A Classification Scheme for the Organization of Electronic Documents in Small, Medium and Micro Enterprises (SMMEs)

Marthinus S. van der Walt

Department of Information Science, Stellenbosch University,
7602 Matieland, Stellenbosch, South Africa
E-mail: msvdw@sun.ac.za

Marthinus van der Walt is a Senior Lecturer in the Department of Information Science at the University of Stellenbosch. He holds a DPhil degree in Information Science from the same university. His teaching responsibilities at present include modules on information organization and retrieval, competitive intelligence, information management and project management, as well as the coordination of an MPhil program in information and knowledge management and supervision of a large number of research projects of Masters students. Most of his research has been in the field of information organization.

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ABSTRACT: This article proposes a generic classification scheme for the purpose of organizing electronic documents in business enterprises in the SMME sector. Data were gathered from literature on information organization, business information, competitive intelligence and information systems, as well as through an empirical study of information organization practices in a sample of 24 small businesses in three different provinces in South Africa. The concepts gathered from folder systems for documents, email and Internet favourites, augmented by concepts derived from the literature, were analyzed using the technique of facet analysis. Business processes feature prominently in the resultant scheme.

1. Introduction

The Library of Congress Subject Headings defines information organization as "identifying, describing, and providing access to information-bearing entities in all kinds of environments, such as archives, libraries, museums, offices, and on the Internet, through the gathering of the entities into organized collections, and/or through the creation of retrieval tools, such as bibliographies, catalogs, indexes, finding aids, registers, search engines, etc." (*Validator,* 2004). In terms of this definition the present article deals with information organization in the office environment, more specifically in offices in small, medium and micro enterprises (SMMEs). (The concept of SMME and the reasons for limiting the project to this sector are discussed in a separate article by Denner and Van der Walt in this issue of *Knowledge Organization*, and will therefore not be elaborated on here.)

According to Taylor (1999, pp.13-14), information organization in offices takes place in manual and electronic records management systems, and involves the organization of units such as directories (folders), data files, computer programs and fields in records. These units are organized at the enterprise level as well as at the personal level by individual staff members. At the enterprise level information may be organized in systems such as folders on network servers, intranets and corporate portals, document management systems, electronic mail systems, transaction processing systems, management information systems, executive information systems, decision support systems and groupware systems (see for instance Laudon & Laudon, 2004, pp.40-46; O'Brien,

2002). Many of these systems are very expensive and will usually be found only in large corporations, not in small enterprises. Folder systems represent the most basic and affordable level of organizing electronic information and are prevalent in SMMEs, on both the enterprise and personal levels. The focus in this article will therefore be on the use of hierarchically structured folder systems for the organization of electronic documents. This does not imply that the application of the classification system proposed here should necessarily be limited to folder systems or even to electronic documents.

2. Problem statement and objective

How to organize documents for the purpose of subsequent retrieval has been a long-standing problem for individuals and organizations, large and small, in the public and private sectors. Referring to the LCSH definition quoted above, it can be seen that two basic solutions to this problem have been developed over the ages, namely (a) the arrangement of *document collections* into some kind of alphabetic or numeric order that provides direct access to the documents by means of browsing or searching according to a specific approach such as author, title, subject or series number, and (b) the creation of a *separate retrieval system* such as a catalogue or index consisting of document representations that contain descriptive data about the documents, allowing indirect access under a variety of search keys. In the case of electronic documents these two solutions are often integrated by including the descriptive data within the documents themselves in the form of metadata. This is usually done when the documents are created. The full text of the document, augmented by the added metadata, provides a rich source of access points that can be indexed and searched by means of retrieval software such as search engines.

Classification (often referred to as "categorization" in the Internet community) plays a useful role in both of the solutions referred to above. Electronic documents created and received in business enterprises are typically stored in folders on personal computers or network servers, thus forming a collection of computer files. Office application software such as Microsoft Office usually provides some basic system folders such as My Documents, My eBooks, My Pictures, Favorites, Inbox, Outbox and Sent items for the arrangement of different types of documents. These folders may be adequate for very small collections of documents, but as collections grow it becomes necessary to subdivide them by creating subfolders.

The problem is, however, that the developers of operating systems and application programs usually give very little guidance as to how exactly a system of subfolders should be designed. Under the heading "Organizing files using folders" in the help files of Microsoft Windows 2000, for example, the user is simply told to "create folders for categories that match the way you want to organize your information." Neither could explicit instructions for structuring a system of folders be found in the help files of Windows XP or Outlook 2002. In Internet Explorer's "Help" under "Organize your favorite pages into folders" it is suggested that the user "might want to organize … pages by topic," with "Art" given as an example. Although it is indicated here that the *subjects* of web pages may be the basis for organizing the favorites in folders, no guidance is given about how the list of subjects should be structured.

