles for the ISD process with IA (because it has none).

TABLE 4 Principles for the ISD process

GB	Constructive and critical debate on genres among the stakeholders. Equal and democratic participation of end-users, IT experts, managers, and other relevant stakeholders - each end user participates in the analysis of only those genres s/he is related to at work. Tailoring of the methods for further scrutiny and technical implementation depending of the particular genres under analysis.
IM	Incremental design of conceptual schema. Integration of views.
SoT	User participation highlighted, socio-technical design. The IS in question evolves open-endedly.
IA	No specific principles for the ISD process, because not instantiated in any method.
SpAct	Discourse analysis, analysis of propositional content of human utterances.
SSM	Parallel streams of cultural and logic-based analyses.
TU	The trade union acquires knowledge of the analysis situation independently of other stakeholders. Design-by-doing and cooperative design.

IM and the genre-based approach share the interest in incremental development of the socio-organizational / conceptual information model. Still, IM pursues an objective model of organizational information, with which all originally individual views should be integrated, whereas the genre-based approach allows those stakeholders who share an interest in a certain set of genres to construct the model for them: there is no need for all stakeholders to objectively comprehend all parts of the organizational model for information.

The genre-based approach shares the ideals of SoT, and adds the emancipatory viewpoint and tailoring of the final method (by means of stakeholder-chosen properties and types of genre-based metadata) to those principles. In SoT, the connection between the socio-organizational analysis of information requirements and the actual technological implementation of that information remains rather implicit, however, because the socio-technical methods have thus far included few conceptual means for bridging these viewpoints (Iivari & Hirschheim, 1996).

The speech-act-based discourse analysis takes a focused viewpoint to a detailed design of speech-act-based communication supported by IS that pursues creating commitments among the workers. In this sense, the ISD process of the genre-based analysis takes place on somewhat different stage, after which a detailed speech-act-based design is, however, possible, as necessary. The genre-based approach shares the interest in unifying different viewpoints of the stakeholders during the ISD process with SSM and the principle for collaborative analysis and development with TU – the rest of their principles for the ISD process diverge.

4.1.6 Summary of the approach-level comparison

Table 5 summarizes the approach-level discussion above by illustrating the similarities and differences between the genre-based approach and the ones in the left column. Since the detailed comparison of DSS, PWP, SA, OO, and the Infological approach with the genre-based approach was considered trivial, those five are not present in table 5.

TABLE 5 Conceptual similarities / differences to the fully analysed other approaches

	Goals	*Guiding principles*	*Fundamental concepts*	*Principles for the ISD process*
IM	S / D	S / D	S / D	S / D
SoT	S / D	S / D	S / D	S / D
IA	S / D	S / D	D	not applicable
SpAct	S / D	S / (D)	S / D	S / D
SSM	S / D	S / D	D	S / D
TU	S / D	S / D	D	S / D

D = no similarities with the genre-based approach found, S / D = partial similarities, but also differences, compared to the genre-based approach

Table 5 implies that one of the "closest relatives" of the genre-based approach is the speech-act-based approach, which seems rather natural as they both con-

sider ISs as a means for supporting organizational communication in everyday work. If the fundamental concept of the speech act were left unmentioned under the guiding principles, it would have shared the guiding principles with the genre-based approach almost exactly. Furthermore, they had several additional similarities with regard to goals, fundamental concepts, and principles for the ISD process. IM and SoT have also things in common with the genre-based approach under all the four topics that characterize an approach. SSM and TU are also related to the genre-based approach, except with regard to their fundamental concepts. IA, in turn, seems to differ from the genre-based approach to the greatest extent of the fully analysed ones.

To summarize, the approach-level discussion implies that the genre-based approach complements the eleven above-mentioned ISD approaches by its goals, fundamental concepts, guiding principles, and principles for the ISD process. Especially, it provides an alternative to IM for analysing requirements for a portfolio of information systems (which is a relevant problem also in the field of EDM) and it could be seen as a conceptual complement to SSM and SoT in the areas of demarcating relevant systems development initiatives and "fitting" the socio-organizational needs with technological opportunities, respectively. Furthermore, the comparison implies that the genre-based approach could be used prior to the "one system" -oriented approaches, which are aimed at tackling the in-depth modelling and implementation issues (SA, OO, the Infological approach, and the speech act based approach).

However, the issue whether the genre-based approach as such would constitute a groundbreaking new approach to ISD in general will require more scrutiny, which is not conducted here, as the major goal of this thesis still resides in the field of EDM. Anyhow, the close relationship between CST, the speech-act-based approach (in the form how it is interpreted by Iivari et al.), and the genre-based approach suggest that these could be most probably abstracted and merged into one single approach, which would be characterized by their interest in communicative and emancipatory rationalities and the view on IS as a means for supporting organizational communication. However, the actual situation within the contemporary speech-act based approach as such is more complicated in the form suggested by Iivari et al. (1998, 2001): Auramäki & Lyytinen (1996) clearly point out that all speech-act-based ISD methods are not committed to the same ideals, let alone the ideals of Habermas' CST. This challenges the categorization of an approach plainly on the basis of one fundamental concept, as is the case of the speech-act-based approach suggested by Iivari et al. (2001), as well as the naming of the genre-based approach developed here (as it is in its current state). Then, speech acts and genres would possibly represent two alternative conceptual bases for modelling under this "umbrella" of the critically oriented approach to model organizational communication for ISD in general.

4.2 Comparison with Other Methods of Developing EDM

4.2.1 Selection of methods for the method-level comparison

The literature review on the field of EDM, which was reported in section 1, revealed that specifically constructed methods of developing EDM in the organization are extremely rare. Only Salminen et al.'s "Methodology for Document Analysis" (MDA) (Salminen, 2000; Salminen, Kauppinen, & Lehtovaara, 1997; Salminen, Lyytikäinen, & Tiitinen, 2000) clearly fulfils the definition of the concept of the method (involving a predefined and organized collection of techniques) in the scholarly EDM literature reviewed. Moreover, as MDA aims at standardizing and structuring document type definitions for structured document systems, it includes also the basic concepts and techniques for that particular purpose, which has been the major focus of the technology-centric books on methodical structuring of (SGML) document types (Maler & El Andaloussi, 1996; Travis & Waldt, 1996). However, these technology-centric books include no means for organizational analysis of EDM, which represent a major contribution in Salminen et al.'s work in the field of structured document systems in addition to the plain analysis and structuring of document type definitions as such. Hence, I regarded MDA as a comprehensive representative of the methods focused on developing structured document systems.

A review on the (mostly consultancy-oriented) textbooks on document management revealed only three books with recommendations for a systematic development process that, at least partially, fulfilled the definition of the method: (Bielawski & Boyle, 1997; Koulopoulos & Frappaolo, 1995; Sutton, 1996). In addition to those three books, Wiggins (2000) refers to a number of well-known techniques for ISD and organizational analysis, such as traditional structured systems analysis techniques, Checkland's (1981) "Soft Systems Methodology" with its techniques, techniques for total quality management, and business process re-engineering as potential means for facilitating the modelling of the organization in connection to the development of EDM. Unfortunately, Wiggins does not bind these separate techniques together to form a logical method for developing EDM. His book is thus not included in this comparison.[14] A few books include more or less detailed techniques for cost-benefit analyses for EDM initiatives (Anttila, 2001; Megill & Schantz, 1998; Wiggins, 2000), which include valuable knowledge in the field as such. I do not compare these techniques with the genre-based method here because the cost-benefit analysis is a logically separate task that must be in any case conducted during the EDM initiatives; also in those adopting the genre-based method for analysing other socio-organizational and technological requirements for EDM.[15]

[14] However, as the most well-known structured systems analysis methods and Checkland's SSM were included in Iivari et al.'s categorization of ISD approaches, they were already compared to the genre-based approach on that level in section 4.1.

