

Business Information Organization:  
A Search for Common Concepts  
to Support Information Integration

A Research Proposal

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**Abstract**

As enterprises grow and subdivide into smaller internal units for better management of their resources, department level managers and information professionals organize their records and other documented information into conceptual structures that allow easy access for departmental decision-making. Eventually, however, enterprise level managers realize that decision-making by departments is not always the best for the enterprise as a whole, move to reclaim some decision-making at the enterprise level, and attempt to integrate departmental information into enterprise wide structures. Yet attempts to create integrated enterprise wide structures by merging department level information, often encounter unexpected expenses because of the complexity of resolving information incompatibility resulting from the different terminology and the different information conceptual structures of the different departments.

Interested scholars, information management vendors, and information architects have generated a rich literature discussing approaches to solving the problems of information integration. Although these approaches have achieved moderate successes, they have not completely solved the enterprise wide integration problem. The approaches are often enterprise specific, concentrating on the ontologies themselves—the information and its organization— independent of the department information professionals who originally organized it. The literature places emphasis on mechanical approaches to combining information and ontologies based on its physical characteristics and mostly ignores the human element.

Clarifying the concepts underlying the work of different but related communities of professionals who organize information—the human element—offers the potential of better understanding organizational concepts basic to integrating different but related information ontologies. The need for such clarification and understanding increases as differently organized information must be integrated into ever larger databases. Study of the problem, to provide the insight into how and why professionals in different departments and communities organized similar information in substantially different ways, is essential for better understanding. To further our understanding, the research goals of the proposed study are to identify the common principles and concepts and to develop the associated theory that underlies information professionals' organizational activities and ontology development.

To meet these goals, primary data from unstructured interviews of enterprise information professionals will be analyzed to identify common principles and concepts of how and why information organization structures are actually developed. Secondary data, consisting of case studies of information structure development, studies of working information organization systems, and reviews of practicing scholar presentations at conferences and other venues will be used so support the primary data. These principles and concepts will be analyzed using constant comparison techniques to develop categories common to the various data sources and associated theory of the information organization structures. Finally implications to our insight and understanding will be discussed in the context of existing literature. Techniques such as bracketing and memoing will be used to enhance validity of the results.

The results of this research will increase our theoretical understanding of how and why enterprise information professionals organize their information the way they do and thereby contribute to solving the problems related to enterprise information integration.

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“They don’t agree!” expressed the surprise in 1962 when telephone planners and computer programmers compared the outputs of the new punch card computerized forecasting system with the products of accounting clerks. The scene was the Illinois Bell Telephone Co. Traffic Department in Chicago where planners were trying to estimate how many cables to put under the streets so they would not have to dig up the streets again soon. They had what they thought was a well proven information organization concept and estimating model that allowed the analysts to sort customer requirements in such a way that the cable requirements between telephone switching offices could be accurately projected. Developed by Chicago Area engineers, this model was based on the concept of “spans,” which represented the paths between the switching offices. Because Suburban Area and State Area engineers also used span concepts and models for their estimates, the Chicago analysts and clerks merged the information from the areas using pencil, paper, and adding machines to provide a total estimate for the company. So it seemed that it would be a trivial task to program an automated accounting machine (an early computer) to merge the estimates in each span to provide a total estimate of total requirements quicker and cheaper. When the results of the manual and automated methods were compared, they did not agree. The automated system did not achieve the expected results expected.

It took days to figure out the cause of the differences. Eventually the analysts determined that the root of the problem was two fold: the slight differences in the span concept and the

resulting different data organization structures used in each of the areas. The estimating models used by Chicago engineers differed slightly from those of suburban engineers; and both differed from those of state engineers. In the Suburban Area, a span never skipped adjacent switching offices; in Chicago, a span might skip adjacent switching offices to connect more distant ones; and in the State Area, spans followed radio systems. These concepts and organization structures were different enough that the relationships between the customer requirements and the span estimates in each of the three areas were not compatible. To solve the problem, the engineers had to reprogram the accounting machines to translate the input data from each of the areas into an integrated structure so that the numbers to be added were conceptually the same.