The result of the absence of clear instructions for organizing folders is that folders are created and named intuitively to satisfy the need of the moment and the subjective frame of reference of the individual, without planning an overall logical structure. This approach might work at the individual level and while the number of documents and categories remains relatively small, but in the long run, and especially for a document repository shared by a number of people, a more systematic approach based on sound principles of document arrangement is required. It is proposed in this article that the application of the accepted principles of bibliographic classification, more specifically faceted classification, should be used to construct a logical and useful system of folders for general use in business enterprises.

As suggested in the "Introduction," the role of classification in business documentation is not limited to its use in folder systems. Categories to which a document belongs can be indicated as part of the metadata referred to above, irrespective of whether the metadata are embedded in the document itself or stored as a document surrogate in a separate retrieval system. Metadata can, for instance, be added to Microsoft Office documents as part of the document properties, with "Categories" being one of these properties. When using the MS Office Search facility (available under File | Open | Tools in Office XP) these categories can be included in the search statement. In Microsoft Outlook a number of built-in categories that can be used for email messages are provided in the form of a "Master Category List",

but only a limited number of these categories are applicable to business-related emails, e.g., Business, Competition, Goals/Objectives, Hot contacts, International, Key customer, Strategies and Suppliers. These categories need to be augmented and tailored according to the needs of a specific business enterprise. Again, it is argued that the theory of bibliographic classification can provide a solid base for designing a system of categories to be used as metadata to enhance document retrieval.

A further possible application of classification in the business environment is to provide the structure for a Yahoo-like subject directory giving access to documents on a corporate intranet. This would provide for the browsing approach as an alternative to searching by means of a search engine.

The purpose of the present article is to describe the development of a generic classification scheme, based on the principles of faceted classification, for the organization of electronic documents in SMMEs. The scheme is primarily intended for the creation of logically constructed folder systems, but could also be of value in the other potential applications of classification mentioned above. It is realized that the individual nature of specific business enterprises will necessitate classification solutions tailored to the local situation, e.g., the structure of the business and the specific products and/or services involved, but a standard generic scheme, providing a backbone for classification in any type of enterprise, and giving guidelines for adaptation to suit individual needs, will provide business people with a tool for organizing their documents without having to spend a lot of time designing a scheme from scratch.

3. Research questions

The following two specific questions will be addressed to provide the necessary theoretical background and empirical data needed for the design of the proposed classification scheme:

– Can the information resources that businesses have to organize be related to business processes?

A point of departure for this investigation is that *business processes* should feature prominently in the structure of a classification scheme intended for organizing the documentation of a business enterprise. Owners and managers of enterprises are primarily interested in the survival and growth of their businesses. Therefore, if the information professional wants to prove the value of an activity such as information organization, that will require resources (human resources, finance, equipment) to be made available, it will be necessary to show that this activity supports business processes and strategic goals, and thereby contributes to the competitive advantage of the enterprise, even if only indirectly. It is therefore hoped that the approach of relating information organization to business processes will demonstrate the potential value of information organization in the business environment.

– What can we learn about the organization of electronic documents in SMMEs from existing practices in the sample of South African businesses?

Data about information organization practices were gathered from a number of small businesses in South Africa with the purpose of getting a feel for how business people think about information organization and possibly identifying best practices that could be used as a basis for constructing a generic scheme.

4. Research methodology

Appropriate literature sources were studied with the focus on the subject fields of information organization, business information, SMMEs, competitive intelligence and information systems. The literature provided concepts to be included in the classification scheme, the theoretical principles for constructing the classification scheme, as well as a theoretical base for the empirical study of information organization practices in SMMEs.

Empirical data about the information organization practices of selected South African SMMEs were gathered by means of structured interviews, guided by a questionnaire, and by observation of the actual systems. A total of 24 SMMEs were visited, 10 in the Northern Province, 8 in the Northern Cape and 6 in the Western Cape Province of South Africa. A more detailed account of the methodology and results of this empirical study is given in the separate article by Denner and Van der Walt. Copies of classification systems, mostly in the form of screen prints of folder systems, were obtained for further analysis. The results of this analysis are reported below.

In the construction of a classification scheme according to the faceted approach, the following generally accepted procedure has to be followed:

– Identify relevant concepts by analyzing the subjects of a representative sample of the information entities to be organized.
  As indicated above, the concepts for this scheme were gathered from the literature and the actual systems in the SMMEs visited. Additional concepts and ideas for structure were taken from the Dewey Decimal Classification.
– Group the concepts into mutually exclusive categories (facets).
– Decide on the order of the concepts in the facets (order in array).
– Decide on the order in which concepts from different facets should be combined to form compound subjects (citation order).
– Decide on the order of the facets in the classification schedule (schedule order).
  According to the generally recognized principle of inversion, the filing order should be the reverse of the citation order to ensure a consistent general to special sequence of subjects (Buchanan, 1976, p.77; Foskett, 1996, p.156-159; Hunter, 2002, pp.82-83; Marcella & Newton, 1994, pp.40-43; Rowley & Farrow, 2000, p.204). In the SMME scheme proposed here, the principle of inversion was also followed in determining the filing order.
– Add a notation to the concepts in the schedule.
– Provide an alphabetical index of the concepts in the schedule.
– Write an introduction to the scheme.
  (Foskett, 1996, pp.147-169; Hunter, 2002, p.8-24; Marcella & Newton, 1994, p.132-138; Rowley & Farrow, 2000, pp.203-210)

In the proposed scheme all the steps outlined above were followed, with the exception of the construction of an alphabetical index, which was not deemed necessary for such a small scheme. The introduction to the scheme is not included in the present article as most of this information is covered by the description of the scheme provided here (section 7). In some instances the compiler deviated from standard practice of faceted classification. These deviations are motivated and explained in the description of the scheme below.