[15] Although the genre-based method does not provide direct means for cost-benefit analyses, the resulting models from its use could provide support for demarcating the organizational

Schäfer et al. (1988) reviewed a number of methods that were developed in the 1970-80s in the field of office systems, after which they elaborated a multiperspective method named "Functional Analysis of Office Requirements (FAOR)". Since FAOR draws together ideas from the earlier office analysis methods and claims to cover the office analysis issues more widely than the previous methods for that purpose, I have chosen it to represent the field of office analysis in this method-level comparison to gain a picture how they contribute to the field of EDM. FAOR, together with IBM's seminal Business Systems Planning (BSP) -method (IBM, 1984), include a number of ideas more or less close to the genre-based method, such as analysing the requirements for a portfolio of information technologies from the viewpoint of the organization (as is the case in the development of EDM as well). These relatively widely-cited methods in the ISD literature were also unenclosed in the general-level categorization of ISD approaches (Iivari et al., 2001) that was discussed in section 4.1. Hence, I included them in this method-level comparison.[16]

Hence, the following methods are included in the method-level comparison with the genre-based method (GB) of developing EDM:

MDA - "Methodology for Document Analysis" (Salminen, 2000; Salminen et al., 1997)
SEDE - "Sutton Enterprise Document Engineering Life-Cycle" (Sutton, 1996)
SSSS - "The System Schematic & Stair Step Method" (Koulopoulos & Frappaolo, 1995)
EDMSM - "The EDMS Methodology" (Bielawski & Boyle, 1997)
FAOR - "Functional Analysis of Office Requirements" (Schäfer et al., 1988)
BSP - "Business Systems Planning" (IBM, 1984)

The method-level comparison covers the following components of method knowledge (Tolvanen, 1998) that are suitable for discerning the conceptual, process-related, and assumption-level differences between the methods:

- development objectives and process covered by the method (with regard to the generic ISD phases)
- conceptual structure; i.e. basic concepts by which the relevant parts of an EDMS are discerned and interpreted in the compared steps of the method process
- techniques and their notation used in the compared steps of the method process with a discussion on participation and roles of the stakeholders
- assumptions and values that have affected the method's construction

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areas in which to conduct those according to the specific techniques provided, e.g., by the consulting literature.

16 Other well-known approaches and methods for office analysis and ISD in general (such as the speech act based methods, Martin's Information Engineering, the socio-technical methods, the structured system analysis methods, the object-oriented methods, and the Infological approach) were already compared to this work with the approach-level discussion in section 4.1.

4.2.2 Development objectives and phases covered by the method

To illustrate the development objectives of the selected methods, table 6 depicts the development process of each method in relation to the generic tasks or phases of ISD. There is no general agreement what constitutes the "generic" tasks or phases of an ISD project or process. The traditional systems development life cycle includes the steps of feasibility study, system investigation, systems analysis, systems design, implementation, and review and maintenance (Avison & Fitzgerald, 1995). Sambamurthy & Kirsch include the tasks of planning, feasibility study, analysis, design, coding, testing, and implementation, which can be conducted more or less iteratively during the development process (Sambamurthy & Kircsch, 2000). Tolvanen has included the phases of business process re-engineering and development, requirements engineering, systems analysis, system design, construction, and operation and maintenance (Tolvanen, 1998, p. 45).

TABLE 6 Generic phases of ISD covered by the methods

	GB	*MDA*	*SEDE*	*SSSS*	*EDMSM*	*FAOR*	*BSP*
Organization design	o	o		x		?	
Planning	x						x
Requirements analysis	x	x	x	x	x	x	(x)
System analysis	(x)	x	x	x	x	?	
System design		x	x		x		
Implementation			x		x		
Operation and maintenance			x		x		
Evaluation		(x)				x	

x = clear contribution to the phase, (x) = minor contribution to the phase, o = optional contribution to the phase, ? = unsure, still possible, contribution to the phase

The following tasks of ISD are chosen to support the comparison here: *organization design* (which can include business process re-engineering, but it is not necessarily based on plainly the concept of the process), *planning* (for the portfolio of information systems), *requirements analysis* (for a particular system), *system analysis* (with the often formal and technology-oriented terminology of the particular system to be designed), *system design*, *implementation* (i.e., construction), *operation and maintenance*, and *evaluation* (i.e. review) of the system. The tasks of coding and testing are not included as separate tasks here, since they are regarded as subtasks of implementation, if they are needed for implementing an EDMS in a particular organization.

Software for EDM is most often purchased from varying vendors and integrated and tailored for a particular organizational context. Sometimes, the tailoring process may require programming-level changes; sometimes the acquired software packages can be integrated within the higher-level functionalities already present in the software. Järvinen (2001, p. 92) has separated the phase of purchasing from the other phases of systems development. In the cate-

gorization used here, the purchasing actions are included in the requirements analysis phase. The systems analysis and design phases delve into the technical details of the EDMS implementation with the chosen software and the implementation phase includes the technical construction of the EDMS in the organization (including, e.g., the integration of the new and already existing software packages in the organization, such as text processing, CAD, archiving systems, publishing software, etc.).

The genre-based method can be used for organization design, if the description of PUI entities and genres is based on a desired futuristic situation, but it does not insist the participants to redesign their organization.[17] MDA includes techniques for describing business processes and organization structures, which could be used for re-engineering the business process and role structures of the domain. SSSS aims at redesigning business processes with the workflow technology included in EDMS software. FAOR does not explicitly declare whether its aim would be to redesign the organization, in which office systems are under scrutiny, which, however, could be possible by the techniques included. The others do not present explicit techniques suitable for organization design. In fact, BSP states that business processes and data are as such rather stable areas, thus aiming at long-term organizational and technological architectures for the contemporary processes.

The genre-based method can be used for the general-level planning for the portfolio of information systems under analysis and their logical relationships in the field of EDM, or ISD in general, which is the major focus of the BSP method. Although the EDMSM includes a step called "planning", it concerns the selection of a pilot unit for the EDMS implementation, not planning for the portfolio of information systems and technologies needed for EDM in the organization.

All the methods include steps and techniques for requirements analysis, which makes their comparison meaningful here in the first place. The scope of the genre-based method ends to systems analysis, in which the socio-organizational requirements for EDM are translated into technology-specific terminology by which each separate IT application are specified further. As Article VI demonstrates, an extrapolated genre repertoire can provide a useful starting point for this. Sometimes, the system analysis itself can probably be made in terms of the genres (e.g. in intranet projects), whereas it seems that in most projects the modelling of data to be implemented and processed in a particular system requires the system-specific technology-oriented concepts and techniques to proceed from the genre-based requirements analysis.

MDA includes techniques and steps for analysing document structures, relationships, and life cycles for designing structured document systems. SEDE includes steps to declare the management functions of document repositories

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[17] In fact, in the "NetEd"-project conducted by the Information Technology Research Institute in the University of Jyväskylä, which was ongoing during the finalizing process of my dissertation in Spring 2001, the diagonal matrix -technique and genre-based thinking were applied proactively to the design of a novel virtual organization for producing Web-based learning environments among a group of companies.

(whether manual or computer-aided). SSSS aims at analysing for workflow implementations, and EDMSM pursues the analysis of the EDMS in a technical sense including document profiles, user groups, and document hierarchies (as was the case of the method tailored further from the genre-based method in the target organization of Article VI). In the design phase, MDA provides techniques for designing document type definitions and user interfaces from several viewpoints for a structured document system, SEDE for designing manual and computer-based repository management functions, and EDMSM for designing the prototype of an EDMS. SEDE and EDMSM provide also concrete steps and advice for implementing and maintaining an EDMS in the organization. MDA and FAOR provide means for, with experimental illustrations of, evaluating the constructed system against the requirements after its implementation.