Twenty years later, communications planners and computer database architects were designing a new integrated information organization structure to model the world wide communications network of the Department of Defense (DoD) bringing together transmission information from one community and equipment information from another. After spending many contract engineering hours, designers realized something was wrong: the tables were becoming much more complex and convoluted than expected; some of the information from the equipment community did not fit comfortably into the organization structure of the model; and it looked like the project would exceed the contract hours allotted to it. At a lull in the discussion, a junior engineer asked what the conceptual basis of the new design was. A more senior engineer patiently explained that the basis of the design was a transmission model developed by an expert in Washington. The junior engineer asked, "why not an equipment model?" The question resulted in a review of the previously unquestioned conceptual basis for the database design resulting in a new information organizational structure based on neither a transmission model nor an equipment model, but instead on a location model grounded on the common concepts of both.

The new structure worked. Built from the transmission and equipment models, the new location model accommodated both transmission and equipment information.

### **The General Problem**

The general problem reflected in the two examples is the difficulty of successfully integrating information previously organized by different communities. In each of these examples, senior managers needed integrated information from multiple communities in their organizations to make decisions. But the dissimilar definitions, concepts, and organization structures, within which information from the different communities was organized, made direct integration of the information invalid and indirect integration questionable, with potentially erroneous results for decision-makers. Yet without integration, decision-makers most likely would have been unable to obtain valid information in time to make their critical decisions. Although they would have been able to obtain information separately from the three areas in the telephone example and from the two communities in the DoD example, they probably would not have understood the different underlying conceptual models well enough to have confidence in the information resulting from the combination.

Technically the problems identified in these two examples are different and yet similar. They are different in that the first is a problem of definitional or conceptual agreement on the nature of a span and the second is a problem of integrating transmission system and equipment information into a single structure. They are similar in that a common information structure must accommodate source information from diverse structures developed independently of each other. The problem is more than developing common definitions; it is also finding common concepts to allow information from different conceptual perspectives to be brought together.

The impact of the integration problem reflected in these two examples was the expenditure of many man-hours redesigning the common data structures so that information could be satisfactorily integrated. The impact would have been much worse had the data structure problems not been discovered early in the information integration process.

Far from being unique, these examples are representative of problems central decision-makers face today in obtaining valid integrated information. As enterprises grow and subdivide into smaller internal units for better management of their resources, department level managers and information professionals organize their records and other documented information into conceptual structures that allow easy access for departmental decision-making. Eventually, however, enterprise level managers realize that decision-making by departments is not always the best for the enterprise as a whole, move to reclaim some decision-making at the enterprise level, and attempt to integrate departmental information into enterprise wide structures. Yet attempts to create integrated enterprise wide structures by merging department level information, often encounter unexpected expenses because of the complexity of resolving information incompatibility resulting from the different terminology and the different information conceptual structures of the different departments. A 2004 Business Week Research survey concluded that executive decision-makers in 2004 were hampered by the lack of sufficiently integrated information to support their decision-making.

Two parallel trends identified in the survey—sub par information access and greater pressure to make sound decisions—have conspired to undermine the confidence that executives have in the ability of their companies to perform at optimal levels. The majority of survey participants (77%) know of bad business decisions made within their organization because of insufficient information; nearly all recognize that inefficient information access significantly impacts productivity.<sup>1</sup>

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<sup>1</sup> Mark Hammond, *The Fact Gap: The Disconnect between Data and Decisions: A Study of Executives in the United States and Europe*. (San Jose, CA: Business Objects, 2004), 1, <http://www.businessobjects.com> (accessed January 10, 2005). The Business Week Research Service study results were based on a 36-question survey of 675 executives and managers in the United States and Europe. The respondents (360 in the United States and 315 in Europe) were

At the department or community level, the cost of not finding the right information at the right time is significant. Susan Feldman, a researcher at International Data Corp. (IDC), an independent research corporation, reports,

Studies by IDC, as well as organizations such as the Working Council of CIOs (cio.executiveboard.com), AIIM (aiim.org), the Ford Motor Company (ford.com), and Reuters (reuters.com) have found that:

- Knowledge workers spend from 15% to 35% of their time searching for information.
- Searchers are successful in finding what they seek 50% of the time or less, according to both Web search engines and our own surveys. . . .
- 40% of corporate users reported that they cannot find the information they need to do their jobs on their intranets.<sup>2</sup>

In addition, these studies suggested that a typical firm with 1000 knowledge workers would spend \$6,000,000 looking for and not finding information, an additional \$12,000,000 reworking information to meet its needs on time, and an additional \$15,000,000 in lost opportunity costs when information was not available in time.<sup>3</sup> Although high, these department-

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members of the BusinessWeek Market Advisory Board, a 10,000-member worldwide panel of BusinessWeek subscribers and online registrants. The respondents represented a broad range of vertical industries and company sizes, with more than 50% from organizations with 1,000 or more employees. **Mark Hammond** was an analyst and writer for Business Objects.

<sup>2</sup> Susan Feldman, "The High Cost of Not Finding Information," *KMWorld* 13, no. 3 (2004): 9. This article was based on Susan Feldman and Chris Sherman, *The High Cost of Not Finding Information: An IDC White Paper* (Framingham, MA: IDC, 2001), <http://www.knowledge-wave.com/scripts-include/en-us/downloads/idcinfo2996.pdf> (accessed March 2, 2005); Kit Sims Taylor, "The Brief Reign of the Knowledge Worker and Technological Unemployment: Information Technology and Technological Unemployment" (paper presented at the International Conference on the Social Impact of Information Technologies, St. Louis, MO, Oct 12-14 1998), <http://online.bcc.ctc.edu/econ/kst/Kstpage.htm> and <http://online.bcc.ctc.edu/econ/kst/BriefReign/BRwebversion.htm> (accessed March 2, 2005). **Susan Feldman** was a research VP of content technologies of International Data Corp (IDC) of the International Data Group, a \$2 billion worldwide information research, publishing and consulting company established in 1964. **Dr. Taylor** was a professor at Bellevue Community College, Washington. The information was based on several studies including a 1999 study of Fortune 500 companies described in the *IDC European Management Fact Book, January 2000*, IDC Doc. # 21511, and the study by Taylor presented at the 1998 conference cited above. Insufficient details on these studies were available to assess the accuracy of the numbers, but they were adequate to indicate that there was a significant cost of not having sufficient information available for decision-making.

<sup>3</sup> Feldman, "High Cost," 10.

level costs appear to represent only part of the problem. The additional costs of integrating that information for central decision-making must be added.

Interested scholars, information management vendors, and information architects have generated a rich literature discussing approaches to solving the problems of information integration. Although these approaches have achieved moderate successes, they have not completely solved the enterprise wide integration problem. Some of these scholars have also suggested that, as a general rule, it is impossible to integrate information organized under dissimilar department information structures or “ontologies”<sup>4</sup> into a single ontology.<sup>5</sup> Regardless, many vendors claim to be able to build such ontologies.<sup>6</sup> Anecdotal evidence suggests that the scholars were perhaps closer to the truth than the vendors. For example, Michael Kreiger, the Director of Information Management in the Office of the DoD Deputy Chief Information Officer, reported in 2005 that although through the late 1990s DoD worked to establish a single data model or ontology for the department, such efforts were not successful. Kreiger also reported that businesses similarly were unsuccessful in developing single centralized models to integrate their information.<sup>7</sup>