5. Information resources and business processes

This section addresses the question of whether or not the information resources that businesses have to organize can be accommodated in a framework of business processes. The busy manager of a small enterprise struggling to survive might not be easily convinced that it is necessary to spend time and money on the organization of the company's information assets. However, if it can be demonstrated clearly that organized information is critical to the operations of the enterprise and that it will support the business processes, he/she might be more willing to invest in systems aimed at the capturing and organized storage of information. It is therefore necessary to determine whether information resources can be directly related to business processes.

Alter (1996, p.60) provides a useful model of generic business processes, grouped into three categories (terminology used by other authors are added in brackets where appropriate):

A. Processes requiring coordinated work from many functional areas

These are processes that cross functional areas. Specific processes mentioned by Alter are the creation of a new product, creating a coordinated plan for an entire business and fulfilling customers' orders.

B. Processes typically related to a specific functional area

– *Production (Operations):* purchasing materials, assembling or fabricating the product, delivering the product, servicing the product and supporting the customer.
– *Sales and marketing:* identifying potential customers, deciding what method customers really want, identifying market opportunities, making customers aware of the product, persuading customers to buy the product, performing the sales transaction.
– *Engineering (Research and Development):* performing research about new methods, determining how to produce products, determining how to improve production processes.
– *Accounting and finance:* performing financial transactions, creating financial statements, paying taxes, investing cash, financing operations.
– *Human resources:* determining hiring requirements, hiring people, introducing employees to the company operations (employee training), paying employees, administering employee benefits, administering disciplinary actions and terminations.

C. Sub-processes and activities occurring in all functional areas

These pervasive processes include communicating with other people, analyzing data, motivating employees, planning work to be done, keeping track of

work being done and providing feedback to employees.

In this discussion the information resources associated with business processes will be grouped in the two broad categories of *internal* and *external* information, a distinction used by several authors (e.g., Choo, 2002, p.139; Pollard, 1999, p.89; Turban & Aronson, 2001, p.101-102). From the point of view of information organization, an important question is whether external information resources should be organized as a separate collection or integrated with internal information. If the organization of both broad categories could be based on business processes, it might be feasible to create a single integrated system for all resources. In the following brief overview of internal and external resources an attempt is made to relate these resources to Alter's model of business processes.

Internal information resources:
This expression refers to all information relating to the internal environment of the company. Most of these resources are produced by company employees and emanate from the business processes outlined above. Some resources originating outside the company, e.g., bank statements, accounts and receipts from suppliers, orders from customers, tax assessments, auditor's reports, etc. should perhaps also be regarded as internal information because of their direct relationship with the internal environment.

Many types of resources can be identified by simply analyzing the list of business processes compiled by Alter and by consulting other handbooks on information systems (e.g., Laudon & Laudon, 2004; O'Brien, 2002). *Cross-functional processes* produce information resources such as product development reports, business plans and competitive intelligence reports. The *production/operation* process involves documentation on the purchasing of materials and equipment (information sheets from suppliers, orders, bills, etc.), records of quality control, delivery notes, guarantee cards received from customers, servicing records and customer records. The *sales and marketing* function produces market research reports, product brochures and information sheets, advertisements, press releases, orders from customers and records of sales transactions. Internal information resources related to the *engineering* (research and development) process include project planning documentation, laboratory notes and project reports. *Accounting and finance* give rise to budgets, regular financial reports on income and expenditure, documentation relating to taxes, records of investments and assets, etc. Information resources produced in *human resources management* include job descriptions, advertisements for vacancies, documents relating to employee benefits, employment contracts, training manuals and other training materials, employee records, including records of payment, leave and disciplinary hearings. In the course of the *subprocesses and activities occurring in all functional areas* information resources such as letters, memoranda, email messages, results of data analyses, schedules of tasks and project documentation are produced.

External information resources:
This category of resources includes all information entities originating outside the enterprise and containing information about the external environment. There is general agreement in the literature on competitive intelligence (e.g., Choo, 1998; Cook and Cook, 2000; Fuld, 1995; Kahaner, 1997; Pollard, 1999, Vine, 2000) that in gathering information for intelligence the focus should be on customers, suppliers, competitors, competing products and services, government policies and regulating instruments, and political, economic, social, demographic and technological trends.