The methods thus clearly vary in the scope of development. In addition to the phases of an ISD project described in table 6, Article IV describes the genre-based method as a means for continuous development the portfolio of information systems in the organization (including the issues related to EDM), in which development issues can cover a relevant subset of organizational document genres at a time. FAOR states that ISD is a continuous process rather than a plain project-oriented effort. However, the development cycle of FAOR focuses essentially on one system at a time, which is still rather close to the project-based approach. MDA suggests that document standardization would be an iterative process along time. The other methods are focused on supporting one project-like effort at a time.

The subsequent comparison of the conceptual structure, techniques, and values and assumptions focuses on the phases targeted by the genre-based method; i.e. organization design, planning, and requirements analysis. The other parts of the other methods, especially the phases and techniques aimed at technical system analysis and design, implementation, and evaluation, can most probably be connected to the genre-based requirements analysis, as necessary.

4.2.3 Basic concepts used for modelling

To illustrate the conceptual viewpoints to be modelled of EDM covered by the methods in question, table 7 describes the conceptual structure of the methods with regard to the following dimensions related to organizational change and IS: task/process, organization structure, people, information, and information technology. These generic components are based on a seminal framework for analysing organizational change established by Leavitt (1965), which is complemented with the component of information that can be distinguished from the components of task, structure, people, and technology in its own right (Päivärinta & Tyrväinen, 2001). Leavitt's framework has also been widely used to analyse the conceptual focus of the ISD methods in the previous research as it is, e.g. in the FAOR method (Schäfer et al., 1988).

TABLE 7 Basic concepts of the methods

	Information technology	*Information*	*People*	*Organization structure*	*Task / Process*
GB	(Property, Metadata)	Genre, (Property, Metadata)	(PUI entity, Property, Metadata)	PUI entity	PUI entity
MDA		Document object, Relationship, Life cycle	User needs	Role object (organization, person)	Goal, Domain, Process, Activity
SEDE		Document domain / zone / collection, Document type, Document profile, Information object		Business unit	
SSSS	System architecture, Application	Document (group), Folder, Cabinet	User needs, (Critical success factor)	Workgroup	Business cycle, Workflow, Task
EDMSM	System / application, Functional req. spec.	Document (type), Document profile, Metadata / attributes		User group, User profile	Business process / function, Workflow
FAOR	Resource	Information object, Information object type, Relationship, Attribute, Life cycle	Needs structure (growth needs, contact needs, existence needs)	Agent	Function, Goal, Task, Activity
BSP	System	Business entity, Data class	Executives' needs, problems, (Critical success factor)	Organizational unit	Business process

Task refers to the hierarchy of meaningful processes and their subtasks that exist to fulfil the goals of the organization. *Structure* consists of the hierarchy of organizational units, groups, and roles comprising identified responsibilities and rights in relation to the organization. The component of *people* refers to individual human beings and human-related factors, which need to be considered in relation organizational change (including the development of EDM) (Leavitt, 1965). *Information* covers the concepts that structure information either in the technological or socio-organizational sense (Päivärinta & Tyrväinen, 2001). *Information technology* refers to those concepts that focus on describing hardware and software that support the capture, transmission, storage, retrieval, manipulation, and display of information in the organization (Alter, 1999; Leavitt, 1965).

Task and structure

With regard to the task and structure viewpoints to analyse and model EDM, the genre-based method diverges significantly from the other methods with its principle according to which the stakeholders can structure their organization with their own terminology. The only constraint is that a PUI entity must produce information for other entities or use information produced by the others. The other methods suggest more strictly constrained concepts to structure an organization, which can sometimes be beneficial (e.g., the strict viewpoint of process may be needed for streamlining the activities in the organization), but sometimes the other methods may offer rather constrained and artificial viewpoints to a particular organization that diverge from the picture that the actual stakeholders have in mind. By this somewhat "meta-conceptual" approach, the genre-based method tries to avoid the difficulties to define and agree on what constitute the "processes", "units", "roles", "agents", etc. *per se* in the organization at the outset of the analysis, which otherwise could be rather time-consuming questions to tackle by the stakeholders. This is a trade-off between creative construction of the EDM requirements and the need for ensuring that a particular viewpoint of the organization would be scrutinized. However, the concept of PUI entity can be as well defined more strictly in a particular case, when the more constrained concepts, such as processes or roles, are necessary to be identified.

People and user needs

MDA and especially FAOR include specific techniques and concepts for collecting and analysing user needs in general, whereas SSSS and BSP concentrate mostly on the needs and opinions of the management, which are mostly presented in the form of critical success factors and other freely expressed requirements. The genre-based method can include individual needs that can be expressed concerning individual genres, or a set of genres, e.g. under the property of "problems and development ideas". In this sense, all of these methods consider the individual aspects related to EDM as qualitative comments expressed by those individuals.

Information

In order to structure organizational information and document resources, several concepts were proposed in the methods. MDA's concept of document object corresponds to such (often readily existing) document type identified in the organization, of which a document type definition (DTD) can be structured. A document object can have relationships to other document objects and role objects and it has a life cycle.

SEDE's document zones are logical collections of documentation under a common topic, document types/objects represent the content of a document in an organizational context (thus being close to the concept of a document genre), information objects refer to a certain kind of technical objects embedded in documents (text, picture, link, graphic, etc.), and document profiles describe the attributes of the document type in a repository.

In SSSS the concept of document (also called as document group) is vaguely defined, but it referred mostly to the documents sharing similar technical objects (e.g., graphics, textual documents), and sometimes a logical group of documents (such as manuals). Folders and cabinets are used for categorizing documents further, which is typical in the most traditional EDM system implementations.

EDMSM's concept of document type corresponds rather closely to the concept of document genre in GB. Document profiles describe the attributes of metadata that should be attached to the individual documents in the EDMS.

In FAOR, an information object refers to the information conveyed, the way the information is expressed, and the physical information carrier. The concept of information object type is rather close to the concept of genre, but it can also refer to a communication channel or medium as such. Information objects can relate to the other objects, and have a set of attributes and life cycle.

BSP structures the information resource by means of business entities of which data (classes) need to be collected and stored. For instance, the data class "personnel data" includes data about the business entity of "employee". This entity-based modelling concept clearly represents a different viewpoint of modelling information resources from that of genre.

Hence, MDA, SEDE, EDMSM, and FAOR include concepts for structuring document resources that relate rather closely to the concept of genre and the meaningfulness of information in the organizational context. However, the use of these concepts still seems to refer to such documents that are readily established in the organization and, in this sense, reified as organizational entities in their own right to be implemented in the future system. The concept of genre can, in addition to such document types, sensitize the stakeholders to discern and enact also "softer" genres (Schultze & Boland, 1997), which may not necessarily yet exist in a certain documented form (but which may be desired to be so in the future), as was the case of the genre of "customer consultation" in Article III. Hence, genres represent somewhat general-level and, from the technical viewpoint, "loose" objects of information, which can include the traditional focused concepts of document type / object and information object type, but

which can also refer to the "soft", still recognizable, purposes and forms of information shared by the PUI entities (cf. Schultze & Boland, 1997).

Information technology

To structure requirements for information technology, the genre-based analysis approaches the technological requirements genre-by-genre with technology-specific metadata under the selected properties. SSSS concentrates on assigning appropriate (workflow) applications with workgroups and technological infrastructures. EDMSM aims at finding an appropriate EDMS application / software for the organization in relation to general-level functional requirement specification based on generic (technological) EDMS functions defined in the book. FAOR speaks plainly of technological resources attached to the other concepts. BSP models (technological) systems in relation to the other concepts. MDA does not explicitly speak of technological issues, as technologies related to structured document systems are assumed *a priori* as the base-line for the implementation. SEDE includes no specific concepts for structuring the technological environment and requirements.