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<sup>4</sup> Dieter Fensel, *Ontologies: A Silver Bullet for Knowledge Management and Electronic Commerce* (Berlin: Springer-Verlag, 2000); Frederico T. Fonseca and James E. Martin, "Toward an Alternative Notion of the Information Systems Ontologies: Information Engineering as Hermeneutic Enterprise," *Journal of the American Society for Information Science and Technology* 56, no. 1 (2005); Barry Smith, "Ontology," in *The Blackwell Guide to the Philosophy of Computing and Information*, ed. Luciano Floridi, *Blackwell Philosophy Guides*, V. 14 (Malden, MA: Blackwell Publishing, 2004); Barry Smith, *Ontology and Information Systems* (Saarbrücken, Germany: European Center for Ontological Research, Universität Saarlandes, 2004), [http://ontology.buffalo.edu/ontology\(PIC\).pdf](http://ontology.buffalo.edu/ontology(PIC).pdf) (accessed 2005 March 5). **Dr. Fensel** was a professor of computer science at Frije Universiteit Amsterdam; **Dr. Fonseca** was a professor of Information at Pennsylvania State University; **Dr. Martin** was a professor of psychology at Pennsylvania State; and **Dr. Smith** was a professor of philosophy at the State University of New York at Buffalo.

<sup>5</sup> Fensel, *Ontologies*, 109; Fonseca and Martin, "Ontologies," 48; Smith, "Ontology," 159-60.

<sup>6</sup> Feldman, "High Cost," 10. reports some examples as Autonom, ClearForest, Convera, Endeca, FAST, InQuira, Inxigt, iPhrase, Mindfabric, Sicierean, and Verity.

<sup>7</sup> Robert K. Ackerman, "Defense Knowledge Management Hinges on Compatibility," *Signal* 59, no. 9 (2005). *Signal* was the official publication of the Armed Forces Communications and Electronics Association,

Nevertheless, while agreeing that it is impossible to combine dissimilar ontologies into a single centralized ontology, Fonseca and Martin argue that theoretically it might be possible to build a common framework, using a hermeneutical approach, which would allow some useful data integration.<sup>8</sup> Such an approach would suggest that designers of centralized ontologies would have to understand how the information professionals in business departments design the ontologies from which the information is derived. Yet the literature is often enterprise specific, concentrating on the ontologies themselves—the information and its organization—independent of the department information professionals who originally organized it. The literature places emphasis on mechanical approaches to combining information and ontologies based on its physical characteristics and mostly ignores the human element.

### **Proposed Research**

Clarifying the concepts underlying the work of different but related communities of professionals who organize information—the human element—offers the potential of better understanding organizational concepts basic to integrating different but related information ontologies. The need for such clarification and understanding increases as differently organized information must be integrated into ever larger databases.<sup>9</sup> Study of the problem, to provide the insight into how and why professionals in different departments and communities organized similar information in substantially different ways, is essential for better understanding. To

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<http://www.afcea.org>, a non-profit international association dedicated to supporting global security by providing an ethical environment that encourages a close cooperative relationship among civil government agencies, the military, and industry. **Robert Ackerman** was the editor of the journal.

<sup>8</sup> Fonseca and Martin, "Ontologies," 48.

<sup>9</sup> In this proposal, the term database is used in a broad sense to include both paper collections of documents and records such as traditional file systems and electronic collections such as enterprise electronic content management systems and enterprise database management systems in the narrower sense.

further our understanding, the research goals of the proposed study are to identify the common principles and concepts and to develop the associated theory that underlies information professionals' organizational activities and ontology development.

To meet these goals, primary data from unstructured interviews of enterprise information professionals will be analyzed to identify common principles and concepts of how and why information organization structures are actually developed. Secondary data, consisting of case studies of information structure development, studies of working information organization systems, and reviews of practicing scholar presentations at conferences and other venues will be used so support the primary data. These principles and concepts will be analyzed using constant comparison techniques to develop categories common to the various data sources and associated theory of the information organization structures. Finally implications to our insight and understanding will be discussed in the context of existing literature. Techniques such as bracketing and memoing will be used to enhance validity of the results

### ***Research Questions***

This research proposes to explore answer to the following research questions:

1. What basic principles and concepts do enterprise information professionals use to organize information and documents and to develop ontologies that support enterprise decision-making?
2. What common theory may be developed from the principles and concepts from the first question?
3. How does any theory, derived from understanding the findings from question 2, compare with theories in organization and classification literature?

4. What do the results of the research questions imply for the development of integrated information structures or ontologies for public and private enterprise and for future research?

### ***Research Methodology***

The proposed research consists of four stages: data gathering and analysis to address research questions 1, analysis to address question 2, literature review and analysis to address research question 3, and analysis to address research question 4.

