THE INFORMATION AUDIT: PRINCIPLES AND GUIDELINES

by

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SUMMARY

The information audit : principles and guidelines

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Auditing is a recognised management technique. It provides managers with an overview of the present situation regarding specific resource(s) and services within an organisation.

Many different types of audits currently exist in the commercial world. Over the last number of years the focus of audits has shifted from a purely financial one to an interest in all activities performed in organisations, including information resources.

Currently, as far as the researcher could determine, there exists no single accepted methodology for performing an information audit. Methodologies differ from organisation to organisation, depending on the purpose of the specific audit. In view of this the researcher investigates whether it is possible (and desirable) to develop a standardised methodology for information auditing, by investigating the nature and characteristics of a typical information audit as well as a number of other audit types, e.g. the financial audit which is a very good example of a standardised audit methodology. Furthermore, the researcher discusses a number of terms and processes that have some connection to the process of information auditing, to a lesser or greater extent. These types of audits and processes are discussed with a view to indicating their applicability to designing an information audit methodology.

These include the communication audit because of its focus on organisational information flow patterns; Information mapping because of its focus on the identification and use of information resources; the information systems audit for its focus on the way in which technological tools are used to manage information resources (although implicitly); the knowledge audit follows logically on information management and information auditing (cf. explanation at the beginning of Chapter 3); and the intelligence audit for its relationship with both information and knowledge management.. The researcher concludes that none of these are the same as the information audit, though similarities exist.

The information audit is discussed by focusing on its aims, the benefits derived from performing an information audit and the role of the information audit in the information management process. Various information audit methodologies are discussed, evaluated and classified.

The researcher comes to the conclusion that even though the principles of the financial audit cannot be used to develop a standardised methodology for information auditing, information professionals can look towards the accounting profession to support them in developing a standardised, universally accepted method for accurately determining the value of information entities.

In conclusion, guidelines for a standardised information audit methodology are listed.

KEY TERMS

- Audit
- Auditor
- Communication audit
- Information audit
- Information management
- Information mapping
- Information resource
- Information systems audit
- Intelligence audit
- Knowledge audit

SAMEVATTING

Die inligtingsoudit: beginsels en riglyne

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Ouditering is 'n erkende bestuurstegniek. Dit voorsien bestuurders van 'n oorsig van die huidige situasie met betrekking tot spesifieke hulpbron(ne) en dienste binne 'n organisasie.

In die kommersiële omgewing word verskillende tipes oudits gebruik. Met die verloop van tyd en veral oor die afgelope paar jare, het die fokus van oudits verander van 'n suiwer finansiële fokus na 'n fokus wat 'n verskeidenheid organisatoriese aktiwiteite en/of hulpbronne insluit, waaronder inligtingshulpbronne.

Die navorser het bepaal dat daar huidiglik nie 'n enkele, algemeen-aanvaarde metodologie bestaan vir die uitvoer van 'n inligtingsoudit nie. Bestaande metodologieë verskil van organisasie tot organisasie, afhangende van die doel van die spesifieke oudit. In die lig hiervan ondersoek die navorser of dit moontlik (en wenslik) is om 'n gestandaardiseerde inligtingsoudit metodologie te ontwikkel. Die navorsing fokus onder andere op die aard en eienskappe van die tipiese inligtingsoudit, asook dié van 'n aantal ander tipes oudits, bv. die finansiële oudit – as 'n baie goeie voorbeeld van 'n gestandaardiseerde oudit metodologie. Die navorser bespreek ook 'n aantal terme en prosesse wat in 'n mindere of meerdere mate ooreenkoms(te) toon met die inligtingsoudit. Die doel van hierdie deel van die navorsing, is om aan te dui of/in watter mate hierdie prosesse gebruik kan word tydens die ontwerp van 'n inligtingsoudit metodologie.

Die oudits wat bespreek word, sluit in die kommunikasie oudit, aangesien laasgenoemde fokus op organisatoriese patrone van inligtingsvloei; "information mapping" aangesien dit fokus op die identifisering en optimale benutting van inligtingshulpbronne; die inligtingstelseloudit wat fokus op die tegnologiese hulpmiddels wat gebruik word tydens die (implisiete) bestuur van inligtingshulpbronne; die kennis oudit ontwikkel logies vanuit die prosesse van inligtingbestuur en inligtingsouditering (vgl. die bespreking aan die begin van Hoofstuk 3); en die intelligensie oudit wat 'n verwantskap toon met beide inligting- en kennisbestuur. Die navorser kom tot die gevolgtrekking dat geen van hierdie tipes oudits dieselfde is as die inligtingsoudit nie, maar dat ooreenkomste wel bestaan.

Die inligtingsoudit word bespreek deur te konsentreer op die doelwitte daarvan, die voordele wat dit inhou, en die rol van die inligtingsoudit in die inligtingbestuursproses. Verskeie inligtingsoudit metodologieë word krities bespreek, geëvalueer en geklassifiseer.

Die navorser kom tot die gevolgtrekking dat die beginsels van die finansiële oudit nie gebruik kan word om 'n gestandaardiseerde inligtingsoudit metodologie te ontwikkel nie. Ten spyte hiervan kan inligtingspesialiste baie leer van die rekenkundige beroep, veral wanneer daar gekyk word na die ontwikkeling van 'n gestandaardiseerde, universeel-aanvaarde metode vir die akkurate berekening van die waarde van inligtingsentiteite.

As gevolgtrekking tot die navorsing, word riglyne uiteengesit vir 'n gestandaardiseerde inligtingsoudit metodologie.

SLEUTELTERME

- "Information mapping"
- Inligtingbestuur
- Inligtingshulpbron
- Inligtingsoudit
- Inligtingstelsel oudit
- Intelligensie oudit
- Kennis oudit
- Kommunikasie oudit
- Oudit
- Ouditeur

CHAPTER 1: BACKGROUND TO THE RESEARCH

1. Introduction

Auditing is a recognised management technique. It provides managers with an overview of the present situation regarding specific resource(s) and services within an organisation.

Many different types of audits currently exist in the commercial world, e.g. financial audits, communication audits, technical audits, employment audits, etc. This can be ascribed to the fact that auditing is recognised as an accepted management technique, applied to different types of organisational resources. In analogy with this, managers have realised that this technique can also be applied to information resources (Robertson, 1994:34). Barker (1990:2) reinforces Robertson's comment by stating that over the last number of years the focus of audits have shifted from a purely financial one to an interest in all activities performed in organisations, ranging from creativity and marketing to information resources.

In layman's terms the purpose of an information audit can be described as the identification of users' information needs. This information can be used to determine how well these needs are met by the information services department within an organisation. From an information management perspective it is significant that the information audit brings about a shift in focus from storage-related issues to service-oriented issues. During the information auditing process there is also a strong emphasis on determining accountability and responsibility (St Clair, 1995a:2).

2. Problem and context

2.1 What gives rise to the problem?

Currently there is a new awareness of information auditing, as can be deducted from the number of articles that have recently been published on this topic (cf. the sources listed in the Bibliography). Evidence of this is also found in the 1996 Special Libraries Association publication: an information audit kit (The information audit, 1996). This organisation regards the information audit as a topic that is currently very important to information professionals (Hall, 1996:iv).

Once management has been convinced of the necessity of performing an information audit, the auditor is still faced with a number of problems. The main problem seems to be a lack of information auditing methodology.

Currently, as far as the researcher could determine, there exists no one accepted methodology for performing an information audit. Methodologies differ from organisation to organisation, depending on the purpose of the audit in a particular organisation. This finding is supported by a conclusion made by Robertson (1994:35), i.e. that there exists no standardised, professionally accepted information audit methodology as is the case with financial audits, for example. LaRosa (1991:7) indicates, like a number of other authors mentioned here, that there is no set methodology for an information audit. She describes an information audit as "more of an evaluative art [rather] than a science". She discusses *guidelines* that could be followed when performing an information audit within an organisation.

Another problem relating to information audit methodology, is the issue of a lack of standards. This is in stark contrast with financial auditing where "formal Standards lay down audit guidelines, checklists, techniques and operating standards which will apply to all types of organization and have evolved over many years" (Robertson, 1994:35). The quoted author suggests that information scientists draw on the experience from the process of financial auditing to develop a standardised information auditing methodology. Such a standardised methodology is not supposed to limit organisations in the execution of information audits, but rather to guide them in terms of elements to investigate and tasks to include in the performance of such an audit, i.e. a checklist of things to do (Robertson, 1994:36).

Barker (1990:17) also refers to this issue. She identifies two main types of audits, i.e. compliance and advisory audits. An example of the compliance audit is the traditional financial audit whereby aspects regarding financial resources in an organisation are monitored. Advisory audits are used to evaluate the effectiveness and/or efficiency of a specific operation in an organisation. The results are used for long-term, strategic planning. The majority of information audits are advisory audits, but Barker (1990:17) admits that there is room for compliance information audits (as does Robertson). This is a viewpoint that should come as no surprise for information scientists, as the term "audit" brings to mind a connection with accountancy for many people. According to Orna (St Clair, 1995a:1) the information audit enables the auditor to perform "a healthy examination of 'accounts', an activity which [gives] ... an appropriate perspective from which to think about information and information delivery."

Robertson (1994:36) reckons that if a standardised information audit methodology and procedure is developed according to the example set by financial audits, the future might be different from what any information scientist could have expected. He foresees a scenario where an information auditor evaluates (according to a set of standardised criteria) the effectiveness with which an organisation has managed/manages its information resources. On determining that no major problems exist, the auditor issues a certificate to state that the organisation "manages its information resources correctly and efficiently and in accordance with established Standards, complying with best practice at that time".

Robertson (above) highlights the problem of the lack of standards for information audit methodology. Haynes (1995:30) also touches on this problem by stating that information auditing has been performed in various different ways in different environments over the years. According to the researcher, this phenomenon can only be ascribed to a lack of standardisation.

Barker (1990:15), however, does not regard this diversity of methodologies as negative. According to her, different methodologies are suitable for application in different environments with different characteristics and objectives. There are a number of authors who discuss information audit methodology in terms of guidelines, rather than a set, standardised methodology, e.g. Hall (1996:iv), St Clair (1995a:1-5, 1995b:6-8, 1995c:5-7), LaRosa (1991:7-9) etc. Hall (1996:iv) states that there is no one standardised methodology for performing an information audit. The reason for this is that each organisation is unique, "which means the audit must be designed for the particular organisation".

In view of a number of different perspectives on the nature of the information audit, the scenario of a standardised information audit methodology can be questioned. According to (Barker, 1990:19-22) information audits cover a wide range of subjects, e.g. internal vs. external information resources, formal vs. informal information systems/channels, official vs. unofficial information.

Robertson (1994:34) "classifies" information audits in terms of their relative simplicity or sophistication. For example: verifying the existence of specific records in a records management system is a relatively simple information audit, whereas an in-depth investigation of the state of organisational information resources, the identification of problems and suggestion of possible solutions can be regarded as a sophisticated information audit.

The question that arises from the discussion above, is whether it is possible (and desirable) to develop a standardised methodology for information auditing (cf. paragraph 2.2).

2.2 Statement of problem/Purpose of the study

The researcher will investigate whether it is possible (and desirable) to develop a standardised methodology for information auditing, by investigating the nature and characteristics of a typical information audit.

2.3 Sub-problems

Sub-problems that will be addressed in this study, include the following:

- The nature of auditing will be investigated (from a financial perspective).
- The nature, characteristics and methodologies of various types of audits will be investigated, amongst which communication audits, information systems audits, intelligence audits, knowledge audits as well as the process of information mapping.
- The difference, if any, between the process of information auditing and infomapping.
- The nature and characteristics of the information audits will be investigated.
- The researcher will investigate the contribution of information auditing, if any, to information management.
- An exposition will be given of a variety of information audit methodologies and these will be compared.
- The relevance/necessity of information auditing will be discussed.
- The researcher will attempt to provide guidelines for a general/standardised information audit methodology.

2.4 Necessity for finding a solution to the problem

It is imperative that information scientists will first have to find answers to the questions raised thus far in the discussion, if information auditing is to be recognised as a valuable (information) management technique.

From the discussion thus far, it becomes clear that there is scope for the development of information auditing methodology as well as the development of information auditing as a(n) (information) management technique (Robertson, 1994:36).