4.2.4 Techniques and participation and roles in planning and requirements analysis

Table 8 lists the detailed method steps for the generic phases of planning and requirements analysis for EDM (or ISD in general) suggested by the methods in question. Note that the individual techniques included in the other methods are not described in detail here. Rather, table 8 attempts to illustrate the number and complexity of the method steps and techniques, or the fact whether any explicit modelling techniques are included in the methods.

SEDE, SSSS, and EDMSM include no explicit modeling techniques (except one matrix notation in SSSS, which is described textually). Rather, their method steps for planning and requirements analysis consist of general-level checklists what should be done, what information should be gathered, and what outcomes should be produced – without explicated techniques nor examples how to model and analyze the results in practice if the plain textual reports are not taken into account. The consultancy-oriented books also define their concepts rather ambiguously, which causes sometimes difficulties to understand what is actually included in such concept and descriptions as " ystem schematic" (SSSS), "document list" (EDMSM), or "document zone" (SEDE). MDA, FAOR, and BSP, in turn, include a comprehensive number, even "toolboxes", of conceptually well-defined techniques that are aimed at analyzing the field of EDM (or office systems or information systems as a whole) from several viewpoints. BSP includes rather simple techniques, mostly matrices for varying purposes, which can be rather easily learned by the development team. Still, the number of separate models produced by the development process of BSP is great. The comprehensive number of different kinds of modeling techniques in MDA and FAOR, instead, requires a considerable time and expertise so that the combination of them could be learned and used effectively by the analysts who coordi-

nate the analysis process. The genre-based method includes two conceptually well-defined modeling techniques, which allow creativity when needed, but also more constrained conceptual bases for modeling, as necessary.

TABLE 8 Method steps for planning and requirements analysis with techniques

GB	*Identify stakeholders** (stakeholders) *Identify PUI entities* [diagonal matrix (PUI entities)] *Identify and name genres* [diagonal matrix (PUI entities, genres, problems & ideas)] *Identify relevant properties* [genre list (genres, properties)] *Gather metadata about genres* [genre list (genres, properties, metadata under the properties)] *Constitute a requirements specification* [genre list (genres, properties, analyzed metadata under the properties)], other reporting*
MDA	*Domain definition* [organizational framework (goal-oriented process, organization roles and their relationships to the goal)] *Process modeling* [document output model (activities, document objects produced), document input model (activities, document objects used)] *Document modeling* [document description (one document object), document-relationship diagram (document objects, relationships), state transition diagram (life cycle of a document object), document component description (components of a document object), reuse table (components, relationships to other document objects)] *Role modeling* [role description (one role object), document-role relationship table (document objects, relationships, role objects)] *User needs analysis* [interviews with structured questionnaires (work situations, problems and needs concerning documents, processes, systems, role interrelationships)]
SEDE	*Define documents** (descriptions of business units, prioritized document zones, document types) *Analyze documents** (model of document types & zones, catalog of the intrinsic objects within the documents, a comprehensive & structured classification system) *Originate documents** (business needs for document collections, document collection inventories)
SSSS	*Defining the Project Scope** [System Schematic (critical success factors, system architecture, applications, routing of existing documents)] *Collecting User Requirements** [Interviews, "blue sky" method, paper prototype (changes in information flow)] *Finalizing the System Schematic and Identifying the New Infrastructure** [System Schematic (new IT infrastructure)] *Developing a Stair Step Model* [matrix (applications, workgroups)] *Document Audit** (documents, applications) *Collapsing the Business Cycle* [Time-Based Workflow Analysis (business cycle, tasks, transfer time, task time)]
EDMSM	*Planning** (project plan) *Knowledge acquisition** [interview, process mapping (task), focus group, observation] *Analysis process** (alignment, organizational profile <mission, top processes, success criteria, the organization's customers, organization chart, user groups by function and location>, document list of existing documents, user profiles <job title, description, tasks, computer experience, documents>, document types <title, purpose, features>, document profiles <title, purpose, structure, attributes, workflow, users, security>, environmental profile <hardware, operating systems, applications, servers, networks>, capacity sheet, EDMS functions) *Tool evaluation & selection** (knowledge of contemporary technologies with regard to the requirements)

(continues)

TABLE 8 (continued)

FAOR	FAOR has four requirements analysis instruments[18] that can be taken into use when regarded necessary in a certain project according to steps tailored for that project. *Function analysis instrument* [Petri nets (state, transition), Function Characterization Form (function, agents,...)] *Communication analysis instrument* [interview, questionnaire, self-recording sheets, observation, document tagging, network diagram (agent, information object type, communication channel), information flow diagram (agents, office units, information object types), requirement profile (technical resources or functions, agents or tasks)] *Information analysis instrument* [observation, interview, questionnaire, recording form, document tagging, tables (information object types, agents, attribute types, relationship types, life cycle of information object type), diagrams (information object type, relationship type, life cycle), structured language (life cycle)] *User needs analysis instrument* [questionnaire (task, position, job content, work performance, coordination and cooperation, org. & social environment, problems, personal questions), group discussion, Likert-scale, arithmetic analysis, profiling]
BSP	*Preparing for the study** (current systems descriptions) *Review the business environment and objectives** *Defining business processes* [process identification (business process), process/organization matrix (business process, organizational units), flowchart (business process)] *Defining business data* [data usage analysis sheets (data class, process), data class definition (data class)] *Defining information architecture* [process/data class matrix (process, data class)] *Analyzing current systems support* [system/organization matrix (system, organizational unit), system/process matrix (system, process), system/data class matrix (system, data class)] *Interviewing executives* [interview sample questions, problem analysis sheet (cause, result, process, data class, solution), (critical success factors)] *Defining findings and conclusions**, *Determining architecture priorities**, *Information resource management**, *Developing recommendations**, *Reporting results**, *Overview of Follow-on Activities**

Steps of the method [techniques (concepts modeled)]
* = no specific *modeling* technique(s) presented
<subconcepts of the main concepts>

With regard to the issue of how the stakeholders participate in the development process, the genre-based method differs from the others. All the other methods require a dedicated analysis team, which steers the development process by interviewing other stakeholders and studying the organization from an "outsider's" viewpoint. The genre-based method regards the role of the analyst as a facilitator who, still necessarily, coordinates the project, but who allows the other stakeholders to use the techniques by themselves to construct the modeling results with the terminology of their own. The analyst ideally thus helps the others to reach the model they see as relevant with regard to development by themselves. I would argue that the genre-based method pursues active participation of all stakeholders, whereas the other methods involve more passive participation under the more dominating coordination of the analyst who gives the exact terminology and strict orders by which to analyze the beforehand-demarcated domain of interest. FAOR (Schäfer et al., 1988) even explicitly ad-

[18] I have excluded the "benefit analysis instrument" of FAOR from this comparison as it concentrates on the cost-benefit issues, which are not the focus of this dissertation.

mits its dependence of a highly skilled expert who should fully master and coordinate the use of this rather complex method, to reach its aim for structuring the problems and particular set of techniques from the toolbox for developing relevant office systems with relevant techniques.

4.2.5 Assumptions and values behind the methods

The preceding analysis of the other method components indicates a number of fundamental differences in the assumptions and values between the genre-based method and the others. I attempt to compare the value orientations according to the main topics of Iivari et al.'s framework (1998, p. 172)[19]:

- *ontology* ("what is assumed to be the nature of IS")
- *epistemology* ("what is human knowledge and how it can be acquired")
- *research methodology* ("what are the preferred research methods for developing and continuous improving of the ISDA[pproach or method] and what are the modes of evidence giving by which they are justified"), and
- *ethics* ("what are the values that ought to guide IS research").