#### *Stage 1, data gathering*

During the first stage, this research proposes to gather data from samples from one primary source and three secondary sources. Although the actual number of samples will depend on similarity of responses, it is expected that 30 or more primary source samples will be required to identify important concepts. Samples from these sources will be selected initially using convenience<sup>10</sup>/ snowball<sup>11</sup> sampling techniques followed up by targeted or theoretical sampling,<sup>12</sup> tailored to fill out the information needed for concept and theory development. Sampling of secondary sources will be used to support the concepts identified in primary source data.

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<sup>10</sup> Michael S. Lewis-Beck, Alan Bryman, and Tim Futing Liao, eds., *The Sage Encyclopedia of Social Science Research Methods*, 3 vols. (Thousand Oaks, CA: SAGE Publications, 2004), 197. **Dr. Lewis-Beck** was a professor and Chair of the Political Department of University of Iowa; **Dr. Bryman** was a professor of social research at Loughborough University, UK; and **Dr. Liao** was a professor of sociology of University of Essex, UK.

<sup>11</sup> *Ibid.*, 1043-44.

<sup>12</sup> Barney G. Glaser, *Doing Grounded Theory: Issues and Discussions* (Mill Valley, CA: Sociology Press, 1998), 157-61. **Dr. Glaser** received his Ph.D. in sociology from Columbia University, and has held the position of Lecturer in Sociology at Columbia University and at the University of California School of Nursing, San Francisco Medical Center. Author of many articles on sociology and Awareness of Dying, Time for Dying and Status Passage (all with Anselm L. Strauss, see below), and Organizational Careers, he was Professor of Sociology, University of California at San Francisco through 2005.

*Primary source: Open-ended interviews of information professionals who organize enterprise information.* Information professionals have responsibility for organizing all or part of the information for a community of users. Such professionals include organizers in departments of offices-of-records, organizers of paper or electronic databases, organizers in special libraries, and organizers in corporate archives. In this “theoretical interviewing,”<sup>13</sup> as sociology professor Barney Glaser terms it, where interviews are conversational in nature, the interviewer asks a few initial open-ended questions followed by ad-hoc “emergent” questions to gain insight into the professional’s organizational activities. Although subject to considerable variation, initial interviews normally last 45-60 minutes. Results of subsequent analysis may require additional discussions with participants, perhaps via email, to clarify data or explore emerging trains of thought.

*Secondary source: Documented case studies of enterprise information organization.* Samples of case studies, from business journals and other published sources of the experiences of information professionals, are expected to provide support to primary source data, providing additional insight into how information professionals they developed their information structures or ontologies .

*Secondary source: Working information organization systems.* Samples of businesses’ actual information organization structures such as data indexes, file plans, and electronic database dictionaries are expected to provide additional insight and support to primary data.

*Secondary source: Presentations at conferences, symposia, and public fora.* Samples of public presentations are also expected to provide support to primary data and particular insight into the actual practices of scholars who have worked on and resolved problems associated with

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<sup>13</sup> Barney G. Glaser, *The Grounded Theory Perspective: Conceptualization Contrasted with Description* (Mill Valley, CA: Sociology Press, 2001), 174-75.

information organizational structures. This source is particularly useful when presentations have been documented in conference proceedings or transcriptions, although audio disks of conference presentations may be alternative sources.

### *Stage 1 and stage 2 data analysis*

Data will be analyzed during the first stage, using the constant comparison<sup>14</sup> and Glaser's grounded theory<sup>15</sup> methods to identify tentative substantive concepts and theory explaining the manner in which professionals organize community information. The constant comparative method analyzes and codes each new item of data, as it is collected, with data already accumulated, inductively generating conceptual categories of similarities and differences. This contrasts with traditional research methods in which analysis does not begin until all data is gathered.

Overlapping the first stage, data analysis, will continue during the second state, using grounded theory techniques to develop the principles and concepts identified in the first stage and ultimately to seek to develop a theory encompassing all the data gathered.