2.5 Defining the boundaries of the study terrain

Information science is a science that has been developed from a variety of disciplines, amongst which are management sciences, computer science, applied computer science and library science (Blom, 1990:140). The same multidisciplinary approach applies when one looks at the information audit, as will be illustrated below:

- Auditing is a recognised management technique, as has been indicated in the Introduction (paragraph 1). In view of this, the characteristics of a typical financial audit will be investigated.
- On the other hand, a communication audit evaluates the effectiveness of communication (i.e. information flow) within an organisation. Therefore, the researcher will also investigate the nature and characteristics of a typical communication audit.
- Information mapping (also referred to as infomapping) is a technique that was developed by Burk and Horton (1987) and has been used to provide companies with an overview of their information resources. The researcher will investigate the nature and characteristics of information mapping, as there exist various perspectives on this technique, e.g. information mapping as discussed by Best (1985:75-94).
- Attention will also be given to the process of auditing (electronic) information systems, and the researcher will indicate whether this is the same as information auditing, or not.
- The main component of the study will concentrate on information audit methodology.

The study will be performed from an information science perspective, regarding information auditing as a tool for effective organisational information management. Furthermore, this study will not be empirical, but will attempt to integrate various viewpoints from the existing literature on the topic.

2.6 Definitions of key terms

As background and introduction to this research, the researcher will quote definitions for the various concepts, as it was found in the literature. Working definitions for each of the concepts will be developed as the various topics are addressed.

2.6.1 Information audit

The concepts "information audit" and "needs assessment" are sometimes regarded as synonyms. St Clair (1995a:1) stresses that this is not the case. The information audit is used when one wants to determine the real role of information in an organisation. Once this has been done, the role of information is examined within the context of the users' needs. In-depth interviews help the auditor to compile a holistic picture of the state of information resources in an organisation. This information can be used, amongst others, when developing an organisational information system.

LaRosa (1991:7) defines a corporate information audit as "a systematic method of exploring and analysing where a library's various publics are going strategically, and of determining the challenges and obstacles facing those publics". The information gained from an information audit ought to give the library manager a clear indication of the current and future information needs of its users/clients and this in turn directs strategic planning.

In an attempt to define what an information audit is, one can investigate what type of results can be expected from an information audit. An information audit attempts to provide a realistic picture of the state of the information resources in an organisation. Therefore, the information audit is more comprehensive than a traditional "needs assessment", as the information audit "links the provision of information services with a healthy examination of 'accounts'" (Orna, 1990:44). The information audit is also used to determine/investigate accountability and responsibility in terms of organisational information resources (St Clair, 1996:9).

2.6.2 Financial audit

Auditing is the process whereby an independent examination of financial information of any entity (whether profit-oriented or not and irrespective of its size or legal form) takes place with a view to express an opinion thereon (Puttick & Van Esch, 1992:44). It can therefore be said that the main objective of auditing is to express an opinion on the fairness of presentation (by management) of the financial position at a specific date and the results of its operations as well as the cash flow for the period (Human, 1996:3).

2.6.3 Information mapping

From an information science perspective, infomapping is a technique that was developed by Burk and Horton (1987). Mapping is a recognised resource management technique and was adapted for information resources management by these two authors. Infomapping is a process whereby organisations can discover all their corporate information resources, i.e. "critical sources of supply". Infomapping involves the identification, location and measuring of organisational information resources (Burk & Horton, 1987:2-4, 28).

2.6.4 Communication audit

A communication audit is a process whereby the state of organisational communications is examined. This is done by focusing on aspects such as "communication needs, policies, practices, and capabilities". The purpose of a

communication audit is to collect information that can be used to design a communication strategy for the organisation. A characteristic of a communication audit is that the findings should be used to make recommendations and/or find solutions to identified problems (Kopec, 1982:24).

2.7 Assumptions made

The research for this dissertation will be conducted based on the premise that information is a recognised strategic resource within organisations. In view of this, information (as a resource) should be managed within the organisational context. Information is however, a unique resource in terms of its characteristics.

2.8 The contribution of this study to the solution of the problem

During the period that this research was conducted (1996-1999), the researcher could not find many documents in which different information audit methodologies were critically discussed. What one finds in the literature is either individual authors who discuss individual information audit methodologies or case studies of the use of specific methodologies. Very few of these documents can be regarded as integrated documents on information audit methodology. The only exceptions are the publication by the Special libraries association (The information audit, 1996), the occasional paper by Barker (1990) and the article by Ellis et al (1993:134-151). As has been mentioned, the Special libraries association published an Information audit kit. Strictly speaking this is not an integrated document, as the publication consists of reprints of a number of articles on the information audit. As Hall (1996:iv) states in the introduction to this collection of articles, the various articles focus on different aspects relating to the information audit, e.g. St Clair discusses how one can conduct and information audit within a one-person library, while Robertson discusses the information audit from a financial perspective. Barker (1990) investigates a number of information audit methodologies and designs a methodology based on these. This methodology is used to perform an information audit in the R&D division of a pharmaceutical company. The third "integrated" source, the article by Ellis et al (1993) focuses on different information audit methodologies, communication audit methodologies and information mapping methodologies. These are discussed in terms of the different types of focuses adopted. The methodologies are then evaluated in terms of their applications in different organisations.

With this study the researcher will integrate a number of perspectives on information auditing into one document. The researcher will investigate the viability of developing a standardised information audit methodology in the light of different opinions of various authors. In conclusion the researcher will attempt to develop a general, standardised information audit methodology, or if this proves not to be possible, to lay down general guidelines for information audit methodology.

3. An overview of the current state of research on the topic

3.1 Nature of theory and research

Robertson (1994:34) claims that a modern audit is more limited in its scope and execution than is implied by the definition of a traditional audit. A modern audit is usually limited to an interview with key personnel in order to find a solution to a specific operating problem or to justify the implementation of a new service in an organisation.

Robertson (1994:36) identifies three general types of financial audits commonly used in the commercial environment. These are financial audits used for:

- "the physical verification of assets and liabilities;
- control and compliance issues; and
- investigative matters".

According to Robertson (1994:36) the majority of information audits currently performed in organisations, can be classified as similar to the first type of financial audit listed above, i.e. these information audits are used to compile inventories of organisational information resources. A few of the information audits performed in organisations can be classified as similar to the third type of financial audit listed above, i.e. investigative for reasons that differ from those for which an investigative financial audit is performed (e.g. in situations where improper handling of funds are suspected).

Haynes (1995:30) regards the information audit as a tool to support the development and design of organisational information systems. Radical changes brought about by business process re-engineering (BPR), often lead to new demands for information services and products. An information audit can provide the information necessary for improving and/or implementing information services and products to satisfy users' needs.

The main purpose of an information audit is to improve organisational performance (by ensuring that users' needs are being met by information systems and products) (Haynes, 1995:30). This purpose implies a number of objectives to be met, e.g. the identification of information problem areas and/or gaps in information provision (Haynes, 1995:32). The researcher will provide a more comprehensive overview of the purpose and advantages of the information audit in Chapter 4.

3.2 Main findings from the literature

It is a well-known fact that information is increasingly being recognised as a strategic corporate resource. Following from this, organisations invest valuable resources - "often considerable resources" - in information services departments. The information services manager has the responsibility of justifying this investment to management (St Clair, 1996:9).

The traditional way in which this is done, is by means of reports to management. The information services manager usually compiles these reports on a monthly, quarterly and/or annual basis. Typical information included in these reports, are feedback from the users of the information services department, interpretations of statistical information, e.g. frequency of usage of specific information services and/or products, etc. These tools contain sufficient information on the functioning of the information services department. At times, however, more information might be needed. In order to obtain an overview, a so-called "big picture", of the state of the information services department, an information audit can be conducted. Examples of times when an information audit could ideally be conducted, include the following: when the purpose, services and/or products of the information services department must be evaluated, when a need for new information services and/or products are identified, or when management questions the existence and/or value of the information services department, (St Clair, 1996:9).

The results of a well-performed information audit are relevant information on the state of information (resources) in an organisation. Once one has an understanding of the way different types of information are being used in an organisation, so-called "information gaps" can be identified and new information products and services can be developed. This information can be used effectively for planning purposes by the corporate library or the chief information officer/information manager.

When organisations face economic difficulties, the first cutbacks are usually proposed in the information centre. In view of this, the information audit can be invaluable in documenting the value of information for the organisation. Additionally, by identifying ways in which to meet the real information needs within the organisation, the cost-effectiveness of the information centre can be improved (Hall, 1996:iv).

At the same time, the audit interviews provide an opportunity for marketing the library or corporate information function and its services and products, a so-called information advantage.

3.3 Conclusions/proposals from the literature

- Information audits represent the state of information in an organisation at one particular point in time. A way/method will have to be found to follow up such an investigation in order to keep information on organisational information resources up to date. Robertson (1994:35) suggests once again that information scientist can look to financial auditors for advice on this issue, as financial audits are performed frequently in organisations for a variety of reasons.
- In order for the above scenario to become reality, it is imperative that properly qualified information auditors should be trained, preferably by means of acknowledged training programmes and professional examinations (Robertson, 1994:36).

3.4 Motivation from the literature for the continuation of the research

The awareness of the importance of information auditing seems to be limited to a small section of the information science community. The majority of (general) managers still do not realise the full value of organisational information auditing, i.e. that the results/findings of an information audit form the basis for proper organisational information management, while at the same time often helping to resolve information (and communication) problems that have not been apparent. This is verified by a statement made by Robertson (1994: 34): "At present, information audits are usually conducted as specific projects to address particular issues", e.g. mergers, introduction of new information technology into an organisation etc. Convincing managers of the value of information auditing remains a challenge, as the real benefits of this process are intangible and largely unquantifiable.

From the above it becomes clear that there is scope for the development of information auditing methodology as well as the development of information auditing as a(n) (information) management technique (Robertson, 1994:36).

4. Methodology

This dissertation is a literature review and critical synthesis of the available material on information auditing. As this study is not empirical, the researcher has conducted a number of literature searches on the topics of the information audit, the communications audit, infomapping, the financial audit and other types of audits, amongst which the environmental audit. Searches were performed on CD-ROM databases (e.g. LISA and INSPEC). Literature searches were also performed on a number of online databases, via DIALOG database host as well as databases through other vendors such as Gale Group and Ebscohost. Literature searches were furthermore done on the Internet via the World-Wide Web. By means of e-mail communication with students doing research on the same topic, more references were obtained.

The dissertation consists of a critical analysis and synthesis of the literature that were studied. Where applicable different opinions from the literature are critically compared.

5. Structuring of chapters

The chapters making up this study, will focus on the following topics:

1. Introduction and background to the research
2. The financial audit
3. The communication audit, information mapping, the information systems audit, the knowledge audit and the intelligence audit
4. The information audit
5. Information audit methodologies
6. Conclusion.

CHAPTER 2: THE FINANCIAL AUDIT

Chapter 2: Overview

In this chapter the researcher will investigate the nature and characteristics of the financial audit. This is done in view of the problem statement (cf. Chapter 1, paragraph 2.2) that was developed upon reading the article by Robertson (1994:34-36) and the questions raised by him (cf. Chapter 1, paragraph 2.1). Financial auditing will be discussed from an international perspective and specific reference will be made to the South African situation. The purpose of this chapter is to provide the reader with an overview of the process of auditing as it is applied in the financial environment and to provide an overview of the different types of financial audits. The characteristics of these audits will be investigated in Chapter 6 in terms of their applicability when designing an information audit methodology.

1. Introduction

Audits are conducted in many different forms in organisations today. The purpose of auditing is to discover, check, verify and control some or other aspect in an organisation. It can therefore be said that one of the main characteristics of an audit is that it is diagnostic. In correlation with this, Ellis et al (1993:146) state that an audit is similar to an annual physical examination. It is used to identify and/or highlight functions and/or areas of dysfunction. According to Robertson (1994:34) an audit is also synonymous with the process of compliance.

2. Definitions of key terms

The following are definitions of key terms used within the environment of financial auditing. More specific definitions will also be included in the discussion in the rest of this chapter.

The Webster's seventh new collegiate dictionary (1976:58) defines an *audit* as: "1a: a formal or official examination and verification of an account book; 1b: a methodical examination and review; 2: the final report of an examination of books of account by auditors".

The same source (Webster's, 1976:58) defines the verb to *audit* as follows: "to examine with intent to verify".

Auditing is defined as: "... the independent examination of financial information of any entity, whether profit-oriented or not, and irrespective of its size, or legal form, when such an examination is conducted with a view to expressing an opinion thereon..." (The principles and practice of auditing, 1992:44).

An *auditor* can be defined as a person who is "authorized to examine and verify accounts" (Webster's, 1976:58).

The Webster's seventh new collegiate dictionary (1976:6) defines an *account* as "a record of debit and credit entries chronologically posted to a ledger page to cover transactions involving a particular time or a particular person or concern" (Webster's, 1976:6).

3. Auditing: A historical overview

3.1 The history and origins of auditing

Evidence of accounting can be traced back to the earliest civilisations, where it was originally done orally. The term "auditor" was derived from the Latin *audire*, to hear. At first the auditor was the master who *listened* to his steward recite (from memory) the disposal and possession of the master's goods and chattels over a specific period of time. Within this context the term auditor acquired a secondary meaning, i.e. "one who satisfies himself as to the truth of the accounting of another" (The principles and

practice of auditing, 1992:2). In layman's terms the process of auditing is described as the checking of accounts.