According to Iivari et al. (1998), the ontology of IS research concerns the phenomena of information and data, information systems and technology, human beings, and human organizations and society at large. Two opposing positions, realism and idealism (or social constructivism, see (Berger & Luckmann, 1966)), have been identified with the ontological positions that can affect an ISD method. Realism "looks upon data as describing objective facts, information systems as consisting of technological structures ("hardware"), human beings as subject to causal laws (determinism), and organizations as relatively stable structures" (Iivari et al., 1998, p. 172), whereas idealism/constructivism sees these phenomena as (inter)subjectively and continually structured by individual agents (Iivari et al., 1998).

Iivari et al. (1998) continue that the epistemology of ISD methods can be analyzed with regard to the axis of positivism vs. antipositivism, in which the former seeks for objective, law-like regularities that can be found in the ISD methods and the latter sees the ISD methods as a means for collecting the viewpoints of the individual participants together to form an intersubjective picture of the target system (i.e., it assumes that a separate analyst cannot acquire proper knowledge of the target system alone, nor by analyzing the "objects", such as end-users or documents, of the system by her/himself).

According to Iivari et al. (1998), the research methodology orientations by which relevant ISD methods are to be developed and evaluated by the method engineers, can be divided into the *nomothetic* (i.e. "scientistic" approach to produce absolute knowledge as a basis for building and evaluating methods), *idio-*

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[19] Note that the reports of the methods in question rarely express these issues explicitly. Hence the following discussion represents the author's interpretations of these issues based on his reading on the source reports referred to here rather than the "absolute truth" of the issue.

graphic (which seek to bind the development and evaluation of a particular ISD method deeply with in-depth understanding and life-history of particular IS development contexts), and *constructive* (which state that an ISD method does not need to describe any existing reality as such at the moment it is created, but it can be reported as a conceptual idea and tool construction, which can help create new reality). However, this categorization could be clarified further according to the aspects of *building* new innovations (such as ISD approaches and methods) and *evaluating* them (cf. Järvinen 2001, p. 10).

The research orientations to produce knowledge as a background for building new ISD methods, as well as for the building task itself, are divided here into the *empirical-nomothetic, constructive,* and *idiographic* orientations[20]. The orientations that have been possibly used for evaluating the method under scrutiny are divided here into the *empirical-nomothetic* orientation (which aims at proving the absolute "scientistic" validity of the method compared empirically to a set of other methods), *idiographic* orientation (which aims at illustrating the usefulness of the method with regard to problems observed in a particular context of development or a limited number of them), and *theoretical/conceptual* orientation (that originates in Järvinen's (1994; 2001) categories of mathematical and conceptual analytical research methods and Siau and Rossi's (1998) non-empirical[21] evaluation techniques, and which aims at illustrating the conceptual and theoretical similarities and differences between the methods under comparison, or a using certain generic conceptual quality criteria (e.g. March & Smith, 1995; Järvinen, 2001) or mathematical measures (e.g. Rossi & Brinkkemper, 1996) to evaluate the methods under analysis in theory).

Finally, the ethics of the method engineers, affecting the method under development, can be categorized to means-ends oriented, interpretive, and critical values that guideline the development of a particular ISD method. The question of ethics and values also declares *whose* values are taken into account in the method in question (Iivari et al., 1998).

Table 9 summarizes the analysis on the assumptions and values behind the methods. In the following, these are also discussed in more detail.

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[20] Iivari et al. (1998) refer to the nomothetic orientation in their examples of the building phase of ISD methods and approaches as a means for gathering *background* knowledge as *a basis for* constructing an ISD approach or method. Here, we include only empirical research methods with the nomothetic orientation in this category. The difference between the constructive and idiographic orientation, as understood here, resides in the starting point to establish a particular development method to be tried out in practice: the constructive orientation starts with conceptually and analytically reasoned theoretical models and assumptions (or earlier methods) and brings them as such to a practical test, whereas the idiographic orientation starts with in-depth analysis of the problems and experiences in a (few) particular development context(s) first (such as the case study in Article I and the experiment in Article II) and builds the suggested method upon the contextual problems found. Moreover, it should be noted that a process of building new innovations most probably involves both constructive and idiographic elements simultaneously (e.g., action research initiatives can be regarded as combining these orientations, cf. Järvinen (2001)). Hence, the purpose of my categorization, especially between the constructivist and idiographic orientations, is to interpret the *dominating* orientation of the ISD method engineers to establish the method in question, not the one and only orientation they might have had in mind.

[21] Siau and Rossi (1998) have simply divided the evaluation approaches of ISD methods into the non-empirical and empirical categories.

TABLE 9 Summary of assumptions and values behind the methods

	GB	MDA	SEDE	SSSS	EDMSM	FAOR	BSP
Ontology:							
- information /data	SC	Real.	Real.	Real.	Real.	SC	Real.
- IS / technology	SC	Real.	Real.	Real.	Real.	SC	Real.
- human beings	SC	SC	Real.	Real.	Real.	SC	Real.
- organization	SC	Real.	Real.	Real.	Real.	Real?	Real.
Epistemology	AP	Pos.	Pos.	Pos.	Pos.	Pos?	Pos.
Research methodology:							
- to build	Idio.	Con.	Idio/ Con.?	Idio./ Con.?	Idio./ Con.?	Con./ Idio.?	Idio./ Con.?
- to evaluate	Idio/ Theor	?	?	?	?	Theor.	(Theor.)
Ethics	Crit. /Int.	Int.	M-E	M-E	M-E	Int.	M-E

SC = social constructivist ontology, Real. = realist ontology, AP = antipositivist epistemology, Pos. = positivist epistemology, Idio. = idiographic methodology, Con. = constructivist methodology, Theor. = conceptual/theoretical methodology, Crit. = Critical orientation, Int. = interpretivist orientation, M-E = means-ends orientation, ? = unsure

Ontology

The genre-based method clearly takes a social constructivist and intersubjective view on the ontology with regard to information and data: genres are socially constructed abstractions of recurrent communicative actions best understood by those who actually (re)produce and use them at work. As Article VI shows, additional concepts are needed for describing information further to implement those genres so that they can be processed as data in an EDMS from the technological viewpoint. FAOR's concept of the information object also tries to distinguish between the content and physical implementation of information, which, however, are still necessarily the same object (whereas in the genre-based method the logical concept of genre may well be related to several technological objects of data). The other methods take a rather straightforwardly realistic position to information: documents, document types, document collections, and data classes in those methods are regarded as "objective" and rather reified (Berger & Luckmann, 1966) objects that exist in the world as such, and they can be then standardized and implemented with an "optimal" solution by those analysts that observe that reality.

The genre-based method, together with FAOR, regards an information system primarily as a socio-organizational system, in which IT plays a role as a part of its implementation. MDA aims at technologically persistent and valid structured document systems, thus representing the standpoint of realism with regard to information systems and technology. SEDE considers organizational practices as a part of the system as a whole, whereas the rest of the methods take a realistic view that regards an EDMS (and other ISs) as rather technological constructions.

Individual viewpoints of human beings play a significant role in the user needs analysis methods of FAOR and MDA, which bring them closer to the ontological position of social constructivism, together with the genre-based method, which pursues to assure this position with its orientation towards wide and active participation. In the other methods, human beings (except the analysts themselves) are seen rather in an instrumental and deterministic way: the other human beings than analysts must be affected to accept the new and "good" technological advances, "sponsors" for this among the management are needed etc.

The rather complex and laborious analysis processes suggested by MDA, FAOR (despite of the fact that the book explicitly claims to be otherwise), and BSP imply that the target organization is seen as rather unchanging to which relatively long-lasting EDMSs (and other ISs) must be planned and developed. SEDE, SSSS, and EDMSM pursue comprehensive and as such stable solutions that are reached by a comprehensive development project. The genre-based method seems to be the most socially constructivist among these methods ontologically with regard to the phenomenon of the organizational environment with its relatively light analysis process that can be targeted at selected areas that need development at that particular moment in the continually changing environment, as well as at organization-scale efforts, if they are considered necessary.