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<sup>14</sup> Ken W. Parry, "Constant Comparison," in *The Sage Encyclopedia of Social Science Research Methods*, ed. Michael S. Lewis-Beck, Alan Bryman, and Tim Futting Liao (Thousand Oaks, CA: SAGE Publications, 2004). **Dr. Parry** was recently Professor of Management and the Deputy Director of the Graduate School of Management at Griffith University, Brisbane, Queensland, Australia. He is a fellow of both the Australian Institute of Management and the Australian Human Resources Institute. He has published articles on the application of comparative modeling and grounded theory methods in leadership research.

<sup>15</sup> Barney G. Glaser, *Basics of Grounded Theory Analysis: Emergence Vs. Forcing* (Mill Valley, CA: Sociology Press, 1992); Glaser, *Doing Grounded Theory*; Barney G. Glaser, *The Grounded Theory Perspective 2: Description's Remodeling of Grounded Theory Methodology* (Mill Valley, CA: Sociology Press, 2003); Glaser, *Gt Perspective 1*; Barney G. Glaser, *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory* (Mill Valley, CA: Sociology Press, 1978); Barney G. Glaser, ed., *Gerund Grounded Theory: The Basic Social Process Dissertation* (Mill Valley, CA: Sociology Press, 1996); Barney G. Glaser and Anselm L. Strauss, *The Discovery of Grounded Theory: Strategies for Qualitative Research* (Chicago: Aldine Publishing; Sociology Press, 1967). **Dr. Strauss** received his Ph.D. in sociology from the University of Chicago, where he also taught; was Director of Social Science Research, Institute for Psychiatric and Psychosomatic Research and Training, Michael Reese Hospital, Chicago; and was contributor of many articles to the literature in the social sciences. Dr. Strauss has written several previous books (including *The American City*) and was Professor of Sociology, University of California, San Francisco until passing on in 1996.

A technique known as “bracketing”<sup>16</sup> will be used to generate ideas during the course of the research and to reduce bias in the analysis. Bracketing consists of writing down ideas as they come to mind during the research so that they are not forgotten later. Strauss and Corbin call such writings “written records of analysis” or “memos.”<sup>17</sup> In bracketing theory, recording such ideas documents preconceptions and thus reduces the likelihood that they will unconsciously influence or bias analysis and theory development. In grounded theory, such memos also serve to provide ideas for theory generation.<sup>18</sup>

### *Stage 3, comparison with the work of other scholars*

The third stage of the research compares the tentative substantive concepts and theory emerging from the research with prior theory of other scholars’ in appropriate literature. Prior theory is expected to either support the researcher’s tentative theory conflict with it. Supporting theory will likely serve to increase the validity of the tentative theory assuming the contexts of the research are similar. Conflicting prior theory, if based on observed data, will suggest additional data gathering and possible modification of the tentative theory. Such additional data will either support the conflicting theory, resulting in modifications of the tentative theory, or it will not support the conflicting theory, resulting in rejection of the conflicting theory under the

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<sup>16</sup> Jeanne J LeVasseur, “The Problem of Bracketing in Phenomenology,” *Qualitative Health Research*, March, 2003 2004, <http://qhr.sagepub.com.content.lib.utexas.edu:2048/cgi/reprint/13/3/408> (accessed March 15, 2005); David L. Rennie, “Grounded Theory Methodology as Methodical Hermeneutic: Reconciling Realism and Relativism,” *Theory & Psychology* 10, no. 4 (2000). **Dr. LeVasseur**, was a registered nurse and associate professor of nursing at Quinnipiac University, Hamden, Connecticut. **Dr. Rennie** was a Professor in the Department of Psychology at York University. His research interests were in grounded theory methodology and its application to the study of the client’s experience of psychotherapy. He is author of *Person-Centered Counseling: An Experiential Approach* (Sage, 1998) and co-editor of *Psychotherapy Process Research: Paradigmatic and Narrative Approaches*.

<sup>17</sup> Anselm L. Strauss and Juliet M. Corbin, *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 2nd ed. (Thousand Oaks, CA: Sage Publications, 1998). **Dr. Corbin** was recently a Professor of Nursing at San Hose State University. She studied grounded theory under Dr. Strauss.