With the development of writing, people started keeping written records of the types of transactions referred to above. This process was called "bookkeeping" (The principles and practice of auditing, 1992:2).

Evidence of complex auditing has been found in ancient Egypt and Babylonia, as well as in the early Greek and Roman civilisations. The principles of Greek and Roman accounting and auditing formed the basis for a statute passed in England in 1285, under the reign of Edward I. The statute stated that auditors must be appointed to check the accounts of the "Masters" and if they were found to be in "arrearages upon the account", they were to be arrested (based on the auditor's testimony) and jailed (The principles and practice of auditing, 1992:2).

During the fifteenth century an increase in trade in Italy and Europe resulted in a number of bookkeeping problems and complexities. The Italian, Frater Luca Pacioli offered a solution, when he developed the double-entry system. He wrote a treatise on this subject in 1494. Subsequently, the first society of accountants was founded in Venice, Italy, in 1581 (The principles and practice of auditing, 1992:3).

During the Industrial Revolution a number of joint stock companies were formed. It was expected of the various businesses to account clearly and honestly to its shareholders (owners). Accountants were appointed to act as agents for the shareholders. This in turn resulted in the profession of accounting and auditing as it exists today (The principles and practice of auditing, 1992:4).

The term "chartered accountant" was used for the first time after the first British society of accountants, incorporated by royal charter, was formed in Edinburgh in 1854.

The International Federation of Accountants (IFAC), an international organization for the accountancy profession, was founded in 1977 with the purpose of creating "a stronger, more unified accountancy profession". By 1996 the IFAC consisted of 119 professional accountancy bodies from 86 countries. These include accountants from industry, commerce, the public sector, education as well as those in private practice (IFAC, 1996a). The mission of IFAC "is the development and enhancement of the profession to enable it to provide services of consistently high quality in the public interest" (IFAC, 1996d).

These international developments resulted in various national developments where organisations were formed for accountants. These are not relevant to this dissertation and therefore will not be discussed.

4. The nature and objectives of an audit

4.1 The nature of auditing

Auditing is only one of the activities of a professional accountant. Over the years the term has developed a more generic meaning with the application of the auditing process to other areas of financial and business activities. The researcher has also determined a trend whereby the process of auditing is applied within the information environment (refer to Chapter 3 for a discussion of communication, knowledge and intelligence audits; see Chapters 4 and 5 for a more detailed discussion of the information audit).

Currently the following branches of auditing can be distinguished:

- Independent/external/financial auditing
- Internal auditing
- Governmental auditing
- Operational auditing
- Management auditing
- Comprehensive auditing

In different countries, different national prerequisites apply to who is allowed to perform these different types of audits. For example: in South Africa independent audits may only be performed by auditors registered in terms of the Public Accountants' and Auditor's Act. In order to perform any of the other types of audits listed above, a person does not need a specific statutory qualification and the independence and responsibilities of the auditor also differ from those of an independent auditor (The principles and practice of auditing, 1992:44).

The main focus of this dissertation is on the independent (or external) audit, but the following part of the discussion will briefly focus on the other types of audits listed above.

4.1.1 Independent/external/financial auditing

The financial audit is also referred to as an external or independent audit. A very basic definition for the financial audit states that it is an "audit of financial statements". The main objective of a financial audit is to determine whether the financial statements (including the balance sheet, income statement and cash flow statement) of an organisation provide a fair representation of the operations and financial condition of the organisation (Flesher, 1996:240-241).

4.1.2 Internal auditing

The internal audit has the same objective as the financial audit, but differs from the latter in the sense that it usually evaluates a more specific/limited aspect in an organisation, e.g. "departmental or segment financial reports". The focus is mainly on operational auditing (Flesher, 1996:241). This means that an "internal" auditor must determine whether management controls the company in a responsible manner, by:

- evaluating all internal systems and procedures;
- determining whether internal control policies and procedures are being adhered to;
- ensuring that the assets of the company were protected, and
- performing special investigations, as needed (The principles and practice of auditing, 1992:44).

More specifically an internal audit can include one or more of the following audit assignments:

- the purchasing function
- application systems
- ethics and fraud auditing
- internal auditing and total quality management
- environmental and social responsibility auditing (Flesher, 1996:xii-xiv).

The responsibilities of the internal auditor correspond with the main objectives of an internal audit, i.e.:

- reliability and integrity of information;
- compliance with policies, plans, procedures, laws, and regulations;
- safeguarding of assets;
- economical and efficient use of resources; and/or
- accomplishment of established objectives and goals for operations and programs (Flesher, 1996:657).

No two internal audit assignments are performed exactly the same way, i.e. no "routine" internal audit assignment exists. Every assignment and its objectives are unique.

Examples of more common internal audit assignments include:

- Financial audits
- Operational audits
- Performance audits
- EDP (information systems) audits
- Contract audits
- Compliance audits
- Special investigations (e.g. fraud)
- International audits (Flesher, 1996:240).

o Internal vs. external auditing

The responsibilities of the internal auditor are more comprehensive than the typical responsibilities of the external (financial) auditor. The latter usually performs mainly financial audits, as opposed to the internal auditor who performs different types of audits, including financial audits. Table 2-1 (below) compares the typical responsibilities of the external auditor with those of the internal auditor:

TABLE 2-1: Typical responsibilities of auditors

External auditor	Internal auditor
Responsibility: attest as to fairness of financial statements.	Responsibility: to aid the organisation in the effective discharge of its objectives.
Information mainly for stockholders.	Information mainly for management.
Direction of audit is looking back.	Direction of audit is looking forward.

(Flesher, 1996: 241)

4.1.3 Governmental auditing

The purpose of governmental auditing is to check the financial statements of the various authorities in the public sector that derive their income from direct and indirect taxes. In South Africa the Auditor-General is responsible for checking the revenue and expenditure of the various authorities. Auditing functions are usually delegated to practising chartered accountants. The auditor reports his findings to the local authority and supplies the Auditor-General with a copy of the report. The Auditor-General is responsible for auditing government finances and reports his findings to Parliament (The principles and practice of auditing, 1992:45).

4.1.4 Operational auditing

The operational audit is regarded as a "nonfinancial" audit, when contrasted to the financial audit. Operational auditing involves the auditing function being applied to an operational function, rather than a financial area (The principles and practice of auditing, 1992:45). Flesher (1996:242) defines the operational audit as "... an organized search for efficiency- and effectiveness-related problems ... [within] an entity or one of its subdivisions." The distinctions between operational and financial

audits are increasingly regarded as merely academic and the two types of audits are often combined in practice. The Institute of Internal Auditors (IIA) also regards these two fields as interrelated in the field of internal auditing.

Another definition of the operational audit states that the main objective is to evaluate "efficiency and effectiveness of operations and operating procedures." When an operational audit is performed, operating problems are discovered and reported to management, who in turn uses the information to solve problems and to recommend appropriate plans of action. It is therefore clear that the auditor "... is more concerned with the *who, what, when, where, why, and how* of running an efficient and profitable business than just the accounting and financial aspects of business functions" (own italicisation). In summary, it is said that operational auditing focuses on the three E's: efficiency, effectiveness and economy (Flesher, 1996:242-243).

The researcher will include a few remarks on operational audit methodology: The first (preliminary) phase of the operational audit is to have an orientation meeting with the management of the organisation during which the scope and reason for/purpose of the audit is discussed and explained. Table 2-2 (below) provides an overview of the basic steps that make up a typical operational audit methodology:

TABLE 2-2: Overall approach to an operational audit

1. Seek out and identify the organization's objectives.
2. Determine the pertinent facts and conditions.
    a. Conduct a physical tour.
    b. Obtain internal forms and documents.
    c. Interview departmental employees.
    d. Prepare financial analyses.
3. Define problem areas or opportunities for improvement.
4. Present findings to management.

(Flesher, 1996:245).

The term management audit is a synonym for operational audit, with the latter being the predominantly used term (Flesher, 1996:48).

- External vs. operational auditing

The financial audit can also be compared to the operational audit in terms of scope. The financial audit usually reviews the financial statements of an organisation and focuses on internal controls within the organisation. In contrast to this, the operational audit reviews organisational objectives, the operating environment of the organisation, its operating policies, as well as the personnel and physical facilities of the organisation. Both types of audits review the various aspects against standards. When performing an operational audit, evaluation can be done in terms of standards of the organisation (e.g. goals and objectives) or standards of industry. These are not necessarily objective standards but in view of the nature of an operational audit (which is used to identify areas where efficiency and effectiveness can be improved), objective standards are not necessary (Flesher, 1996:243).

4.1.5 Management auditing

The purpose of a management audit is to evaluate how effectively the management systems of a firm operate and to spell out the risk(s) if they are not. Management audits are mandatory in the United States, according to the House Bill 1256 (The principles and practice of auditing, 1992:45).

4.1.6 Comprehensive auditing

The term comprehensive auditing is taken from the Canadian business environment and refers to a management and operational audit being performed in addition to the traditional independent (or external) audit (The principles and practice of auditing, 1992:45).

4.1.7 Other audits

In addition to the different types of audits discussed above, Puttick and Van Esch (The principles and practice of auditing, 1992:45) also mention two developing branches of audits, i.e. the energy audit and the strategic audit. The energy audit is used to evaluate the use and allocation of energy resources and the main aim of the strategic audit is to audit the planning process in a firm – this includes the entire information system.

4.2 The objectives of an audit

4.2.1 Major objectives of an audit

Originally an independent (i.e. financial/external) audit was known as a cash audit, i.e. an audit with the purpose of determining whether or not all receipts and payments had been accounted for by the responsible party. Today an independent audit is far more comprehensive (The principles and practice of auditing, 1992:46). Its main objective is to express an opinion on the fairness of management's presentation of the financial position of a company at a specific time as well as the results of its operations over a specific period. Three key terms are evident in this objective. These are:

- Opinion - the auditor does not certify or guarantee fairness.
- Fairness - relates to the concept of materiality and therefore does not mean 100% correct.
- Presentation - refers to the fact that the financial statements of a company are the responsibility of management (Human, 1996a:1,3).

4.2.2 Secondary objectives and advantages of an audit

From the main objective (discussed above), two further objectives are identified. The auditor does not only give an opinion on the financial statements of a company, but his presence and procedures aim to:

- detect errors and fraud; and
- prevent errors and fraud.

Strictly speaking the detection and prevention of errors and fraud are the responsibility of management. It is however most probable that the auditor will come across errors and/or fraud while verifying the financial statements of a firm. In instances where fraud and/or error are detected, the auditor must use his judgement to decide whether he will extend his investigation and how much further (The principles and practice of auditing, 1992:46-47).

4.2.3 Other advantages

Besides the main objectives and advantages of an audit that have been discussed above, various other advantages result from an independent audit. These include the following:

- Financial statements that have been approved by an auditor are more readily accepted as reliable by interested parties such as banks.
- Inland revenue authorities use audited financial statements for calculating taxation.
- Audited financial statements provide a reliable basis for valuation of a business as well as for the settlement of claims.
- The auditor can use the information obtained during an audit to propose improvements to the accounting system of a firm.
- The auditor can also make suggestions regarding increased proficiency and profits (The principles and practice of auditing, 1992:51-52).

4.3 The scope of an audit

The instructions that an auditor receives from the client determine the scope of a specific audit. The instructions must be confirmed in writing. This written agreement is referred to as *Engagement Letters* according to the *Generally accepted auditing standards, AU 211,* issued by the South African Institute of Chartered Accountants in April 1977 (The principles and practice of auditing, 1992:52). For an example of the scope of an audit, refer to the discussion of the scope of a typical internal auditing assignment, earlier in this chapter (paragraph 4.1).

4.4 Classes of audits

In the literature one finds various classifications of audits. Puttick and Van Esch (The principles and practice of auditing, 1992:53) identify two main classes of audits, namely:

- Complete or standard audit

  This involves checking and testing to the extent that the auditor regards necessary to enable him to decide "whether or not the financial statements [of a firm] fairly represent the state of affairs".

- Restricted or partial audit

  This type of audit involves either:

  - An audit that is not required by law but that is requested by a client and results in auditing some of the records of a firm, e.g. an audit of the cash transactions only.
  - An audit that is requested by a client in addition to a complete or standard audit, e.g. a share transfer audit of a limited company (The principles and practice of auditing, 1992:53).

Once the auditor has decided to perform either of these two types of audits, three other aspects have to be considered, namely where, when and how the audit will be performed. Answers to these questions are in turn influenced by the following three aspects:

- The size of the company.
- The statutory requirements (if any) that govern the audit.
- The wishes of the client (The principles and practice of auditing, 1992:53-54).