Epistemology

The genre-based method takes the antipositivist standpoint by denoting that valid knowledge of genres and requirements for their development represented by the resulting models must be constructed intersubjectively among a wide collection of the stakeholders. Although FAOR includes techniques to formulate relevant systems development problems and the subsequent models in collaboration with several stakeholders, the process is still much more analyst-driven than in the genre-based method, which suggests FAOR to be epistemologically more positivist. The other five methods rely fully on the team of analysts, which observe and acquire valid and objective knowledge from the domain (which is external to their own work domain), and then model the target system according to that knowledge they have acquired. In this sense these five other methods can be regarded as epistemologically positivist.

Research methodology: assumptions behind method engineering

None of the methods in question have used nomothetically derived knowledge as a basis for method construction. The history of MDA (Salminen, Kauppinen, & Lehtovaara, 1996; Salminen et al., 1997) and my personal experiences from its development process (Tiitinen et al., 2000) indicate that MDA has been constructed conceptually upon a number of existing methodological backgrounds to affect the development of structured document systems in the legislative domains in question.

FAOR has included a number of separate techniques, which are to be applied to a particular development situation as considered necessary by the

stakeholders. Hence, this suggests that the method engineers of FAOR have had a slight idiographic orientation during the development efforts of this "toolbox", within which the method should be used and tailored for the use situations. However, the fact that the book describing the FAOR method (Schäfer et al., 1988) describes no development history indicates that the *method engineering* orientation has been mainly constructivist in itself.

As SEDE, SSSS, EDMSM, and BSP represent more or less consultancy-oriented constructions with no documentation how and why they are elaborated and reported, as they are, no clear orientation of how they have been built can be identified. However, those books state that the method engineers have gained practical experience from numerous individual development cases and then abstracted their experience to a method description. The building orientation of these methods thus could be estimated to reside somewhere around the idiographic and constructivist approaches.

The development history of the genre-based method, as reported in Articles I-VI, clearly represents the idiographic orientation, in which the problem area of EDM in the organization has been studied with in-depth research efforts, from which the genre-based method has then been elaborated and abstracted. The experiences reported in Article VI suggest that the method would be easy to tailor for varying casual needs, which implies that the idiographic orientation could continue also in its future elaboration. Hence, the genre-based method most clearly represents the idiographic orientation in the building process as well as in the evaluation strategy. In addition, the genre-based method is compared theoretically and conceptually with the other methods in this very section to crystallize its potential contributions in the field of EDM.

No explicit feedback to evaluate MDA, SEDE, SSSS, or EDMSM for further method engineering has been reported in the references discussed. Hence, not much can be said here about the methodological orientation to their evaluation by the method engineers (the theoretical and conceptual comparison conducted here does not aim at engineering those methods). Schäfer et al. (1988) have extensively compared FAOR to a great number of other contemporary office modeling methods for modeling offices in the theoretical/conceptual sense thus crystallizing its potential conceptual and theoretical contributions at that time.

This introductory part is also the first theoretical and conceptual comparison of BSP to the methods of developing EDM. However, as BSP has been a well-known method for IS planning (especially for planning for structured databases) for decades, theoretical and conceptual comparisons between BSP and other (strategic) IS planning methods can be found in the literature (e.g. Zachman, 1982). However, it is less clear whether those comparisons have actually affected the further development and use of the methods in question.

In the field of EDM, neither empirical-nomothetic evaluations nor such theoretical evaluations comparing the methods in question to a set of universal quality criteria or mathematical measures were found.

Ethics

SEDE, SSSS, EDMSM, and BSP have a clear means-ends orientation from the viewpoint of the system analysts and management. With the methods in question, it is assumed that the "best" target system(s), defined by the analysts who use the method under the sponsorship of the top management, can be reached and justified to the other stakeholders with technological and managerial arguments.

MDA's orientation is more interpretivist because it regards the models also as a means of negotiation for the user needs which should be taken into account in the technological solution (a structured document system), in addition to the plain system analysis conducted by the analysts. FAOR is clearly interpretivist because the models and its development process aim at mutual understanding of relevant problems in the office context in the first place, and the case-specific tools can be selected from the toolbox for that particular situation. FAOR also highlights the job satisfaction of an individual, which should then be taken into account in addition to the technological and managerial considerations.

The genre-based approach attempts to promote the critical orientation of all stakeholders during the development of EDM explicitly, as described in Article V. However, the experiences reported in Article VI indicate that the genre-based method does not necessarily confirm that orientation in itself during actual development efforts; personal commitment to the critical orientation among the stakeholders is needed first, after which the method can be used as a means for critical debate. Otherwise, the major orientation of the genre-based method stays only on the interpretivist level, or in the "worst" case, it can even be used in a means-ends way plainly, without a comprehensive participation of the stakeholders, by the IS analysts alone.

4.2.6 Summary of the method-level comparison

The genre-based method aims at planning for an IS portfolio related to EDM and requirements analysis for an EDMS from the viewpoint of the organization. The method can also be used for organization design, as necessary. The development objective and starting point of the genre-based method differs from the other methods analyzed, which suggests it to have a complementary position in the field.

The genre-based method includes only four basic concepts for analyzing the target organization with its EDM, which still provide a flexible and comprehensive basis for modeling the organizational tasks and structures in relation to document resources and furthermore technological options to implementation issues. In the consultancy-oriented methods, the basic concepts have been weakly defined, whereas in the research-oriented methods the number of different concepts needed makes the methods rather complex. With regard to the techniques used during the development process, the consultancy-oriented EDM books typically involve rare explicit techniques, whereas the research-based methods (and BSP) include an exhaustive toolbox of them. The genre-

based method can thus be located in between the consultancy-based methods (excluding BSP) and the other research-based methods (and BSP) with regard to the number and complexity of its basic concepts and modeling techniques.

The genre-based method aims at active participation and emancipation of all stakeholders and the facilitator-oriented role of the analyst, whereas the others are more or less analyst-driven. The values and assumptions behind the genre-based method show that it takes the social constructivist standpoint in its ontology, antipositivist standpoint with regard to its epistemology, rather idiographic research methodology (together with this conceptual/theoretical evaluation in the field of EDM), and critical orientation with regard to ethics in addition to the interpretivist and means-ends-based orientations. The genre-based method thus represents a reasonably distinguished paradigmatic position with its values and assumptions among the analyzed methods in the field of EDM.

All this together shows evidence for my argument that the genre-based approach and method complements the existing methods of planning for, requirements analysis for, and continuous development of EDM in the organization, is theoretically original, and conceptually rather uncomplicated. However, it does not cover the phases of system analysis, design, implementation, and evaluation, which have been covered with a set of the other methods discussed above.

5 CONCLUSION, SHORTCOMINGS, AND FURTHER RESEARCH

"I was determined to be wise, but it was beyond me."
(Ecclesiastes 7:23, c. 900 BC, Good News Bible)

"The whole point of seeing through something is to see something through it... If you see through everything, then everything is transparent. But a wholly transparent world is an invisible world. To 'see through' all things is the same as not to see."
(C.S. Lewis, The Abolition of Man, 1944, 1st Touchstone edn. 1996, Simon & Schuster, New York, pp. 86-87)

This section firstly concludes the main arguments of my dissertation by a brief sketch on my contributions with regard to the research questions formulated in section 2.1. Secondly, I discuss about the shortcomings of this thesis, which can, in turn, be regarded as potential areas of further work.

5.1 Contributions

The most important contribution of this dissertation resides naturally in the genre-based approach to (including the method for) developing EDM as such, which was motivated, constructed, and tried out in practice as reported in the articles. Since the detailed results of the separate articles have already been summarized in section 3, and the comparative discussions were summarized in sections 4.1.6 and 4.2.6, the aim here is to conclude and crystallize the arguments related to the genre-based approach to developing EDM briefly from the viewpoint of this dissertation effort as a whole.