<sup>18</sup> Glaser, *Theoretical Sensitivity*, 83-92.

conditions of this research. In addition, venter literature will be reviewed to determine what work they may have done with information organizers.

Upon completion of the comparison, the researcher will finalize the tentative concepts and theory, and complete that part of the dissertation documenting stages one and two.

#### *Stage 4, implications*

After stages 1 through 3 are complete, the researcher will discuss the results with other scholars at UT and professional associations, personally and via email. The results of this discussion will be incorporated in the dissertation to reflect the research implications for the development of integrated information structures or ontologies for public and private enterprise, for education in information organization, and for future research.

#### ***Research Scope***

The scope of this research is organization of information in ongoing enterprises.<sup>19</sup> It explores concepts and theory behind the methods used by information professionals to design departmental and central information organization structures or community ontologies to store and retrieve such information. It addresses only formal information organization structures serving such communities. Such information is contained in documents, such as letters and reports normally stored in paper and electronic departmental document and record systems, in other content management systems, and in special libraries. And such information is normally retained for the purpose of future enterprise decision-making.

As a practical matter, this research focuses on the activities of enterprise information professionals, inside or outside<sup>20</sup> of enterprises, who are responsible for making the

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<sup>19</sup> As used in this proposal, enterprises includes profit, non-profit, public and private businesses, corporations and other entities that provide a product or service.

<sup>20</sup> Consultants are an example outside information professionals .

organizational structure design decisions for formal document management systems whether paper or electronic wherever they are in the formal enterprise structure. At the time of the two examples described at the beginning of this proposal, such responsibility resided with administrative and clerical personnel.<sup>21</sup> With the reduction of clerical personnel brought about by the computer revolution, responsibility was redistributed to other workers on an ad hoc basis throughout the enterprise. Over the next few decades, information organizational responsibility appears to have settled in positions with titles of records manager, archivist, special librarian, document storage system designer, and others for professionals who are responsible for formally organizing paper and electronic information so that others can locate it. These are the professionals who are the candidates for participation in the proposed research.

This research is exploratory in nature for the purpose of developing concepts and theory based on the specific data analyzed. The grounded theory methodology underlying it validates the concepts in relationship to that specific data.

Descriptions of selected information professional activities will be used only to illustrate the concepts and theory developed with this research. Description, per se, is not a goal of this study and might be misleading, since statistical sampling techniques have not been used and the grounded theory methodology does not lend itself to accurate description.

Data sources will be limited to United States enterprises to keep the effort within reasonable time boundaries. Although case studies and conference proceedings will not be limited to specific geographic locations, it is expected that most of the interviews will be conducted in the Austin and other areas of Texas to minimize the cost of travel. The investigator expects that the broad scope of public and private business activities within the Austin area in particular will allow adequate theory development. This does not, however, preclude interviews

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<sup>21</sup> Titles of such professionals included clerk, analytical clerk, technical clerk, administrative clerk, and secretary.

outside of Texas if necessary to support specific important categories to maintain research validity.

### ***Human Subject Protection***

After supervising committee approval, the research proposal will be submitted for Institutional Review Board approval. Although the research methodology inherently protects confidentiality of subjects through data consolidation, supporting examples will be carefully screened so that the interviewed professionals and their companies cannot be identified in the research report unless specific permission has been granted otherwise.

The constant comparative methodology stresses the importance of accurate data when interviewing subjects, since the primary source interview data are likely to be fairly sensitive to how people answer questions in context—what they mean by their answers may be embedded in the larger context of what they say which may include meanings from what they said paragraphs and pages before. Therefore interviews will be recorded and transcribed. Transcripts and field notes will not contain personal information, and the actual recordings and contact lists will be protected and destroyed after the completion of the research project. Video recording and photographs are not planned for this research.