Many information items gathered for the purposes of competitive intelligence support the *cross-functional business processes*, especially strategic planning and decision-making. In the creation of a business plan, which can include processes such as the setting of strategic goals, determining niche market segments and deciding about mergers with, or acquisitions of, competitors, the top management of a company has to rely heavily on external information resources. These include resources such as general news and economic journals, cuttings from national and local newspapers, trade journals, annual reports, planning documents and environmental filings of competitors, reports on court cases against competitors, publicity materials of competitors collected at conferences and trade exhibitions and land registry documents. In the *production/operations process* there seems to be heavy reliance on internal information and little need for external information, except perhaps descriptions of competitors' processes as a source for benchmarking and improving the company's own processes, and documentation from suppliers of materials and technology. External sources needed for *sales and marketing* include market reports by market research companies and academic research units, geographic information (e.g., maps),

directories of information about potential customers and evaluations of CRM software. In *research and development* the creation of a new product or the improvement of an existing product or manufacturing process involves extensive use of external information such as research reports, conference papers and patent literature. For *accounting and finance* external information is needed about tax law changes, sources of external finance (e.g., a small business development corporation or government funding), investment opportunities, financial software, etc. *Human resources management* is dependent on a variety of external information sources such as labour legislation, trade union documentation, sources about industry trends in salaries and employee benefits, guidelines for performance measurement and video and audio tapes for training.

The categorization of typical business information resources within the framework of a business process model above suggests that it is theoretically feasible to organize resources in small, medium and micro enterprises (and larger enterprises as well) according to such a framework. It is not suggested that the model of business processes used for analysis here, or any other theoretical model, be applied rigidly in the development of a system for classification. The current trend is to move away from a strictly functional division of business activities and to apply other approaches, such as organizing around customer-oriented processes, geographic regions or product groups (Alter, 1996, p.59). Many businesses today also undertake special projects that cut across functional boundaries. In a specific enterprise one should, therefore, analyze the actual structuring of business processes and use that as a model for organizing the information resources of the company.

6. Features of existing folder systems for organizing electronic documents in the sample of South African SMMEs

This section contains an analysis of the main topics and features identified in the folder systems observed in the sample of small businesses. The purpose of the analysis is to point out important concepts and classificatory principles and practices that might be employed in the design of the proposed generic scheme, as well as practices that are not in accordance with accepted classification principles and should, therefore, perhaps be avoided.

Linking up with the preceding discussion of business processes it was observed that many of the concepts in folder names can also be related to the business processes. Especially prominent were folders related to *finance*, e.g., accounts, assets, creditors, debtors, expenditure, financial statements, income, invoices and tax-related documents, and *customers*. Financial documents were often subdivided chronologically by folders for calendar years, e.g., invoices subdivided by 2001, 2002, etc. Customer/client folders were subdivided in different ways – by individual customer name, customer number or grouped in categories, e.g., businesses, churches, doctors, farmers, mines, schools and sport clubs. The observation about the prominence of financial and customer folders confirms the results obtained with the questionnaire and interviews, namely that financial and customer information were rated as the most important categories of business information by the respondents (see Denner and Van der Walt article).

Examples were also found of folders that can be related to the *products or services* of the companies, e.g., price lists, guarantees, stock inventories and folders for specific categories of products such as course materials, grass, poles, logos and signs, the *human resources*, e.g., staff forms, staff circulars, job descriptions, salaries and disciplinary reviews, and *marketing and sales*, e.g., advertisements, marketing letters, quotes, orders and payments. Many folders were unique to individual businesses, e.g., folders for specific products, services and staff members – these should obviously not be included in a generic classification scheme intended for all small businesses, but instructions for the addition of such topics should be included.

Folders not directly related to business processes include the following:

Many folders referred to various *document types*, e.g., correspondence/letters, document templates, certificates, company logos, contracts, databases, emails, manuals, photos, reports and spreadsheets. Some of these types were used as subdivisions under topical folders that relate to business processes, but some were used as top level folders, indicating documents of a general nature. In some cases a document type folder was subdivided by topical folders, implying a citation order where the document type is given preference over the business topic. Microsoft system files such as My Documents and My Pictures, which were also used by many of the businesses, of course also imply a preference for arrangement by document type on the highest level of the citation order (see criticism of this practice below).

In a number of the businesses instances of folders named for specific *staff members* or groups, e.g., typists, were observed. These were not used for documents about the staff members, in which case they could be subordinated to a human resources folder, but for documents *created by* them. It seems logical to keep all your own documents together, especially when storing the documents on a central server or when you have to share a computer with someone else. Typists and secretaries often take this practice one step further and save all documents created for other staff members under the name of the person. The problem with storing documents under the name of the originator is that people leave the company or move to another department where they assume new duties. In the case of people-based folder systems with idiosyncratically designed subfolders, it can be very frustrating and time-consuming for a new incumbent of a post or other staff members to figure out where documents about a specific topic have been stored. This problem can be avoided if everybody uses a standardized system based on a classification of topics directly related to business processes and other business concepts.