5.1.1 What should be included in a reasonable approach to develop EDM in the organization?

Article I illustrated how organizational changes and new IT opportunities can cause several rather significant, both deliberate and emergent, changes to EDM in the organization continually within a time frame of a few years. These changes require long-term planning efforts to coordinate the organizational development together with the acquisition of novel IT, and also defined responsibilities and ways to react to the unplanned encounters affecting EDM. Articles I and II thus supported Sprague's observation that EDM in the organization involves several IT applications, several application areas and organizational functions with varying needs for development, and several stakeholders with diverging interests in the development of EDM (Sprague, 1995). Furthermore, these areas are interrelated and changing continually along time.

The motivational findings in Articles I and II suggest the following requirements for an approach to developing EDM in the organization:

- As organizations and IT opportunities (nowadays mostly developed outside a particular organization having needs for EDM) are under continuous evolution, the development approach should include means for comprehending and demarcating areas of responsibility with regard to the organizational document resources and their development. The resulting model of organizational document resources should be simple enough to be efficiently constructed.
- As several stakeholders have diverging interests in EDM development with diverging knowledge of and opinions on the development needs in the first place, the approach should provide a simple conceptual means so that it could be easily learned also by those stakeholders having no background in the discipline of IS, but also an effective conceptual basis by which the interests of end users, IT experts, managers, and other possible stakeholders could be discussed, preferably critically, with commonly understood language.
- As EDM relates to several application areas in the organization, the model of organizational document resources should provide practical and focused tools to demarcate relevant areas to be developed with relevant technologies, without forgetting the coordination of EDM as a whole.

To summarize, the development approach to EDM should:

- *link the organization model, information model, and technological solutions for EDM in the organization;*
- *be easily comprehensible, practical, and efficient; and*
- *support collaborative participation and (preferably critical) debate among a wide assembly of stakeholders in development efforts with a common terminology, aligning individual viewpoints and intersubjective viewpoints to development.*

These general-level requirements can be regarded as the first area of contributions in this dissertation. Based on the research efforts reported in Articles I and II, the subsequent research was directed to the genre theory of organizational communication, whether it could respond to the observed challenges to develop EDM from the viewpoint of the organization.

5.1.2 How could the genre-based method / approach support the practical development of EDM?

To instantiate the genre-based approach to EDM, such method was constructed with action research efforts resulting in Articles III and IV. Article VI reported the experiences of a consulting team after it had used and elaborated the genre-based method further for their own business purposes.

First of all, the method has been able to reveal hundreds of communicative genres in the target organizations, of which a major part represents documented information, with reasonable efforts and the granularity sufficient for initiating focused development actions. These extrapolated genre repertoires have enlightened organizational stakeholders about the heterogeneity, importance, and complexity of EDMSs. The models provided by the method thus have enlightened the stakeholders of the chaotic reality so that no often-oversimplifying technology-centric development approach would blur or underestimate the socio-organizational challenges to effective EDM.

However, after that chaos-creating effect the genre-based method has provided a practical, comprehensible, flexible, communicative, efficient, and, in certain (although not necessarily in all) conditions, emancipatory means for demarcating relevant areas of development, and for defining detailed, both organizational and technological, requirements for EDM in the organization among focused assemblies of the stakeholders. The fact that an independent business-oriented consulting team has extensively applied and elaborated the basic ideas of the research-oriented efforts suggests the practical usefulness, efficiency, comprehensibility, and flexibility of the genre-based *approach* as such, especially in the initial phases concerning requirements analysis for EDMSs.

The concept of genre provides a general-level "metaconceptual" basis by which several kinds of document resources can be holistically scrutinized from the organizational viewpoint, even those "soft" genres (Schultze & Boland, 1997) that have not even been contemporarily identified, let alone standardized, as documents (as illustrated, e.g., in Article III). With the concept of PUI entity, these two concepts together form also a basis for organization-specific language by which each organization can use the terminology of its own in order to structure the organization and its information resources in the socio-organizational sense, but which can be also conceptually understood satisfactorily enough from an outsider viewpoint by those, e.g. consultants and researchers, who are interested in comparing those concepts among a number of organizations. Furthermore, the preliminary experiences concerning the identification of technical document types on the basis of document genres (reported in Article VI) also indicate that explicitly identified genres can provide a basis towards techno-

logical data modelling, with various additional methods which will still be needed for the modelling and analysis of technological EDM solutions in the phases of system analysis, design, implementation, and evaluation. Hence, the genre-based approach seems to have the capability to act as a starting point for linking the organization model, information model, and technological aspects in the development of EDM within a collaborative (and in certain conditions critical) debate on the development issues participated by a wide assembly of stakeholders.

All in all, this dissertation has contributed by establishing a theoretically grounded approach, with a practical method instantiating it, to requirements analysis for EDM from the organizational viewpoint, which was sufficiently motivated by a review on the document management literature and exploratory and experimental interventions to organizational settings, and which has succeeded to demonstrate its practical contribution and usefulness both in collaborative research-based development efforts between industry and academia as well as in purely business-oriented consultancy activities.

5.1.3 How does the genre-based method / approach contribute to the other contemporary development methods in the field of EDM and ISD approaches in general?

In addition to demonstrating the practical contribution of the genre-based approach and method as such, section 4.1 of this introductory part positioned the genre-based approach within a set of previously identified significant ISD approaches (including also the major approaches used for analysing office systems, such as the structured systems analysis approach, the information modelling approach, the socio-technical approach, SSM, and the speech-act-based approach, which were also of interest with regard to the field of EDM) and section 4.2 compared it to the other methods identified with the field of EDM (or otherwise related to the genre-based method).

Based on the literature review in section 1 of this introductory part, the comparative discussion in section 4 contributes to the field of EDM as such, declaring the positions and standpoints of the contemporary methods in the field with regard to each other, because no previous comparisons between the EDM development methods and approaches was found from the reviewed literature.

Based on the comparative discussion in section 4, the genre-based approach, with an exemplary genre-based method that was constructed and elaborated in this dissertation, establishes a complementary approach to the planning and requirements analysis for EDM in the organization compared to the other existing methods and approaches in the field. Based on Article V and section 4.1 in this introductory part, the genre-based approach also represents a complementary elaboration to the previous ISD approaches in general; especially within the ideals of CST, and among the approaches focused on analyzing organizational communication (such as the speech-act-based approach).

5.2 Shortcomings and Limitations, i.e., Future Research Directions

Despite of the research efforts reported above, the genre-based approach to developing EDM, let alone to ISD in general, is still in its infancy. A number of clarifications are needed in the future to crystallize its theoretical contribution further and to validate and elaborate its method-level effectiveness in practice.

Although the genre-based approach was found helpful in the development of EDM systems in the target organizations, the issue to what extent genre theory was the key to the successful initiatives and to what extent it could steer the development initiatives towards the critical orientation *per se* may require more scrutiny. The consultants' actual usage of the genre-based approach (Article VI) included some theoretical inconsistencies and had slipped towards the dominance of formally rational orientation from the viewpoint of the consultants, instead of the rationality orientations and the viewpoint of the end-user as intended by the method engineers. Still, according to the consultants, their EDM projects had been rather successful. Further reflection on the specific contribution of genre theory versus other theoretical and conceptual approaches will surely be needed.[22]

The theoretical relationship between ST and the genre-based approach to ISD practice should be explicated and elaborated further in the future.[23] Especially, ST could be capable of providing conceptual elements to observe asymmetric power and domination structures, before a genre-based initiative pursuing the ideals of CST, e.g. to find out whether the critical genre-based orientation would be realistic in a particular development initiative in the first place. Thus far, the clearest thing from ST explicitly adopted here is the general-level idea of structuration (as mentioned in section 2.2). Hence, I can declare that ST has *informed* my dissertation by its general statements. The more detailed relationships between the rich conceptual frameworks and ideas of Giddens' ST and the genre-based approach remain to be studied further elsewhere.