Another possible classification is the one by Ellis et al (1993:134). These authors identify two main types of audits commonly used in the commercial environment, namely compliance and advisory audits.

- Compliance audit: The compliance audit can be performed as an independent audit or as part of an operational or financial audit. The purpose of a compliance audit is to determine whether an organisation is meeting certain specified requirements, e.g. internally or externally imposed laws, regulations, standards, policies, plans and procedures. Management can request a compliance audit or it can be performed to satisfy a legal requirement (Flesher, 1996:251).

The steps of a typical compliance audit are listed in table 2-3.

TABLE 2-3: "Methodology" for a "typical" compliance audit

1. Find a system within the organisation that identifies all the policies, procedures, standards, laws, etc. that applies to the organisation.
2. Evaluate the effectiveness of the system through research, to determine all the requirements (internal and external) that apply to the units that are audited.
3. Test for compliance with the identified policies, procedures, etc. and draw conclusions.
4. Report the results of whether compliance has occurred.

(Adapted from Flesher, 1996:251)

Over the past few years, compliance audits have become increasingly important, as organisations are being held accountable at a higher level for their performance. This is because boards of directors, top management, stockholders, taxpayers and governments all request accountability (Flesher, 1996:251).

An example of a compliance audit is a traditional financial audit. The purpose of a compliance audit is to examine the accuracy with which specific procedures are being followed within an organisation as well as to determine whether legal and fiscal standards are being adhered to (Ellis et al, 1993:134).

- Advisory audit: The focus of advisory audits differs from that of compliance audits. The characteristics of the latter include the following: the audit is diagnostic, it is used to evaluate the appropriateness of existing information systems and services and it also informs users in the organisation of its findings, e.g. regarding problems with information systems and services (Ellis et al, 1993:134).

Ellis et al (1993:134) conclude that a compliance audit focuses on financial systems in organisations in contrast with advisory audits. The findings of the latter are often used for strategic planning.

5. The auditing process

As have already been explained, the main objective of an audit is for an auditor to express an opinion on the fairness of management's presentation of the financial statements of a company. This process consists of two major components. These are:

- assessing the reliability of the accounting system of a company; and
- verifying the fairness of the balances accumulated in the accounting records (The principles and practice of auditing, 1992:59).

5.1 Procedures and activities that make up the auditing process

The specific procedures and activities that make up the auditing process can be divided into four main stages, namely:

- Pre-engagement activities
- Planning
- Compliance and substantive procedures
- Evaluating, concluding and reporting (The principles and practice of auditing, 1992:56).

Each of the stages mentioned above and their various sub stages will be discussed below.

5.1.1 Pre-engagement activities

According to Statement AU 015 (see Addendum A, The South African Institute of Chartered Accountants statements on auditing standards) there are three pre-engagement activities. Each of these will be discussed briefly:

- Investigation of a new client or the change(s) in the circumstances of an existing client: The purpose of this investigation is to reduce business risk. See also the discussion under Quality control (paragraph 7.3).
- Determine skills and competence requirements: An auditing firm must perform a situation analysis of the company where the audit must be performed. The purpose of this is to determine whether the auditing firm has personnel with the necessary skills to effectively perform an audit in a specific environment.
- Establish terms of engagement: The instructions that an auditor receives from the client must be confirmed in writing. This written agreement is referred to as *Engagement Letters* (The principles and practice of auditing, 1992:56).

5.1.2 Planning

Absence of planning or ineffective planning result in an ineffective audit. The researcher has determined that proper planning is the key to success of any project. The ultimate objective of planning is to limit the audit risk (Human, 1996b:1).

The following sub stages make up the planning process:

- Obtain knowledge of the entity's business: The auditor must familiarise himself with the functions performed within the company to be audited, as well as the environment within which it operates (The principles and practice of auditing, 1992:57).
- Make a preliminary judgement of materiality: The auditor has to obtain interim financial statements of the company. Based on these he makes a judgement of materiality, the purpose of which is "to plan the audit so that sufficient evidence is gathered to draw such a conclusion" (The principles and practice of auditing, 1992:57).
- Consider inherent risk: Consideration of inherent risk is important to the auditor as it has an influence on the procedures for gathering audit evidence. Inherent risk is defined as "the intrinsic susceptibility of errors occurring" which could have an effect on financial statements, before internal control has been taken into account (The principles and practice of auditing, 1992:57).
- Obtain an understanding of the accounting system and related controls: It is also necessary for the auditor to make a preliminary assessment of control risk. "Control risk is the risk that a material error which could occur will not be prevented or detected timeously by the internal controls." Information obtained in this regard will help the auditor to determine whether or not internal controls exist that could influence the accuracy of the financial statements. In instances where no or insufficient controls exist, the auditor must determine what types of errors could

occur. He must then make provision for the detection of these (The principles and practice of auditing, 1992:57-58).

- Formulate an audit approach: The audit approach constitutes the overall plan designed by the auditor to accomplish his primary objective, i.e. to express an opinion on the financial statements of an entity (The principles and practice of auditing, 1992:58).
- Study internal controls on which reliance is intended: If the auditor intends to rely on specific internal controls in order to achieve his audit objective, he should evaluate these controls. The auditor can do this by:
  - inquiring into the detailed working of the accounting system and its controls;
  - recording a description of the system;
  - confirming that the record is an accurate description of the system; and
  - making a preliminary evaluation of the internal controls (The principles and practice of auditing, 1992:58).

As a final stage of the planning phase the auditor prepares a written audit programme in which he stipulates the nature, timing and the type of audit procedures that are necessary to conduct the audit (The principles and practice of auditing, 1992:58).

5.1.3 Compliance and substantive procedures

Compliance procedures are used to prove that the controls on which the auditor relied during the audit, operated effectively. If it is found that the controls were functioning ineffectively, substantive procedures must be increased (The principles and practice of auditing, 1992:57-58).

5.1.4 Evaluating, concluding and reporting

During the final stage of the auditing process, the auditor determines whether he has obtained sufficient evidence to support the conclusions he has come to. The conclusions relate to whether the financial information of a company is presented fairly. These conclusions are included in the audit report (The principles and practice of auditing, 1992:59).

5.2 Different approaches to the auditing process

It is important to note at this point of the discussion, that Statement AU 015 (see Addendum A) acknowledges different approaches to the audit process. The Statement does however state that when the approach outlined in the statement, is followed, it should result in an effective audit being performed (The principles and practice of auditing, 1992:58).

Different approaches to the audit process include the following:

- Balance sheet approach
- Systems-based approach
- Transaction flow or cycle approach
- Risk-based approach (The principles and practice of auditing, 1992:59-66).

5.3 Common auditing activities

Activities common to all types of audit assignments include the following:

- Planning, control and supervision
- Fact finding, analysis and documentation
- Recommending
- Reporting (Flesher, 1996:253).

6. The auditing profession and the professional auditor

The most important role player in the auditing profession, is the professional auditor who earns this title, based on his qualifications and responsibilities.

6.1 Qualifications

In South Africa a "public accountant and auditor" is a person who is registered with the Public Accountants' and Auditors' Board (PAAB), after obtaining the professional qualifications as specified by the PAAB:

- a candidate must obtain a *degree, diploma or certificate* (as determined by the Board) from a university in South Africa
- the candidate must serve a *training contract* (for a period, five years or less, as determined by the Board)
- the university qualification and training contract are prerequisites for the *qualifying examination* conducted by the Board (The principles and practice of auditing, 1992:15,17).

When a candidate has obtained the above-mentioned university qualification, when he has served the training contract and has passed the qualifying examination, he gains entry into the auditing profession in South Africa (The principles and practice of auditing, 1992:15).

Besides the qualifications listed above, Puttick and Van Esch (The principles and practice of auditing, 1992:15-16) discuss a number of characteristics a good auditor should have as well as the type of personality suited to this profession. These will not be discussed in this dissertation.

6.2 The auditor's responsibilities

In his professional capacity as an auditor in South Africa, the auditor has a number of professional responsibilities. These are listed below:

6.2.1 Reports his opinion

The auditor must report his opinion of the financial or other statements "of any entity, whether profit-oriented or not, and irrespective of its size, or legal form..." (The principles and practice of auditing, 1992:24, 44). The report is always in written form and the types of statements the auditor investigates, depends on the subject of the audit.

6.2.2 Conducts the audit with due professional care and competence

The above requires the auditor to conduct and audit honestly and with the necessary care and skill regarding the subject matter. If this is not done, the auditor may be held liable for fraud and negligence.

6.2.3 Maintains an independent mental attitude

The auditor is often obliged to rely on information provided to him by others, especially if this information is obtained from an area beyond his expertise. In these instances the auditor must represent information in a way that does not advantage or disadvantage anyone (The principles and practice of auditing, 1992:26-27).

6.2.4 Reports on material irregularities

It is the duty of the auditor to report on material irregularities that exist or has taken place and which can lead or has already lead to financial loss. If the situation is not rectified within 30 days of the auditor having handed in the report, it is his duty to

report the situation to the Public Accountants' and Auditors' Board (The principles and practice of auditing, 1992:27).

6.2.5 Detects and reports illegal acts, other irregularities and errors

In April 1990, the South African Institute of Chartered Accountants issued Exposure Draft 80, defining various concepts and guidelines on the auditor's reporting responsibility (The principles and practice of auditing, 1992:28-29).

6.2.6 Registers with the PAAB (Public Accountants' and Auditors' Board)

The Act ensures that firms fulfil the training requirements set out by the PAAB and that the trainee has undergone the necessary tertiary education, as firms must register all training contracts with the PAAB. The Act also controls the number of trainees per firm. The PAAB maintains registers of the successful completion of contracts, cancellations of contracts and transfers of trainees (The principles and practice of auditing, 1992:32-33).

6.2.7 Adheres to code of conduct

It is expected of a professional auditor to conduct himself according to the code of conduct of the PAAB and therefore to conduct him-/herself in a manner befitting a member of the profession. The code lists a number of acts that are regarded as improper conduct (The principles and practice of auditing, 1992:33-34).

7. Auditing and accounting standards

Auditing standards are necessary to evaluate the performance of the auditor in terms of his implementation of his responsibilities (cf. paragraph 6). Before formal standards were set, the situation was such that every auditor could decide how to interpret his responsibilities. The result of this lack of standards was a wide range of individual interpretations ranging from very strict to casual interpretations (The principles and practice of auditing, 1992:34).

7.1 Auditing standards

The International Auditing Practices Committee is responsible for formulating international auditing standards. Members of the IAPC represent a broad geographical base (e.g. member countries include Australia, France, Canada and South Africa, to name just a few) and members represent different types of firms. The Committee has to reach consensus on an issue before accepting it (International Auditing Practices Committee, 1996).

The adherence of auditors to internationally recognised auditing standards has a number of advantages, e.g. it contributes to an increase in public confidence in their work and in the credibility of financial statements. In developing countries where auditors sometimes work in a free-enterprise system for the first time, they can use these standards as guidelines. A further advantage is more consistent handling of international financial transactions. This is important in light of a fast-growing global economy. The codification of the International Standards on Auditing and Related practices (ISAs) made it more user-friendly and accessible. The standards are arranged according to the way in which a typical audit is conducted. The standards provide general and specific guidance on auditing practices, starting at the planning phase and continuing through field work to conclusion and reporting (for a more detailed discussion of the phases of the auditing process, see paragraph 5). Other issues are also addressed, e.g. the responsibilities of management and the auditor with respect to financial statements and the audit itself; and guidelines for specialised areas such as computer information systems auditing (International Auditing Practices Committee, 1996).

The ISAs are dynamic in the sense that they are continually updated to ensure that it reflects current business and accounting trends (International Auditing Practices Committee, 1996).

7.2 Accounting standards

The International Federation of Accountants (IFAC) is responsible for developing "uniform professional and ethical standards and encourages national bodies of accountants world-wide to adhere to these standards so they may more effectively serve the public interest". The more than 60 technical pronouncements that have been issued by the IFAC cover almost all aspects relevant to the auditing profession. Care has been taken to ensure that the needs of those who are served by auditors are considered in the development of these pronouncements (IFAC, 1996a). The final pronouncement issued by the IFAC is available at a charge from their publication department. An overview of the pronouncements that have been issued is included as Addendum B.

Another body that is involved in the development of more uniform, internationally accepted standards on accounting and reporting, is the International Accounting Standards Committee (IASC). The efforts of the IASC are supported by the IFAC (IFAC, 1996a). Membership of IASC is the same as that of the IFAC and the Mutual Commitments into which these two bodies have entered, state that IASC "has full and complete autonomy in the setting and issue of International Accounting Standards" (Preface to statements of International Accounting Standards, 1996).