Also prevalent were folders related to specific *computer programs*, e.g., Corel Draw, Lotus, Microsoft Excel and Word, Norton Antivirus and Pastel (an accounting program). In most cases, these folders only contained the program files and were probably automatically created when installing the program. In some cases, however, the program name was used for a top level document folder, subdivided by topical folders relating to business processes or document types as described above, e.g., a series of customer folders under Corel Draw (the program used to design logos and other graphics for the customers), or customer folders under Pastel for financial files created by an auditing firm.

In the opinion of the author of this article, the classification of documents according to the computer program used should be discouraged. From the point of view of document retrieval, especially browsing by means of a program such as Windows Explorer, it is not particularly useful to group together all documents created with a specific computer program, and in that way separating documents dealing with the same business topic. An arrangement collocating all documents on a specific topic is more logical and useful.

It should be noted, however, that some programs force the user to use a built-in folder system, or do not make provision for an option to change the default folder. Email systems and Internet browsers are typical examples of programs where one has to use the built-in folders, e.g., Inbox, Sent items, Favorites and Bookmarks, or your own folders created within such a folder system. It is suggested that the classification scheme for electronic business documents as set out in this paper also be used as the basis of folder systems for organizing email messages and the addresses of Internet resources. This will mean that the staff member need only learn one system which is applied in different document collections. This is similar to the situation in libraries where parallel arrangement of collections such as books, serials, reference works and a children's' section, using the same classification scheme, is a well-known phenomenon (Rowley & Farrow, 2000, p.338). Email attachments and Internet downloads should be saved in the same folder system used for other company documents.

With reference to the distinction made between internal and external information resources made in paragraph 5 above, it was observed that the great majority of folder names imply internally produced documents. External sources are mainly material received from suppliers and the government. These are often in printed format and are therefore not reflected in the electronic documentation. Electronic versions are sometimes received as email attachments or downloaded from the Internet.

In all the folder systems with more than 10 folders some form of *subdivision with subfolders* was observed. These subdivisions were both of a hierarchical and syntactical nature. Relatively few instances of hierarchical subdivision were found, some examples being My Documents\Attachments, My Documents\My Pictures, Templates\Letterheads, Churches\Name of specific church and Political Parties\Name of specific party. The majority of subfolders represented syntactical subdivision, e.g., Emails\Business, Company name\Letters, Quotes\2002, Quotes\Churches, Design\Certificates, Financial statements\Farmers, Company name\Advertisements and Price Lists\Name of Supplier.

As can be seen from the examples in the preceding paragraph, the combination of concepts usually involves a subject heading and a document type. There is, however, no consistency in the order of these two types of concepts – in some cases the subject comes first and in others the document type. In the systems observed there seems to be a tendency to prefer the type of document rather than the subject term involved. This is not in line with the *citation order* usu-

ally found in bibliographic classification schemes such as the Dewey Decimal Classification (where document types are provided in the table of standard subdivisions) and advocated by writers on classification theory (e.g., Foskett, 1996, pp.151-155; Rowley & Farrow, 2000, pp.169-171). The apparent preference for document type in the business folder systems might be a case of the easy way out. It is easier to determine the form of a document than the subject, and it is also difficult to construct a logical classification of subject headings. It is suggested that a logically constructed classification system for business information, such as the one proposed in this article, will make it possible for businesses to categorize documents containing subject and document type concepts in a consistent manner. If the theoretical principles of citation order can be applied, the citation order should be Subject : Document type in most cases.

The arrangement of all the folder systems observed were purely *alphabetical* at each level of subdivision. No instances were found where a notation was used to produce a systematic arrangement of folders. A disadvantage of alphabetical arrangement is that the order of the folders is not systematic, for example the General folder, which one would expect to find at the beginning of a series of folders in an arrangement that progresses from general to specific, would be under G. Folders for related documents will also be scattered throughout the alphabet according to the chosen subject headings. However, alphabetical arrangement also has advantages. It is generally known and used, especially in the electronic environment, e.g., in Internet directories such as Yahoo! It also makes it very easy to add new concepts, as opposed to a notational system where hospitality of the notation is a major problem. Taking both the advantages and disadvantages of alphabetical arrangement into account it was decided to use a mixed approach in the scheme proposed here. This approach is explained in more detail in the description of the scheme below.

7. A generic classification system for business information in SMMEs

Based on facet analysis of the concepts identified in the literature (see section 5 above), and in the actual information systems observed in the SMMEs (see section 6 above), a classification scheme that should be suitable for use in a variety of business enterprises in the SMME sector, with limited adaptation for local circumstances, was constructed. The outline of the scheme is as follows (the full scheme is given in Appendix A):

0 General documents
01 External environment
02 Management (General)
03 Finance
04 Human resources
05 Products & Services
06 Marketing & Sales
07 Customers
08 Special collections
09 Other subjects

In the discussion below the principles involved in the construction of the scheme are explained. (The reader should refer to Appendix A where necessary.)