### ***Data Management***

To ensure that the theory generated in this research is clearly traceable to the data, and since human subjects will be involved in this research, data must be carefully managed. The method proposed to do this is a combination of paper and electronic document management. Management of field data will be consistent with normal procedures to protect individual and company confidentiality. Consent forms and associated data crosswalks will be kept on paper in

locked files until completion of the research, and then destroyed. Audio CDs will be kept in locked files except when being used for transcription and analysis. They will be erased at the completion of the research. Unless specific permission has been obtained, reference to specific businesses in the recordings will not be included in the transcriptions. Interview and survey data will be produced both electronically and in paper. Electronic tracking will be supported by a free-form database software package<sup>22</sup> and references and citations controlled using a citation management software package.<sup>23</sup> Paper data will be managed in 3-ring notebooks and stiff cover note binders, and referenced from the appropriate management software. Table 1 shows the management plan for the data expected to be generated by the proposed study.

### **Importance of Research Results**

It is expected that the results of this research will provide concepts and theory that will assist information professionals who must integrate information from independently developed community ontologies into common ontologies for centralized business decision-making. In addition results are expected to contribute original knowledge to information science by increase our theoretical understanding of how and why enterprise information professionals organize their information the way they do and thereby contribute to solving the problems related to enterprise information integration. Results of the research promise to provide an intellectual foundation for the creation of new methodologies to develop integrated classification structures, taxonomies, ontologies, and database architectures, in public and private enterprise and to provide the basis for further research to validate resulting theory and related hypotheses.

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<sup>22</sup> Asksam: The Free Form Database Ver. 5.1, Seaside Software, Inc. (d.b.a. askSam Systems), Perry, FL.

<sup>23</sup> End Note Ver. 8.0, The Thompson Corp, Stamford, CN.

| Type of Data   | Form       | Container                                | Organization                        | Disposition          | Backup     |
|--|------------|--|-------------------------------------|----------------------|------------|
| IRB Paperwork  | Paper      | Note binder                              | Chronological                       | Retained with report | Duplicate  |
| Site authorization*  | Paper      | Note binder                              | Alphabetical                        | Retained with report | Duplicate  |
| Confidentiality Agreement*   | Paper      | Note binder                              | Alphabetical                        | Retained with report | Duplicate  |
| Informed consent   | Paper      | Locked file                              | Alphabetical                        | Destroyed            | None       |
| Consent crosswalk  | Paper      | Locked file                              | One document                        | Destroyed            | None       |
| Nondisclosure agreement  | Paper      | Note binder                              | Alphabetical                        | Retained with report | Site copy  |
| *These documents will be treated as informed consent documents if the site officials wish their participation to be confidential |            |  |                                     |                      |            |
| Interview recordings   | R/W CD     | Locked file                              | Random Number                       | Erased               | None       |
| Interview transcripts  | Paper      | Note binder                              | Numerical                           | Retained with report | Electronic |
|  | Electronic | Windows Directory                        | Numerical                           | CD                   | BU Drive   |
| Journal Articles   | Paper      | Notebook                                 | Alphabetical by Author              | Retained in library  | Source     |
|  | Electronic | PDF computer files linked from citations | Directory by Journal Alpha by title | CD                   | Source     |
| Citations  | Electronic | EndNote 8 file                           | Multiple sorts                      | CD                   | BU Drive   |
| Field notes  | Paper      | Notebook                                 | Numerical (based on date)           | CD                   | Electronic |
|  | Electronic | MS OneNote 2003<br>Windows Directory     | Numerical (based on date)           | CD                   | BU Drive   |
|  | Electronic | AskSam 5 Database                        | One file multiple sorts             | CD                   | BU Drive   |
| Open coding memos  | Electronic | AskSam 5 Database                        | One file multiple sorts             | CD                   | BU Drive   |
| Theoretical coding memos   | Electronic | AskSam 5 Database                        | One file multiple sorts             | CD                   | BU Drive   |
| Procedural memos (such as theoretical sampling)  | Electronic | AskSam 5 Database                        | One file multiple sorts             | CD                   | BU Drive   |
| Draft reports  | Paper      | MS Word file                             | One file                            | CD                   | Electronic |
| Final report   | Paper      | PDF File                                 | One file                            | CD                   | Electronic |

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