It is however, significant to take note of the fact that, in contrast to national accounting standards, neither the IASC nor the international accountancy profession has the power to enforce the International Accounting Standards. Similarly neither the IASC nor the accountancy profession can require compliance with International Accounting Standards (Preface to statements of International Accounting Standards, 1996). The researcher therefore comes to the conclusion that accountants from across the globe use the International Accounting Standards as guideline standards.

7.3 Quality control

In addition to auditing standards, auditing firms must implement quality control procedures to ensure effective audits. These quality control procedures are related to generally accepted auditing standards but differ from the latter in that quality control procedures focus on the organisational structure and performance of the entire firm. Auditing standards apply to each individual audit (The principles and practice of auditing, 1992:36).

7.3.1 The South African situation

Since adherence to international auditing and accounting are not mandatory, the researcher will look at specific issues when it comes to Quality control. These are relevant to the South African situation.

The South African Institute of Chartered Accountants lists nine elements of quality control that auditing firms should take into account when formulating quality control procedures and policies. All nine elements apply to all types of auditing firms but the manner in which each of the elements is implemented is determined by factors such as the size, organisational structure and services rendered by the firm (The principles and practice of auditing, 1992:37).

Each of the nine elements of quality control will be discussed briefly:

7.3.1.1 Independence

In terms of independence it is necessary to ensure that audit personnel do not have prohibited investments nor prohibited relationships with the firm's clientele. The independence principle should therefore form part of auditing firm staff policy (The principles and practice of auditing, 1992:37).

7.3.1.2 Recruitment

An auditing firm needs enough properly qualified personnel in order to function effectively and profitably. Staff requirements and hiring policies can form part of a manpower programme. The key to this is that "[staff] requirements at all levels of experience should be based on current clientele and anticipated growth, personnel turnover and promotion within the firm" (The principles and practice of auditing, 1992:37).

7.3.1.3 Professional development, training and advancement

The purpose of procedures and policies relating to professional development, training and advancement is to ensure that personnel are qualified to successfully perform the tasks allocated to and/or expected of them. These policies and procedures can also support the implementation and maintenance of a professional development programme, i.e. an orientation and ongoing education programme within the particular firm. This quality control procedure also relates to on-the-job training (The principles and practice of auditing, 1992:38).

7.3.1.4 Allocation of partners and staff to assignments

For each audit assignment, the firm must determine the number of staff members needed as well as the type of tasks they will have to perform. Each scenario then determines the allocation of staff members. "Assignment policies and procedures should [therefore] provide reasonable assurance that work will be performed by persons having adequate technical training and proficiency" (The principles and practice of auditing, 1992:38-39).

7.3.1.5 Planning, supervision and review

Continuing the reasoning from the discussion above, it is important for firms to have policies and procedures for planning, supervision and review. As is the case with the other elements discussed thus far, the policies and procedures mentioned here "provide reasonable ensurance that the work is performed to appropriate standards of quality" (The principles and practice of auditing, 1992:39).

7.3.1.6 Consultation

In instances where auditors encounter professional and/or technical problems during an audit, consultation procedures ensure that the staff will obtain the necessary assistance from internal and/or external experts (The principles and practice of auditing, 1992:39-40).

7.3.1.7 Acceptance and continuation of service to clients

An auditing firm must carefully select its clients. Policies and procedures can be laid down to protect a firm from clients who wilfully misrepresent their financial statements, or who are involved in illegal business transactions. For example: policies and procedures relating to the professional relationships of a firm will stipulate that a potential client's business reputation be investigated, or will confirm the firm's independence of a prospective client (The principles and practice of auditing, 1992:40).

7.3.1.8 Quality review

Quality review procedures ensure the availability of evidence of a firm's adherence to its policies and procedures regarding all aspects of quality control discussed above. Often large firms appoint a review team (made up of partners from different branch offices) to conduct a quality review of each office. This is done approximately once every three years (The principles and practice of auditing, 1992:41).

7.3.1.9 Communication

It is of the utmost importance to inform all the personnel of an auditing firm of its quality control policies and procedures. This can be done by means of a various methods of communication (The principles and practice of auditing, 1992:41).

7.3.2 The international scene

As far as Quality control on the international scene is concerned, a statement of policy "Assuring the quality of audit and related services" has also been issued by the IFAC (see Addendum B) (Final pronouncements issued by the IFAC, 1996).

8. Conclusion

Following a discussion on other types of audits (Chapter 3) and the information audit (Chapters 4 and 5), the researcher will investigate whether principles and characteristics of financial audits can be applied to the process of information auditing (Chapter 6).

CHAPTER 3: THE COMMUNICATION AUDIT, THE INFORMATION SYSTEMS AUDIT, INFORMATION MAPPING, THE INTELLIGENCE AUDIT AND THE KNOWLEDGE AUDIT

Chapter 3: Overview

The following part of this dissertation will focus on a number of terms and processes that have some connection to the process of information auditing, to a lesser or greater extent. These types of audits and processes are discussed with a view to indicating their applicability to designing an information audit methodology. Two terms that are often used as quasi synonyms for the term information audit, are the terms communication audit and information mapping. Not one of these two terms encompass the full meaning of an information audit, as will become clear from the following discussion.

The reasons for choosing the specific types of audits that will be discussed in this chapter are as follows:

- The communication audit because of its focus on organisational information flow patterns.
- Information mapping because of its focus on the identification and use of information resources;
- The information systems audit for its focus on the way in which technological tools are used to manage information resources (although implicitly);
- The knowledge audit: knowledge management (also referred to as strategic information management) is the "highest"/last level of information management (according to the evolution of information management functions) and therefore logically follows on information management and information auditing;
- The intelligence audit for its relationship with both information and knowledge management.

In the first section of this chapter the researcher will provide background information on the different types of audits (listed above) and the process of information mapping. In the second part of the chapter the researcher will discuss how the different types of audits are performed, i.e. the methodologies for these. The researcher will also classify the different types of audits according to the classification system of Ellis et al (cf. Chapter 2, paragraph 4), i.e. as either advisory or compliance audits.

1. Introduction

In the next section of this chapter, the researcher will provide background information on the different types of audits to be discussed and will also define key concepts that will be used during the discussion.

1.1 Communication audit

A related concept to that of the information audit is the communication audit. The two concepts are often regarded as identical (i.e. synonyms) or quasi synonyms. In the second part of this chapter the researcher will explain that the term communication audit does not encompass the full meaning of the information audit.

The term communication audit is a generic term that was used for the first time during the 1950s to describe a number of systems/strategies that were used to investigate the communication effectiveness in organisations. According to Downs (1987:43) communication audit methodologies were developed by following the examples of financial audit methodologies.

Attempting a definition of the concept communication audit is difficult because the concept has been used as an umbrella term for a variety of applications in different situations (Ellis et al, 1993:143). For example: Hamilton (1987:3) defines a communication audit as an objective report of the communication situation in an organisation. This audit report can be used by top management to implement improvements, e.g. to improve the flow of communication in the organisation. Ellis et al (1993:142,143) define a communication audit as a procedure whereby the state of communications in an organisation is investigated according to a set of criteria, or where the mutual understanding between the parties involved, is evaluated. Cortez & Bunge (1987:41) provide a more comprehensive definition of communication auditing. They describe a communication audit as a process whereby facts are collected, analysed and interpreted, resulting in the presentation of a report that reflects the communication philosophy, structure, practices and flow in an organisation. The researcher will use this definition as a working definition of a communication audit in this dissertation.

Different types of communication audits have different purposes. The "general" purpose of a communication audit is to compile a knowledge base on organisational communication in order to identify and neutralise communication problems (Ellis et al, 1993:142). The communication audit is also concerned with the organisational and sociological aspects of information flow (Buchanan & Gibb, 1998:34).

The different approaches to communication audits include a broad spectrum of activities that could include one or more of the following:

- assessing the effectiveness of the introduction of information technology into an organisation;
- assessing interpersonal communication;
- evaluating management/employee communications;
- evaluating the effectiveness of organisational communications;
- assessing public relations activity (Ellis et al, 1993:143).

Communication audits can be performed for a variety of reasons, e.g.:

- prior to organisational/departmental restructuring;
- when planning to acquire new telecommunications technology with a view to satisfying communication needs;
- for a functional purpose: it is a fact that effective communication serves as a motivating factor (Ellis et al, 1993:142).

1.2 Information mapping

In the literature, the researcher found different descriptions of the process of information mapping. This is because information mapping is currently being used in different environments for different purposes. In the next section of this chapter, the researcher will discuss the differences between the various applications.

1.2.1 Fields; Chance

Two authors, i.e. Fields (1981:155-161) and Chance (1993:237-239), discuss the method of information mapping as developed by Horn.

During the early 1970s Robert Horn developed the American programmed instructional system, also known as information mapping. It is described as a research-based method that is used for analysing, organising and visually presenting information (Chance, 1993:237).

Horn himself defines this form of information mapping is as "a set of rules and procedures for writing, organizing and displaying information about a subject". It involves the categorisation of information according to a classification scheme and then "assigning each chunk of information into labelled blocks. The order and format

in which these blocks are displayed is then geared towards making learning easier and information retrieval more efficient" (Fields, 1981:155).

The major application of this specific form of information mapping as a linear programmed instruction system; a secondary application is as a system for the classification of information; and in line with this, also as an information retrieval system (Fields, 1981:155).

As a programmed instructional system, information mapping can be applied in support of different student levels of knowledge and information needs, e.g.:

- For initial learning
- For the naive student.
- For the sophisticated student
- Relearning
- Review (a quick overview)
- Reference use (Fields, 1981:157).

Information mapping has a number of objectives. These objectives are mainly focused upon making specific processes easier and quicker. These processes include:

- Learning and reference work (e.g. For books).
- The preparation of learning and reference materials (e.g. Computer-aided instruction and hypertext).
- The development of cost-effective procedures for designing and maintaining (e.g. updating) training and reference materials (Fields, 1981:155).

Throughout the years the application of this form of information mapping has evolved and examples of other subject areas where information mapping has been applied range from accounting to arithmetic, cognitive development, educational programmes and media courses to nursing and history (Fields, 1981:159). Chance (1993:237-239) discusses the application of information mapping as a means of determining the usability of online information retrieval systems. This is done by focusing on the content of these systems.

There is however, another school of thought that ignores the application of information mapping as a teaching device related to programmed instruction, but who views it as an alternative method to conventional prose for the purpose of communicating information. According to this school of thought information mapping is defined as "...a set of rules and procedures for writing, organizing and displaying information on a subject" and "...the structured writing facility of information mapping may be of value in the classification and retrieval of information" (Fields, 1981:160).

According to the researcher, Horn's approach to information mapping cannot be classified as an audit.

1.2.2 Burk & Horton

Burk & Horton developed the method of Infomapping as a method for identifying tangible information resources in organisations (Underwood, 1994:59). The methodology of Infomapping as described by Burk & Horton (1988:24) focuses on the use of maps to illustrate the fundamental relationships between items, places, etc. The information map (infomap) can therefore be used to give a visual presentation of the information resource entities in an organisation, and the relationships between these entities[1].

[1] An information resource entity is defined as a configuration of people, things, information, energy and other forms of input that have the ability to create, collect, store, provide, process and/or disseminate information (Burk & Horton, 1988:21).

1.2.3 Underwood

Underwood (1994:59-64) develops a soft-systems approach to Infomapping for which he uses Burk & Horton's method of Infomapping as foundation.

According to Underwood (1994:59) the method of Infomapping supports the information manager in compiling an inventory of organisational information resources and subsequently, a profile of each of these resources. This overview of the organisational information situation, helps in the identification of gaps in the information collection, areas where duplication take place, outdated information resources, to name just a few.

Underwood (1994:59) stresses that the effectiveness of Infomapping and the results thereof, depend on the accuracy with which the information users give their opinions of the organisational information situation. It should be noted, however, that the question as to *how* the information is used is not answered through the application of this technique. A lack of information about the context within which information is used, can hamper the information manager in analysing the results of Infomapping. The soft-systems method is proposed as an alternative (for a full discussion of this, refer to paragraph 2.2.3).

1.2.4 Best

Best (1985:79) provides yet another description of the process of information mapping. According to this author, an information map is used to construct an overview (model) of the way in which an organisation functions and how it uses information. This model, i.e. the information map must take into account the aims of top management in terms of cost-saving, increasing profit, and improving organisational efficiency. The model should also make provision for indicating whether or not corporate policy and goals are being met.

Best's description of information mapping is that it is diagnostic and evaluative and therefore it can be classified as an advisory audit, with elements of a compliance audit (i.e. where it is determined whether corporate policy and goals are being met).