The classes

The main facets identified in the analysis of the concepts are *documentary forms*, the *external environment*, internal *business processes* (general management, financial management, human resources management, production, research and development, marketing and sales and customer relationship management), *human resources*, *products and services* and *customers*. These facets, as indicated in the headings of classes 0-7, together with classes 8 and 9 form the main classes of the classification scheme.

It is a moot point whether the classes mentioned in the previous paragraph should be called main classes or facets. According to many authors (e.g., Buchanan, 1976, p.88; Foskett, 1996, pp.173-174; Hunter, 2002, p.87; Marcella & Newton, 1994, p.35; Rowley & Farrow, 2000, p.201), the term "main class" is normally used to refer to the top level of subdivision in a *general* classification scheme such as Dewey and UDC. At this level one finds disciplines such as philosophy and history, or groups of closely related disciplines such as social or natural sciences. The top level classes of the SMME classification do not comply with this view of main classes. They are facets of a special classification for business documents, which should produce mutually exclusive categories of concepts if applied rigorously. At the same time, they do form the top level classes in this scheme and can therefore be regarded as the main classes of this specific scheme (although this stretches the meaning of the term "main class" somewhat).

Class 0 makes provision for document types of a general nature (compare Dewey class 000 and the

standard subdivisions). Document types associated with a specific business process or other topic are enumerated under the topical class, e.g., auditor's reports, budgets and invoices under class 3 (Finances) and product manuals under class 5 (Production). Documents should be classed in 0 only if they do not belong under a more specific other class. The subdivisions of class 0 can be used to subdivide any of the other classes should the need arise. To illustrate this, some of the form headings are enumerated under other classes, e.g., Meetings: minutes and agendas under Management (General).

Class 1 (External environment) makes provision for documents obtained from external sources, e.g., downloaded from the Internet or received as email attachments, and dealing with topics in the environment that might be of importance for strategic planning in the organization. Internally produced competitive intelligence reports about the environment should also be classed here.

Class 2 (Management (General)) contains all management processes that do not belong under one of the main business processes (financial management, human resources management, production, marketing and sales and customer relationship management).

Classes 3-7 covers the specific business processes generally recognized as essential for any enterprise to operate successfully. Whether these are to be seen as processes or other types of facets of a business depends on the terminology used: finances, human resources, products and customers are not process concepts, but financial management, human resources management, production and customer relationship management (CRM) are. This distinction is important from a theoretical point of view, but perhaps not for the practical application of the scheme to arrange documents. For the purposes of using the headings of the classification scheme in a document retrieval system, e.g., as folder names, it will be convenient to use the shortest possible form, e.g., Customers, rather than Customer relationship management.

The process *Research and development* is included under *Products & Services* on the grounds that R&D is mostly concerned with developing new products and services. In cases where R&D plays a company-wide role it should be moved to *Management (General)*.

It can be argued that *class 7* (Customers) should be subsumed under 6 (Marketing and Sales), as CRM is a responsibility of the marketing department. Customers form a separate class in the suggested scheme to emphasize the importance of the customer as an element of a business ("the customer is king!"). In the empirical study information about customers was also rated as very important by the respondents (see Denner & Van der Walt article).

Class 8 is left vacant for whatever special class of documents not provided for in the other classes that an enterprise requires. In a folder system for storing electronic documents on a network server class 8 could, for instance, be used for confidential documents, in which case the whole folder can be password-protected. Documentation relating to cross-functional projects could also be placed here.

Class 9 is available for documents on topics that are not specifically business-related, and therefore not provided for in classes 0-8, but that might be regarded as useful to store for whatever reason. Alphabetic class headings may be created as needed, or a standard classification scheme may be used to subdivide class 9. Using the Dewey classification for organizing Internet favourites, one could, for instance class an electronic dictionary at 94 (using the 4 from Dewey class 400 Languages) and a website with information for travelers at 991 (using 91 from Dewey 910 Geography and Travel). When using such a general classification scheme to subdivide class 9 care should be taken not to class documents here when a suitable place is already provided in classes 0-8.

Order and notation

One might ask why a notation (0-9) is used for the main classes and whether a pure alphabetic arrangement would not be easier to understand. The purpose of the notation is to maintain the order in which the classes have been set out in the scheme. There is a logic in the order which might not be obvious to the casual observer. An accepted principle of classification, and one applied intuitively by most people not trained in classification, is that the order of arrangement should be from general to specific (Buchanan, 1976, p.26; Foskett, 1996, p.156; Marcella & Newton, 1994, p.9-10). This order is reflected in the sequence of classes starting with documents not restricted to specific topics, followed by the external environment, general management and then the specific business processes and other business concepts. There is also some logic in the order of the specific business processes. One can argue that a business first needs financial and human resources before products can be manufactured and

services delivered. Marketing and sales depend on the availability of products and services to market and sell. The customer is at the receiving end of the chain of business processes.