Since the major objective here has thus far been to instantiate the genre-based approach with one practical method for developing EDM, the genre-based method developed in this dissertation does not utilize all concepts of the genre theory to its full potential. Especially the roles of such concepts as *genre system* (Bazerman, 1994) and *genre ecology* (Erickson, 2000)s should be clarified further in the future in relation to the existing method. Most probably, these concepts would awake fruitful elaborations to the contemporary method.

A number of other theories, in addition to those referred to above, relate to the structuring of organizational communication that could bring additional

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[22] The author wishes to acknowledge Matthew Jones for his insightful comments denoting this issue.

[23] Yates' and Orlikowski's work already leans rather explicitly on Giddens' ST (Orlikowski & Yates, 1994; Yates & Orlikowski, 1992), but they do not use genre theory in practical ISD - they regard it more as a useful lens to be used in IS *research*

viewpoints to the genre-based approach and its role in the field of ISD in general. Such theories may include activity theory, which has reached increasing interest in the IS community lately (Kuutti, 1991; Virkkunen & Kuutti, 2000), the "Media richness theory" (Daft & Lengel, 1986; Daft, Lengel, & Trevino, 1987), "Critical mass theory" (Markus, 1990), "Social influence model" (Fulk, Schmitz, & Steinfield, 1990), the "emergent network perspective" (Contractor & Eisenberg, 1990), and "channel expansion theory" (Carlson & Zmud, 1999).

Thus far, the genre-based approach has only been compared to the other EDM methods and ISD approaches on the conceptual and theoretical level – it has not been empirically compared to other methods or approaches in practical development. In this sense, my dissertation does not include any "scientifically valid, objectively best" approach or method with regard to the other ones discussed. If the idiographic standpoint to the research methodology is fully assumed according to its pure philosophical standpoint, the empirical-nomothetic comparisons at the method-engineering level can even be considered rather meaningless as such: two situations in different organizations cannot be objectively compared, nor cannot the methods used in them. However, "scientistic" and experimental evaluations of the particular techniques of the genre-based method with regard to the other methods in laboratory conditions might still shed additional light on its potential contribution, and reasons for them, among the established ISD methods and approaches.

The distinction between the socio-organizational and technological concepts for modelling EDM was observed in Article VI, by which the consultants in question could proceed from requirements analysis towards a practical tailoring of the EDMS package in question for the specific needs of the customer. As the contemporary genre-based method is focused on the planning and requirements analysis phases from the organizational viewpoint, more work to construct explicit links from genre-based modelling to the implementation-oriented methods (typically used in the phases of system analysis and design) would be useful to bridge the gap between the social and technological in the development of EDM and ISD practice in general. For example, it seems rather obvious that MDA could be rather straightforwardly used for developing structured document systems for a relevant set of document genres after a general-level requirements analysis for EDM conducted with the genre-based method. In general, explicitly defined connections from genres to data and process modelling (from the system viewpoint) could probably constitute an effective toolbox by which the socio-organizational requirements analysis based on genres and PUI entities could be "translated" to useful technical system specifications. This could enhance *both* efficient, effective and collaborative requirements specifications *and* accurate and effective systems design and implementation efforts by the IT experts.

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YHTEENVETO (FINNISH SUMMARY)

Jo kahdenkymmenen vuoden ajan *elektroninen dokumenttien hallinta* (EDH) on ollut osa tietojärjestelmätutkimuksen kenttää. EDH:n kehittämisen tärkeys lähes kaikenlaisissa organisaatioissa kasvaa informaatioteknologian kehittymisen mukanaan tuomien mahdollisuuksien ja organisaatioiden jatkuvien muutospaineiden myötä. EDH:n kehittämisessä organisaatioissa olisi huomioitava laajalti useita eri tietojärjestelmäsovelluksia, joita organisaation toiminnassa ja siten myös sen dokumenttien hallinnassa tarvitaan, eri käyttäjien tarpeita, ja useita muita organisaatioon liittyviä tekijöitä. Nykytutkimus ei kuitenkaan ota kovinkaan kokonaisvaltaisesti huomioon EDH:n kehittämiseen organisaatioissa liittyviä asioita, vaan keskittyy enimmäkseen yksittäisten informaatioteknologioiden mukanaan tuomiin yksityiskohtiin, asianomaisten teknologioiden näkökulmista ja teknologialähtöisistä käsitteistä käsin ilmiötä tarkastellen.

Tämä työ perustelee, miksi uutta *organisaation näkökulmasta* liikkeelle lähtevää lähestymistapaa EDH:n kehittämiseen tarvitaan, muodostaa tällaisen lähestymistavan ja kehittämismenetelmän, jolla voidaan saada aikaan vaatimusmäärittely elektroniselle organisaation dokumenttien hallintajärjestelmälle, sekä raportoi näistä havaittuja kokemuksia, kun niitä on sovellettu dokumenttien hallintajärjestelmien kehittämisen vaatimusmäärittelyihin ja yleisen tason suunnitteluun erilaisissa organisaatioissa. Kehitetty lähestymistapa ja menetelmä perustuvat organisaatioissa tapahtuvaa kommunikaatiota kuvaavaan *genre*-teoriaan ja kommunikatiivisen genren käsitteeseen.

Kehitettyä lähestymistapaa ja menetelmää on tutkittu käytännönläheisissä toimintatutkimushankkeissa, jotka on toteutettu eräiden suomalaisten yritysten ja Jyväskylän yliopiston välisenä yhteistyönä. Tämän lisäksi menetelmää on sovellettu erään EDH:n kehittämiseen suuntautuneen konsulttiorganisaation liiketoiminnassa kahden vuoden ajan, josta saatuja kokemuksia myös raportoidaan. Kokemusten mukaan genre-pohjainen lähestymistapa (ja sen mukaisesti rakennettu menetelmä) on osoittautunut varsin käytännönläheiseksi käsitteelliseksi apuvälineeksi EDH:n kehittämisen alkuvaiheissa erilaisissa organisaatioissa, koskien dokumenttien hallintajärjestelmien vaatimusmäärittelyä ja yleisen tason suunnittelua.

Tämän lisäksi genre-pohjaista EDH:n kehittämisen lähestymistapaa ja menetelmää verrataan alan kirjallisuuden pohjalta yleisellä tasolla muihin yleisimpiin tietojärjestelmien kehittämisen lähestymistapoihin ja erityisesti muihin EDH:n kehittämiseen suunnattuihin menetelmiin, josta saadut tulokset osoittavat tässä väitöstyössä kehitetyn lähestymistavan ja menetelmän täydentävän aikaisempia tietojärjestelmien kehittämisen lähestymistapoja yleensä, kuten EDH:n kehittämiseen erityisesti suunnattuja aikaisempia menetelmiäkin. Erityisesti genre-pohjaisen lähestymistavan voidaan nähdä täydentävän aiempia organisaatioissa tapahtuvan kommunikoinnin analysointiin ja sitä tukevien tietojärjestelmien kehittämiseen suunnattuja lähestymistapoja, esimerkiksi puheaktipohjaista lähestymistapaa.

ORIGINAL ARTICLES

I

DELIBERATE AND EMERGENT CHANGES ON A WAY TOWARD ELECTRONIC DOCUMENT MANAGEMENT

Päivärinta, T. & Salminen, A. 2001.
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II

ON RETHINKING ORGANIZATIONAL DOCUMENT GENRES FOR ELECTRONIC DOCUMENT MANAGEMENT

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III

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A GENRE-BASED METHOD FOR INFORMATION SYSTEMS PLANNING

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V

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VI

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