Best's (1985:78-94) approach differs from that of Burk & Horton in that Best regards information mapping as a technique/tool that can be used to support the implementation of information technology in organisations. In contrast, Burk & Horton's method of "Infomapping" concentrates on the identification and location of all corporate information resources – not only information technology.

1.2.5 Cousins

Cousins, as Best, suggest the use of information mapping when introducing new technology into an organisation. The introduction of technology into an organisation creates complex management and development problems and information mapping is suggested as a solution to these problems (Cousins, 1981:46).

1.2.6 Posch

A problem that is common to many organisations nowadays, is the lack of communication between information professionals, on the one hand, and staff and management, on the other. Posch (1992:56) regards information maps as tools to facilitate communication regarding the information environment in an organisation.

Posch (1992:56) defines information mapping as consisting of diagrams about an organisation's information resources. The information maps are used to describe the corporate information resources, i.e. "those assets used directly to manage an organization's resources". The information maps are also useful for illustrating the relationships between the information resources, their characteristics and their role in the organisation.

1.3 Information systems audit

From 1950 onward computers were introduced in many companies, including accounting firms. The technology replaced well-established paper-based systems. The most common type of data that were stored on Electronic Data Processing (EDP) systems, as they were originally known, was accounting data, such as ledgers and journals (Flesher, 1996:647).

In response to these developments the information systems audit was developed. The term information systems audit is defined as follows: any audit that is used to focus on all aspects (or selected parts) of automated information processing systems and to evaluate these. Information systems audits do not focus solely on automated systems – manual processes and systems and the interfaces between automated and manual systems are also investigated (EDP auditors, 1987:2). Flesher (1996:249) adds to this definition: "Information systems audits involve everything from the initial conversion to an electronic system to applications of specific software programs."

Information systems auditors investigate and evaluate the development, maintenance and functioning of components of automated systems (or of entire systems) as well as the interfaces between various types of systems in an organisation (EDP auditors, 1987:2).

Nowadays, EDP auditing is more commonly referred to as information systems auditing. This auditing speciality is changing rapidly – the result of the continual development of information technology and other technologies that result in little or no human intervention in some procedures (Flesher, 1996:648). It is important that internal auditors have some understanding of information systems. The term *information systems* as used in this context, can vaguely be defined as systems where accounting systems are embedded (Flesher, 1996: 648). A lack of generally-accepted definitions of concepts such as "systems, information and subsystems" are still regarded as a drawback within the field of information systems auditing, especially when looked at from an educational perspective and when developing information systems audit theory (Flesher, 1996:651).

Information systems auditing is very close in its definition to that of the information audit (as it is defined in Chapter 4, paragraph 2). In contrast to the information audit, information systems auditing is one-sided and limited to focusing mainly, though not exclusively, on automated information processing systems. This interpretation by the researcher is supported by the following quotation from Wysong (Information systems auditing, 1983:v): "Our challenge as auditors in the EDP environment is to control where technology is taking us and to see that systems are built to take advantage of the potential benefits of the technology..."

One can therefore conclude that information systems audits are usually performed in environments where the main focus is on electronic data processing and/or the systems used for these processes as well as specialised information systems – where accounting systems are embedded.. In Chapter 4 it will become clear that the term information audit is used to describe a much more encompassing process where the focus is firstly on information (and information content) and secondly on the role that information plays in the organisation as a whole.

1.4 Knowledge audit

Contrary to popular opinion, knowledge management is not a new concept. Ponelis & Fairer-Wessels (1998:1) quote Horton who indicated in 1979 already, in his evolution of resource management functions, that the management of knowledge originated during the 1980s in the form of expert systems and artificial intelligence.

The concepts *knowledge* and *knowledge management* will be defined, before the researcher defines the knowledge audit. The abstract nature of both these concepts make it extremely difficult to define.

Knowledge is that which is internalised within the human mind. It "is formulated in the minds of individuals through experience" and is subjective by nature. Knowledge is the product of adding value to information (which in turn is the product of adding value to data) (Ponelis & Fairer-Wessels, 1998:2-3).

Knowledge management focuses firstly on the identification of knowledge needs and knowledge assets, as well as the identification of knowledge problems and opportunities; and secondly, on the implementation of knowledge management strategies and solutions (Ponelis & Fairer-Wessels, 1998:5).

According to Kirrane (1999) the scope of knowledge management activities include the creation, discovery, buying (or borrowing), distribution, capture, retrieval, measurement and updating of knowledge. One of the tools available to the manager responsible for organisational knowledge management, is the knowledge audit that is used to collect information on the state of knowledge in an organisation.

1.5 Intelligence audit

Another "level" of information auditing that has recently been under discussion is the so-called *intelligence audit*. The researcher will give a brief overview of two different interpretations of the intelligence audit.

According to Jurek (1997:42) the purpose of an intelligence audit is to identify corporate experts within an organisation, as well as other existing sources of knowledge. The ultimate goal of an intelligence audit is to compile a database of expertise available in the organisation, as compared to a database compiled according to departments. This database will serve as a one-stop source of information that will be very useful when, for example, having to identify members for a research project team.

When looking at Kirrane's description of the scope of the knowledge audit (paragraph 2.4) the researcher concludes that the intelligence audit as defined by Jurek could be regarded as a component of the knowledge audit, rather than as an audit in full right.

Another, different interpretation of the intelligence audit is provided by Fuld (1991) and will be discussed in more detail at the end of this chapter (paragraph 2.5).

2. The different types of audits: Methodologies

The different types of audits that were listed at the beginning of this chapter and defined in the first part of this chapter, will subsequently be discussed in more detail by focusing on specific methodologies that are used when performing these.

2.1 Communication audit

The process of communication cannot be separated from information. The purpose of communication is the dissemination of information. Few of the authors' works that have been studied refer to the information component when discussing communication auditing. Hunn & Meisel (1991:56), however, focus strongly on information as one of the focus areas of a communication audit by stating that a "[communication audit] records the flow of information through an entire organization or sub-unit."

From the above discussion it becomes clear that it is difficult to define the boundaries of the communication audit. Buchanan & Gibb (1998:34) describe the information audit as being subsumed by the communication audit. The researcher disagrees with this statement as a communication audit focuses only on information flows (as far as information is concerned) and not on identifying and evaluating information resources. Information flow is therefore only one component that should be investigated during an information audit. The researcher comes to the conclusion that an information audit is more encompassing than a communication audit when it comes to investigating the information environment.

In the next section of the discussion, the researcher will give an overview of three different communication audit methodologies.

2.1.1 Cortez & Bunge

The phases that Cortez & Bunge suggest be included in a communication audit are similar to those discussed by Stanat for inclusion in an information audit (refer to Chapter 5, paragraph 3.15 for a detailed discussion of information audit methodology as proposed by Stanat). The communication audit methodology as discussed by Cortez & Bunge (1987:45-59) consists of the following phases:

Phase 1: Planning

Determine the purpose and scope of the audit, formulate goals, identify focus areas and determine the general approach to be followed. Draw up a time schedule stating when each of the different phases must be completed.

Phase 2: Compile an inventory of communication items

Collect information about organisational communication items, communication programmes, communication channels, etc., as determined by the scope of the audit. One of the purposes of the communication audit is to give as complete a description as possible of the way in which communication takes place in an organisation. (When applying this phase to information auditing, one would have to provide a complete description of the information life cycle within an organisation.)

Phase 3: Collect information from management

The scope of the audit, as determined during the planning phase, will determine which members of management will be involved in the communication audit to provide information on organisational communication processes, procedures and tools. The auditor can identify members of management who should participate by looking at management responsibility for specific functional areas in the organisation, as well as management responsibility for specific communication functions.

The main purpose of this phase is to collect information pertaining to management's beliefs and attitudes towards the organisational communication function; individual communication styles; key messages distributed by members of management; as well as problem areas identified by them. The researcher regards the identification of key messages that are distributed by management as crucial in terms of the information content of these.

Phase 4: Collect information from staff

It is also very important to collect information from staff, as they are the ones who are influenced by the way in which communication is managed in the organisation. During this specific phase the auditor should identify staff members who will be interviewed or who will be asked to fill out questionnaires. Determine the method that will be used for collecting information, e.g. questionnaires and/or interviews. The auditor should also decide whether all staff members will be involved in the collecting of information or whether only selected staff members will be involved, as determined by sampling. Once a first round of interviews has been conducted, or a number of questionnaires have been sent out, the auditor might obtain important new information. The auditor can then conduct a second round of interviews or send out more questionnaires, as a way of following up on this information and obtaining more detailed information.

Phase 5: Analyse the identified communication items

Analyse the inventory of communication items (as identified during phase 2) and add to these the additional items that were identified during phases 3 and 4. Evaluate these items according to the goals of the audit and the focus areas that were identified during phase 1.

Phase 6: Tabulate, summarise and interpret the data

This phase of the communication audit can be problematic, especially if staff from within the organisation performs the audit. In most instances, staff members do not have the qualifications that enable them to interpret statistical data accurately. Another problem that arises from organisational staff having to interpret the data, is their lack of objectivity. Confidentiality is another potential problem, especially if staff members' names are indicated in the data that has been collected.

It is important that the collected data be analysed and interpreted according to the goals and focus areas that had been identified during the Planning phase (1).

Phase 7: Write the report

The writing of the final report should not present any problems to the auditors, especially if phases 1 (Planning), 5 (Analysis) and 6 (Interpretation) have been performed properly. During the planning phase the expected results of the audit should have been spelt out and sufficient time should have been planned for so as to enable the audit team members to analyse the collected data, to have meetings, to compile preliminary reports, to circulate these for comment.

Phase 8: Inform the staff of the organisation

It is of the utmost importance that the staff members of the organisation are informed of the results of the audit. They were involved in the process by having to give of their working time to provide information. Cortez & Bunge (1987:58) stress the importance of focusing on positive results in the final report, as well as areas where positive improvement can take place. The full report need not be presented to the staff of the organisation. It has been found that the dissemination of the audit results have a bigger impact when it is presented in a summarised format, focusing only on the most important findings than when they are presented with the full report. Staff should also be informed about possible developments and plans for follow-up procedures.

Phase 9: Follow-up

The results and recommendations of the communication audit must be implemented, otherwise the exercise is useless and a waste of time and money. In order to ensure effective implementation, it is suggested that the implementation process be properly monitored.

The researcher comes to the conclusion that the phases that make up this methodology, as described by Cortez & Bunge, can be used successfully for performing an information audit – it is as simple as replacing the term *communication* with the term *information*. When this methodology is used for conducting an information audit the researcher also suggests that more emphasis be placed on information content.

This specific methodology is an example of an advisory audit because it has a strong diagnostic component: the appropriateness of communication systems and channels are evaluated and the staff members are informed of the findings of the audit.

2.1.2 Downs

The communication audit methodology that is proposed by Downs shows many similarities to the methodologies that will be discussed in this chapter. This supports the claim by Hamilton (1993:75) that the principles of an audit stay basically the same and that only the techniques and methods that are used are different for different types of audits.

The communication audit methodology as proposed by Downs (1988:11-49) consists of four phases. The researcher reckons that basic elements of this methodology can be used as a basis to designing an information audit methodology. Downs' methodology differs from some of the other methodologies that will be discussed in that Downs does not make provision for staff from within the organisation to perform the audit. His methodology only allows for auditors from an external auditing firm, to perform the organisational communication audit, the reason being that "[a]nyone can collect information about communication in the organization, but it takes persons with professional expertise and insights to make practical sense of that information – to identify strengths and weaknesses" (Downs, 1988:8).

Phase 1: Initiation

The need for an audit is verbalised. Permission needs to be obtained from management to perform a communication audit. The scope of the audit is determined. The auditors are informed about the way in which the organisation functions, and are provided with

information about the organisational culture, policies, etc. The auditors, in turn, inform management about the audit procedures that they are planning to use.

Phase 2: Planning

Provision is made for financial resources that might be needed; the nature of the final report is discussed and specified; the auditors determine and specify how they will be working in conjunction with the staff of the organisation. The auditors also identify focus areas and select their auditing instruments and tools. The staff members who will participate in the audit, are selected, they are informed of their involvement and appointments are made with them. The staff members are informed of the audit that will be performed and subsequently the auditors make the final preparations.

Phase 3: Identification of a focus area for the audit

According to Downs, an audit should focus on the most important elements in an organisation, e.g. staff involved in different positions, on different post levels; the structuring of the staff; the way in which the staff function as an integrated network; the communication channels that are used and the types of information that are shared. Downs discusses eleven broad guidelines that can be used to guide the auditing process. These include, amongst others: an investigation of the direction(s) of information flow; an investigation of the relationships between information (communication) and task performance; an investigation of the quality of communication relationships, etc.

Phase 4: Conduct interviews

Downs suggests the use of any appropriate instrument for gathering information. The two most basic auditing tools that are discussed by him, are the interview and the questionnaire.