Another principle related to the general-specific order is the principle of inversion, according to which the filing order of facets in a classification scheme should be the reverse of the citation order (see section 4 above). Citation order in the proposed scheme applies mainly to the combination of concepts referring to *document type* and *business topics* (see section 6 above). For example: Where do you class a human resources database, a customer newsletter or a policy document on information management? It is suggested that documents such as these should go with the topics (human resources, customers and information management) rather than with the document types (database, newsletter and policy document). If the user of the scheme knows that the important topical concepts are lower down in the schedule and the less important form concepts are in class 0, then it is possible to consistently decide where to class a document where both topical and form concepts are present.

It should be clear that a notation is necessary to maintain an order based on theoretical principles such as those set out above. Pure alphabetical arrangement would lead to an order of classes that is not in accordance with the principles of classification. The notation could also be used on lower hierarchical levels to get more logical arrangements, but an alphabetical arrangement of classes at these levels makes it easier to add new classes as required and is more well-known to the ordinary business person than a notational system.

Should the numerical notation of 0-9 prove to be too restrictive for a business that wants to add further main classes, it can easily be replaced by an alphabetical notation.

Specificity

For practical reasons it was decided to limit the scheme to two levels of subdivision below the main classes. In the case of folder systems where the user has to browse by opening folders one after the other in order to locate the required document, it is advisable to avoid deep hierarchical structures. Very small businesses might not need all the classes provided in the scheme, whereas larger businesses (or even information-intensive small businesses) might need to subdivide some classes further. The alphabetic arrangement of classes below the main classes makes it easy to delete or add classes as needed by specific companies. An alternative to creating subfolders for collocating certain documents is to allocate file names according to prescribed conventions for specific classes of documents, so that these documents sort together automatically.

8. Conclusion

Returning to the problem and objective stated in section 2, one can conclude that it has proved possible to design a generic classification scheme for business documentation based on an analysis of the concepts found in actual systems observed in the sample of SMMEs investigated, supplemented by concepts taken from the literature. Business processes and related business concepts form the backbone of the scheme. The system was designed with electronic documents in mind, but there is no reason why it should not be equally valid for the organization of hard-copy documents. The empirical investigation was limited to small and micro enterprises, but as the structure of the classification scheme reflects a generally accepted grouping of concepts according to business processes/functional areas, the scheme should also be applicable in larger enterprises. These business processes and concepts are universal – therefore, although the empirical study was limited to South African enterprises, the classification should be useful to businesses in other countries with minor adaptations.

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References

Alter, S. (c1996). *Information systems: a management perspective*. 2nd ed. Menlo Park, Calif.: Benjamin/Cummings.

Buchanan, B. (1976). *A glossary of indexing terms*. London: Bingley.

Choo, C.W. (c2002). *Information management for the intelligent organization: the art of scanning the environment*. 3rd ed. Medford, N.J.: Information Today.

Cook, M. & Cook, C. (2000). *Competitive intelligence: create an intelligent organization and compete to win*. London : Kogan Page.

Foskett, A.C. (1996). *The subject approach to information*. 5th ed. London: Library Association.

Fuld, L.M. (c1995). *The new competitor intelligence*. New York : John Wiley.
Hunter, Eric J. (2002). *Classification made simple*. 2nd ed. Aldershot : Ashgate.
Kahaner, L. (1997). *Competitive intelligence : how to gather, analyze, and use information to move your business to the top.* New York : Simon & Schuster.
Laudon, K.C. & Laudon, J.P. (c2004). *Management information systems: managing the digital firm*. 8th ed. Upper Saddle River, NJ : Pearson Prentice Hall.
Marcella, R. & Newton, R. (c1994). *A new manual of classification*. Aldershot: Gower.
O'Brien, J. (2002). *Management information systems: managing IT in the e-business enterprise*. 5th ed. Boston : McGraw-Hill/Irwin.
Pollard, A. (1999). *Competitor intelligence*. London: Financial Times.
Rowley, J. & Farrow, J. c2000. *Organizing knowledge : an introduction to managing access to information*. 3rd ed. Aldershot : Gower.
Taylor, A.G. (1999). *The organization of information*. Englewood, Colo.: Libraries Unlimited.
Turban, E. & Aronson, J.E. (c2001). *Decision support systems and intelligent systems*. 6th ed. Upper Saddle River, N.J.: Prentice-Hall.
Validator: subject & names authority. (2004). Version 3.2. AT&T Government Solutions.
Vine, D. (c2000). *Internet business intelligence: how to build a big company system on a small company budget*. Medford, N.J.: CyberAge Books.