As is the case with the method for Infomapping, as described by Burk & Horton, the communication audit methodology of Downs does not provide for the writing of a final report or for any follow-up procedures. The researcher identifies this as a limitation of the methodology. The methodology should not be dismissed because of its limitations. The basic elements that are included in this methodology can be used as guidelines when developing an information audit methodology. The researcher classifies this specific communication audit methodology as an example of an advisory audit. The reasons for this are that the methodology has a strong diagnostic component by focusing on different elements of organisational communication processes and systems.

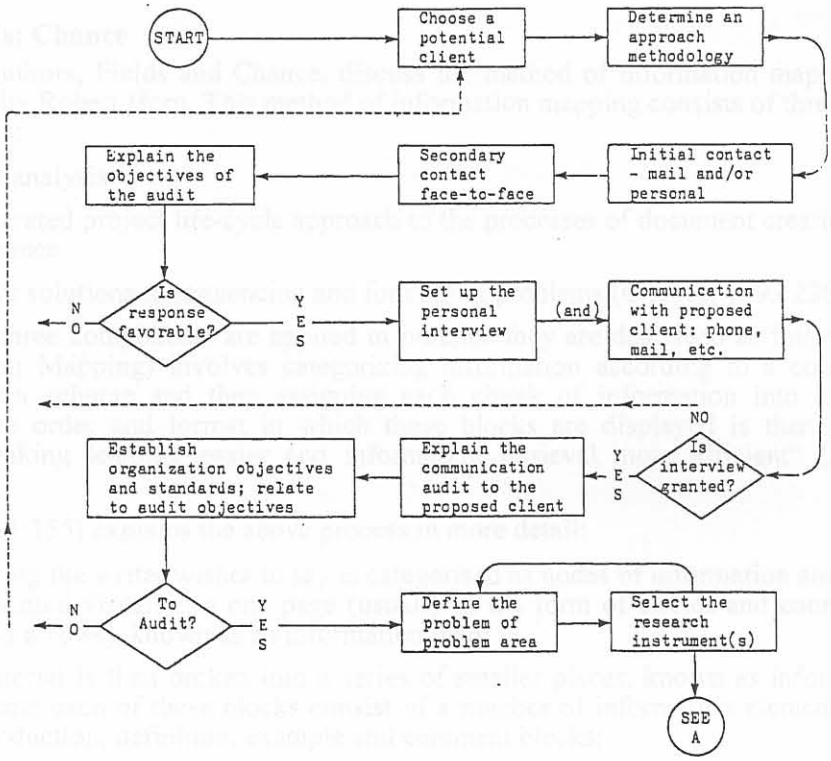
2.1.3 Ferguson & Ferguson

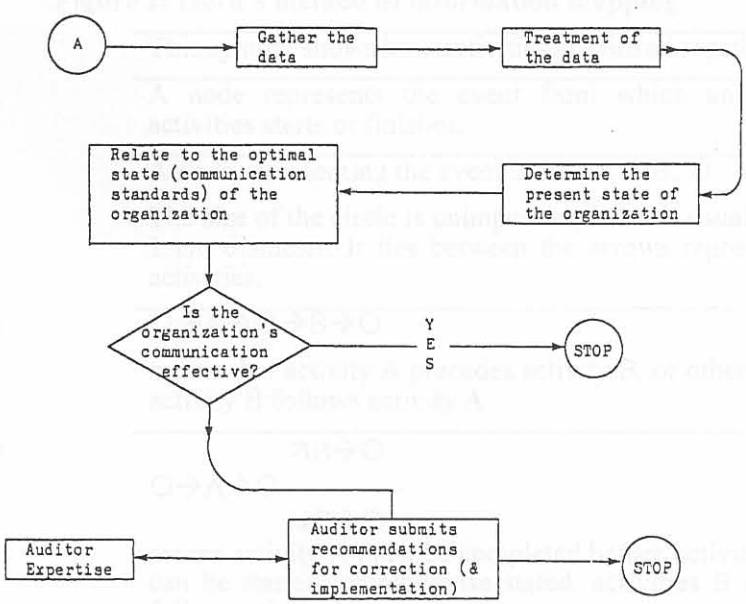
The methodology for a communication audit as proposed by Ferguson & Ferguson (Organizational communication, 1989:578-579) is flexible in the sense that it allows for different scopes. The methodology is presented in the form of a flowchart which makes different implementation options possible – depending on the answers that are provided to the different questions. For example: if at the end of the audit, it is determined that the communication in the organisation is effective, a proposal can be made that the audit be completed at this point. In the instance where it is determined that organisational communication is ineffective, there is an automatic progression to the next step during which proposals are made for corrective action (cf. Figure 1).

The researcher identifies a limitation to this methodology. This limitation is similar to the one identified for Burk & Horton's Infomapping methodology, i.e. that no provision is made for the implementation of the proposals that were made during the last phase of the communication audit. The advantage of this methodology is the visual presentation thereof – this should facilitate the way in which the audit is performed.

The communication audit methodology as discussed by Ferguson & Ferguson is yet another example of an advisory audit because it is used to evaluate the effectiveness of organisational communication.

Figure 1 : Schematic of communication audit





(Organizational communication, 1989:578-579)

2.2 Information mapping

In the next section of the discussion the researcher will focus on different approaches to information mapping, as discussed in the literature.

2.2.1 Fields; Chance

Both the authors, Fields and Chance, discuss the method of information mapping as developed by Robert Horn. This method of information mapping consists of three main components:

- Content analysis.
- An integrated project life-cycle approach to the processes of document creation and maintenance.
- Effective solutions to sequencing and formatting problems (Chance, 1993:238).

When the three components are applied in practice they are described as follows: "It (Information Mapping) involves categorizing information according to a consistent classification scheme and then assigning each chunk of information into labelled blocks. The order and format in which these blocks are displayed is then geared towards making learning easier and information retrieval more efficient" (Fields, 1981:155).

Fields (1981:155) explains the above process in more detail:

- Everything the writer wishes to say is categorised as nodes of information and these are presented visually on one page (usually in the form of circles and connecting lines and arrows), known as an information map;
- The material is then broken into a series of smaller pieces, known as information blocks and each of these blocks consist of a number of information elements, e.g. the introduction, definition, example and comment blocks;
- The information blocks are arranged in a standardized sequence.

The process is visually illustrated in Figure 2.

Figure 2: Horn's method of information mapping

Introduction	This symbol shows how activities are linked together.
Definition	A node represents the event from which an activity or activities starts or finishes.
Notation	A node representing the event is shown thus: O The size of the circle is unimportant, but it is usually about ½-1 cm diameter. It lies between the arrows representing two activities.
Example one	O→A→O→B→O means that activity A precedes activity B, or otherwise stated, activity B follows activity A.
Example two	↗B→O O→A→O ↘C→O means activity A must be completed before activities B and C can be started, or otherwise stated, activities B and C must follow activity A.

(Excerpted from Fields, 1981:156)

From the above description it becomes clear that information mapping aids writers in conducting a proper analysis of information content; and the management of complex and appropriate subject matter (Chance, 1993:238).

The key components of the information mapping method are:

- Seven information types: procedure, process, structure, concept, fact, classification, principle.
- Seven information principles: chunking, labelling, relevance, consistency, integrated graphics, hierarchy, accessible detail.
- Two units of information: map, block (Chance, 1993:238).[2]

The researcher comes to the conclusion that the methods of information mapping that were developed in analogy with the original method as developed by Horn, are aimed at making information content available on a micrographic level. An example of this is where the method is used to focus on content detail such as is the case with classifying information found in course material and the mapping of book indexes. The researcher regards this method as too focused to be applied to information auditing where information content is taken into account but not in terms of specific detail as is done with Horn's method of information mapping.

Horn's method of information mapping is not used to examine and/or verify any specific thing and therefore cannot be classified as either an advisory or compliance audit.

2.2.2 Burk & Horton

The process of Infomapping as described by Burk & Horton shows many similarities with the process of information auditing as described by Stanat (refer to Chapter 5, paragraph 3.15 for a detailed discussion of the methodology as described by Stanat). On the other hand, Burk & Horton's methodology differs from the information systems audit (where the main focus is on automated accounting systems) in that Burk & Horton use Infomapping as a method to identify corporate information resources, whether these are technological or not. The results of the infomap are used to promote the optimal use of information as an organisational resource. Once again therefore, there is not an exclusive focus on information technology, although the implementation of information technology can support the optimisation of the use of information as a resource. It is interesting to note that Burk & Horton are the only authors who stress that their method of Infomapping be performed from a proper understanding and grasp of the concept of information management (Burk & Horton, 1988:13). Conducting an organisational Infomapping exercise will therefore create and stimulate organisational awareness of the importance of information (resources) management (Buchanan & Gibb, 1998:38).

The researcher will consequently provide a summary of the process of Infomapping, as proposed by Burk & Horton (1988:32-175).

Phase 1: Compile a preliminary information resource inventory

During this phase, reference is made to the information resource inventory as a *preliminary* one, seeing as the real corporate information resources can only be identified upon completion of all four phases of the Infomapping process.

As is the case when wanting to perform any type of investigation (or audit) in an organisation, it is of the utmost importance to obtain the permission and support of top management before embarking on the exercise. After permission has been obtained, the purpose and scope of the audit (or infomap) can be determined. Factors that should be taken into account when making such a decision include, amongst other things, the current knowledge base regarding the information resources in the organisation; the size and structural complexity of the organisation (e.g. whether there are branch

[2] Information Mapping as described here by Chance (1993:237-239) is a trademark of Information Mapping Inc.

offices); the way in which information is currently used for planning and management purposes.

The next step would be to develop an instrument that can be used to collect the needed information, e.g. a questionnaire. Burk & Horton suggest the use of a classification scheme during the process of collecting the information. According to their proposed classification scheme, the identified information resource entities (i.e. potential information resources) are classified as sources, systems or services, or a combination of these. (The categories are not exclusive.) Based on this classification scheme, sub-categories can be identified, if necessary, e.g. internal and external information resource entities; manual or automated information resource entities. The classification is done based on the information that is collected about each information resource entity and by focusing on the specific context within which the information resource entity is used as well as how the use and value of the entity is perceived by the users and managers thereof.

It is important the person responsible for identifying and discovering organisational information resources, be on the lookout for so-called "hidden" information resource entities, i.e. information resource entities with potential value that staff members are not using or not even aware of. Information that is collected about so-called "hidden" information resource entities should be handled with care as it may be of a confidential nature or sensitive information that is used to provide the organisation with a competitive edge, in which case there are reasons for the information resource entity being "hidden".

Phase 2: Determine the cost and value of the information resource entities

The process whereby the cost and value of information resources/products are determined has been and still is a very controversial subject. Burk & Horton suggest the determination of the "relative" value of the identified information resource entities, as well as the calculation of the cost of these. The information gained in this way is also used to determine whether the information resource entities are being used in a cost-effective manner within the organisation. The researcher will not discuss these formulas and methods in detail, nor will she evaluate these or their usefulness. This is a topic for further research as will also be discussed in Chapter 4.

Burk & Horton suggest that one starts by calculating the cost of the identified information entities. Three guidelines apply:

- Identify the elements of cost to be considered.
- Determine objective(s) for costing, e.g. operating costs, total investment to date, etc.
- Decide on a method for measuring cost, e.g. direct costing, standard costing, life-cycle costing, cost estimating, etc.

It is also important to identify unnecessary and excess costs.

Following on the phase during which the cost of the information entities is calculated, the value of the information entities needs to be determined. Firstly, the nature of values to be investigated must be identified. Thereafter the information entities must be compared with one another and must subsequently be ranked in terms of their overall value to the organisation. The following three ratings should be taken into account before doing the ranking:

- Rate effectiveness (i.e. the measure of effectiveness with which the information entity supports the activity/activities intended);
- Strategic role of the information entity (i.e. the strategic importance of the information entity in terms of the activity/activities it is supposed to support);
- Strategic role of the activity (i.e. the strategic importance of the activity supported by the information entity).

The value-added model as developed by Taylor (1986) can also be used to determine the value of information entities.

For the last component of this phase, Burk & Horton start from the principle of information (resources) management that states that it is very important to relate cost

to value. To do this with the identified information entities, the ranked information entities are taken and categorised according to value indexes, ranging from high, to medium, to low, to nil value levels.

Phase 3: Analysis

During this third phase the actual infomapping is done. The first step of this phase is to determine according to which goals the analysis should be performed.[3] The goals guide the process of analysis.