Appendix A

Classification scheme for business information in SMMEs

0 General documents

(Use class 0 only when a document cannot be classed in 1-9 below. Use these document types as subdivisions under classes 1-8 when needed)

Annual reports
Correspondence
Databases (general enterprise-wide databases)
Journals (use for external journals and magazines)
Maps
Meetings: minutes and agendas
Newsletters/Bulletins (internal)
Newspapers
Pictures (including company logo, clipart, graphics downloaded from the Internet)
– use instead of the Windows file My Pictures
Policies and procedures (use for company-wide manuals)
Reports (see also Annual reports)
Templates - use for internally produced document templates (e.g., company stationery)

1 External environment

(Class here documents about external factors that might impact on the enterprise, influencing strategic decision-making)

Competitors (company profiles, news items, management profiles, SWOT analyses, etc.) - subdivide by company name
Consumer associations - subdivide by name
Ecological issues (pollution, climate, global warming, etc.)
Economic issues (exchange rates, inflation, tourism, etc.)
Government (laws, regulations, policies, projects, investigations, etc.)
Local (Municipality)
National (subdivide by Department)
Provincial
Industry/Trade Associations - subdivide by name
Labour unions - subdivide by name
Market analyses
Political issues (elections, human rights, political parties, etc.)
Social & cultural issues (changing demographics, customs, religion, etc.)
Suppliers/Service providers - subdivide by name
If necessary, subdivide each supplier as follows:
Contracts and agreements
Correspondence
Orders
Products/services (catalogues, price lists)
Technology (IT trends, new production technology, etc.)

2 Management (General)

Customer relationship management (class in 7)
Financial management (class in 3)
Human resources management (class in 4)
Information (& knowledge) management (including access to information)
Marketing management (class in 6)
Meetings: minutes and agendas
Mergers & acquisitions
Physical resources management
Production management (class in 5)
Public relations management
Quality management

Restructuring
Risk management (emergency planning, security, etc.)
Sales management (class in 6)
Strategic planning (business plans, mission statements)

3 Finance (financial management)
Auditors (reports, correspondence)
Banks – subdivide by name
If necessary, subdivide each bank as follows:
Bank statements
Contracts
Correspondence
Budgets
Creditors (statements & receipts) – subdivide by name
Debtors & debt collection (including overdue notices) – subdivide by name
Financial reports (income, expenditure, turnover, cash flow)
Insurance (of assets)
Investments – subdivide by financial institution
Invoices & orders (arrange by invoice number)
Municipal rates & taxes
Petty cash (invoices)
Physical assets (asset register, contracts & agreements, guarantees)
If necessary, subdivide as follows:
Buildings
Computers
Furniture
Telephones
Tools/Machinery
Vehicles
Rental (premises & equipment)
Taxes (company tax, unemployment tax, VAT, tax assessments, etc.)

4 Human resources
Advertisements (job vacancies, job descriptions)
Affirmative action
Applicants (CVs, correspondence, etc.) - subdivide by name
Career development (see also Training)
Health and safety
Housing scheme
HR database
Insurance benefits (group, unemployment, short term)
Labour relations (discipline , grievance procedure, disputes, strikes, arbitration)
Leave
Medical scheme
Motor vehicle scheme
Pension fund
Performance appraisal
Remuneration (compensation, salaries, wages)
Skills inventory
Social functions
Staff (staff members, ex-staff members and agents) - subdivide by name
Training (in-service) (courses, timetables, training materials)
Workplace skills plan (skills development)

5 Products & Services
Accreditation (e.g., of training courses)
Course materials (curriculum, handbooks, question papers)
Equipment (machinery and tools, including instruction manuals)
Materials (raw materials and components used in production)
Product manuals/instructions
Product specifications
Production costs (calculations, reports)
Production figures (statistics)
Production processes
Quality control (including standards)
Research & development (projects, reports) [If preferred place in class 2]
Stock inventories

6 Marketing & Sales
After-sales service
Delivery notes
Market research reports (internal)
Order forms
Price lists (prices/fees of the company's own products/services)
Product descriptions (catalogues)
Promotions (marketing plans, campaigns, sales promotions)
Publicity materials (advertisements, information sheets & brochures, newsletters)
Sales figures/reports
Sales representatives reports – subdivide by name
Tenders

7 Customers
Certification (proof of training courses attended/passed)
Competitions

Customer database
Customer service
Functions (social, prize-giving, etc.)
Individuals - subdivide by name or categories, e.g., tourist guides, students, secretaries
Organizations - subdivide by name or category, e.g., businesses, churches, farms
If necessary, subdivide each customer as follows:
Contracts and agreements
Correspondence
Logos
Orders
Quotes & proposals

8 Special collections
Use for categories of documents that should be stored separately from those classed in 0-7, e.g., documentation of cross-functional projects and restricted access documents.

9 Other subjects
Use for documents on subjects that might be of interest to the company, but do not fall under any of the subjects listed above. Create subject headings as the need arises, or adapt a general classification scheme such as the Dewey Decimal Classification. In the latter case the numbers from the scheme can be used for subdivision after 9, e.g.,
91 Philosophy
92 Religion
93 Social Sciences
94 Languages
95 Science
96 Technology
97 Art
98 Literature
99 History, Geography, Biography