Burk & Horton suggest the use of three basic analytical processes. The first consists of the compilation of a matrix to indicate the location of the information resource entities within the organisation, in relation to the users, functionaries (handlers and/or suppliers) and managers of these entities. The information can be combined in one matrix, or alternatively, a matrix can be compiled for each of the groups, i.e. one for the users, another for the functionaries and a third one for the managers (see Addendum C for an example of a user matrix). The second analytical process involves the visual presentation (mapping) of all the identified information resource entities on one sheet of paper. The third analytical process involves the visual presentation of all the identified information resource entities in terms of their financial aspects, i.e. value and costs.

Following on the compilation of the different maps, the information needs to be analysed. Burk & Horton suggest different methods for analysis. For example: one can look at the way in which the information resource entities are distributed throughout the organisation, and compare this with the distribution of the users, functionaries and managers thereof. The purpose of this method of analysis is to evaluate whether, if at all, and how effectively the information resource entities are being used as corporate resources. The source by Burk & Horton (1988:123-137) can be consulted for more detailed guidelines as to what critical factors should be taken into account during the process of analysing the different matrixes.

The mapping process was briefly mentioned as part of the second analytical method. The identified information resource entities are plotted on an information map (preferably on one sheet of paper), according to their characteristics, as became clear during the analytical process. The axes of the information map represent function, conduit, content and holdings, respectively (see Addendum D for an example of an information map). When plotting the information resource entities, each one must be scrutinised and answers must be found in order to determine the location on the infomap, e.g. is the entity more function-oriented as compared to being content-oriented. The infomap can be used for various purposes, e.g. to give an overview of the information resource entities in the organisation and by giving an overview, allowing one to identify areas where duplication take place, areas where gaps exist as well as areas of potential co-operation.

Phase 4: Synthesis

During this phase, all the information that was collected during the first three phases, are synthesised and consolidated. The corporate information resources are also identified. The phase of synthesis concentrates on three aspects of the information resource entities, i.e. the nature of the entities, their value and cost as well as their various strong and weak points. The result of the synthesis is a complete knowledge basis of all the information resources in the organisation. Burk & Horton (1988:175) describe the result as follows: "... after all four Steps had been completed, the overall result was a reconnaissance map of previously uncharted terrain – the first of its kind – providing a bird's eye view of your corporate information resources, their identification, location, nature and strategic significance".

The researcher comes to the conclusion that there are limitations to Burk & Horton's methodology of Infomapping. One limitation is that the process as described by them, does not allow one to make pertinent proposals regarding the improvement of information practices in the organisation, nor does it allow for proposals for future action plans. In all the communication audits that were studied (of which the one of

[3] In Stanat's methodology for performing an information audit, she suggests that these goals be determined during the first (planning) phase, in accordance with organisational policy and goals.

Cortez is regarded as being the most comprehensive of these), as well as the majority of information audit methodologies (as discussed in Chapter 5), one of the most important parts of the audit, if not the most important, is the proposals that are made in the final report, as well as a plan/schedule for the implementation of these proposals. (These characteristics are also integral to other types of audits, e.g. the financial audit.) To the researcher it seems like a futile exercise to build up a knowledge base of the information environment within an organisation and not to put the information to any use. The time, money and staff that were invested in an audit (or infomap, for that matter) should be used to the advantage of the organisation. As a fifth phase of Burk & Horton's methodology for infomapping the researcher would like to add a phase during which a final report is prepared with the results of the exercise and with a view to the future, i.e. proposals for improvement/development and the implementation of these.

Buchanan & Gibb (1998:38) identify Burk & Horton's method of infomapping as "...the most comprehensive method available for identifying and defining an organisation's information resources." Information management practices and policies are investigated and problems and opportunities are identified. A limitation to the methodology is the lack of investigation of the organisational environment (in terms of the policies and objectives). Although the cost and value of information resources are determined, the methods used are crude and only provide rough estimates. Furthermore it is a time-consuming and expensive process.

Burk & Horton's method of Infomapping cannot be classified as an audit because it is only an intensive discovery process. Some components of this methodology, i.e. elements of phases 2, 3 and 4 can be regarded as examples of elements of a typical advisory audit (according to the classification of Ellis et al). This is because elements of these phases focus on the valuing of the information resources – this is diagnostic, with the further aim of evaluating the effectiveness and value thereof.

- Infomapper software

During the early 1990s, F.W. Horton Jr. was involved in the development of an expert system called InfoMapper®, to assist information managers in applying the technique of infomapping in their organisation (Expert system, 1992:81). It is a database-oriented system that allows for the identification and classification of organisational information resources by means of inventorying and also for the compilation of different types of reports. The software program met with varying degrees of enthusiasm. It was, for example, harshly criticised by Barclay & Oppenheim (1994:31-42). Horton himself reacted to this in an article published in 1994 wherein he defended the product and its application (Horton, 1994:117-120). For a full description of InfoMapper, the article by Hayes (1992:9-11) applies.

2.2.3 Underwood

Underwood (1994:61) points out that various techniques have been used in conducting information audits, one of which is the technique of information mapping. Probably the best-known discussion of this technique is the one by Burk and Horton (1988) and summarized by Horton in a series of articles (Horton, 1988:249-254; 1989a:19-24; 1989b:91-95).

It is suggested that the term *information mapping* "has arisen from the study of methods of managing information resources that place particular emphasis on linking the effectiveness of management with the acquisition and use of information." According to a number of authors, the main advantage resulting from this technique is that one is able to obtain a general/broad overview of the information environment in an organisation (Underwood, 1994:61).

Underwood (1994:61) points out that, contrary to popular belief, the graphical presentation of results is not an essential component of the technique of information mapping. The concept of "mapping" should be seen as locating an information resource in an organisation "by reference to a set of coordinates based upon some conceptual model." There is an obvious analogy to cartography, where a graphical map is drawn, using sets of coordinates. In terms of information mapping, the information can remain in the form of lists of descriptions, associated with coordinates. The

drawing of an information map need not be done, especially if the purpose of the exercise is only to compile a list of organisational resources and their locations. There are obvious advantages to using a graphical map, e.g. the reinforcement of textual information through graphical presentation, is said to "add another dimension of meaning". The eye and brain are encouraged to form new associations and/or interpretations (Underwood, 1994:61).

The success of a mapping exercise depends to a large extent, on the choice of a framework of coordinates, as this determines the focus with which the map will be studied (Underwood, 1994:61).

The technique of infomapping uses a two-dimensional coordinate structure. On the one axis information resources are presented which are valued primarily for content (on the one extreme) or medium/conduit, i.e. for information flow (on the other extreme). The second axis is used to present information resources, which are valued primarily for its information function, as opposed to being valued as information holdings. The coordinate of an information resource is determined, after carefully studying it in terms of its use in the organisation, as well as its management (i.e. who is responsible for its creation, maintenance and deletion) (Underwood, 1994:61).

- Case study

A very young company was chosen. The organisational environment was therefore unstable, e.g. the operating environment which was not clearly defined. The unstable organisational environment reflected in the organisational information environment where the information flow was still developing. These two levels of uncertainty, in turn, reflected in the poor decision making in the organisation (Underwood, 1994:62-63).

Different departments in this young organisation were still competing, with the result that each were trying to build up its own information collection - the danger being, the creation of small "information empires". Little, if any effort, was made to share or pool information resources (Underwood, 1994:63).

"To develop an information map when faced with this prevailing view was a thankless, and ultimately, impossible task: there was no common view, and little appreciation of information sources outside the functional perimeter of each division of the organization" (Underwood, 1994:63).

- Alternative approach

The soft-systems approach is identified as one of the best techniques for dealing with design in an environment where the problems are ill-defined. This approach is also defined as a "method of learning", where a shared view is built of the requirements of system design (Underwood, 1994:63-64).

In an environment where the role and value of information resources are unclear, focus group interviews are suggested as a means of collecting information. The advantages are that a cross-divisional debate can be held during which each division can explain the value of its own information resources, while at the same time, giving other divisions the opportunity to examine how these information resources can be used by them (Underwood, 1994:63).

- Findings

Traditionally the techniques of information auditing, e.g. information mapping, is based on the assumption that a stable information environment exists within an organisation and that there is a shared (common) view of the value and flow of information resources in the organisation. Underwood (1994:64) describes this as a "systemic" view.

In contrast to the above, the soft-systems techniques, are suitable for use in environments where a number of different (even contrasting) viewpoints exist. The soft-systems approach does not only emphasise these differences, but even encourages

debate about them. Underwood (1994:64) concludes that the soft-systems approach "has a particular value and role to play when dealing with organizations which are young or are undergoing rapid change."

Underwood's basic methodology is based on Burk & Horton's and because of this the methodology can be described as an example of an advisory audit.

2.2.4 Best

Best (1985:80-81) distinguishes between information mapping as a method and as a technique. He regards information mapping as a method, rather than as a technique. According to him the advantage of this point of view, is that a wide variety of techniques (e.g. input/output analysis, data analysis, etc.) can be used during the different phases of the information mapping methodology. The disadvantage of regarding information mapping as a method, rather than as a technique, is that there exists no one, specific, set pattern according to which one can apply the method. This also highlights, once again, the problem of a lack of information audit methodology.

Best's methodology for "information mapping" for introducing information technology into an organisation, consists of eight phases. The different phases of information mapping, as developed by Best (1985:78-94), will be discussed:

Phase 1: Definition and taking into account corporate policy

As is the case with the other audits that have been discussed thus far and the methodologies for information auditing that are discussed in Chapter 5, it is very important to identify corporate policies and goals and to take these into account when planning to perform an information audit. Best explains this by pointing out that an organisation is made up of a collection of interactive elements, of which information is one of the elements. This emphasises the importance of taking into account corporate policies and goals.

Phase 2: Investigate organisational structure

The organisational structure is investigated according to specific design principles, e.g. effective information flow, the number of information transactions that are conducted across departmental boundaries, the control measures that are needed for information that is used to increase profit margins, the time that is invested in the creation, dissemination and use of information, etc. This can help the auditor to determine whether for example, there exist any autonomies regarding the management and flow of information in the organisation. The investigation also provides the auditor with information as to whether or not information is recognised as a corporate resource and managed and used as such.

The result of this phase is an organisational map that indicates autonomous areas.

Phase 3: Define and analyse problem areas

The information that was collected during the previous phase is used to identify problem areas. Furthermore the information is analysed, taking into account organisational policies and goals (as identified during the first phase).

Phase 4: First "information map"

The first "information map" consists of a number of diagrams and documents that serve as a summary and compilation of the information that has been gathered thus far. Furthermore, this information map serves as a basis/foundation from which the auditor can conduct other investigations, e.g. as relates to the functions and areas of information flow.

Phase 5: Investigate technological options

This phase makes it clear that Best uses the method of information mapping as a tool to the introduction and implementation of information technology in the organisation.

Phase 6: Develop a creative information map

The result of phase 5 is a so-called "creative information map". This map consists of a specification of interfaces, mass storage media, and other technological tools that have been identified as of potential use to the organisation. During this phase, the cost implications of the new information technology must also be investigated. The second information map in Best's methodology therefore serves as guideline for the choice of technological options and the financial implications of these.

Phase 7: Make proposals

Write a report in which the guidelines identified during the previous phase, are "converted" to proposals for implementation.

Phase 8: Implement the proposals

This phase is similar to the implementation phases as discussed by Stanat (refer to Chapter 5) and Cortez & Bunge (discussed earlier in this chapter).

In summary, Best (1985:94) can be quoted on the methodology of information mapping: "... [it] is a structured method for matching management's requirements in controlling the organisation with the structure of that organisation, to arrive at a medium-term strategy for implementing a technological 'nervous system' binding together existing DP to new information technologies and the best existing professional management practices. Carried through with commitment, it can be an exciting process for those concerned and can open up new ways forward, not only in communication and efficiency but in general business success."

Despite the limitation of Best's methodology (i.e. its focused application on being used to implement technology in an organisation), one can look at the basic phases (e.g. the definition of the organisational environment, the identification of problem areas, etc.) for guidance when developing an information audit methodology. What the researcher prefers about this methodology is the strong emphasis on the visual presentation of findings (i.e. the various infomaps).

Strictly speaking, Best's tool of information mapping cannot be regarded as an audit of any type, since the main aim is to use it to guide the implementation of information technology in organizations. Diagnostic elements (cf. the advisory audit) are present in phase 2.

2.2.5 Cousins

Information mapping is suggested as a tool for managing the introduction of information technology into an organisation, because the information map can help the organisation understand the nature of the problems that it faces (Cousins, 1981:48,52).

Cousins (1981:48) uses an information map to present "the geography of the 'Information Business'". It is a two-dimensional map. On the one axis the *products* and *services* that are currently used, are indicated. On the second axis the *content* activities that the organisation is engaged in, are reflected, as well as the *conduit* systems that are in place. This information map included in the article by Cousins (1981:50) is in the same format as the one used by Burk & Horton.

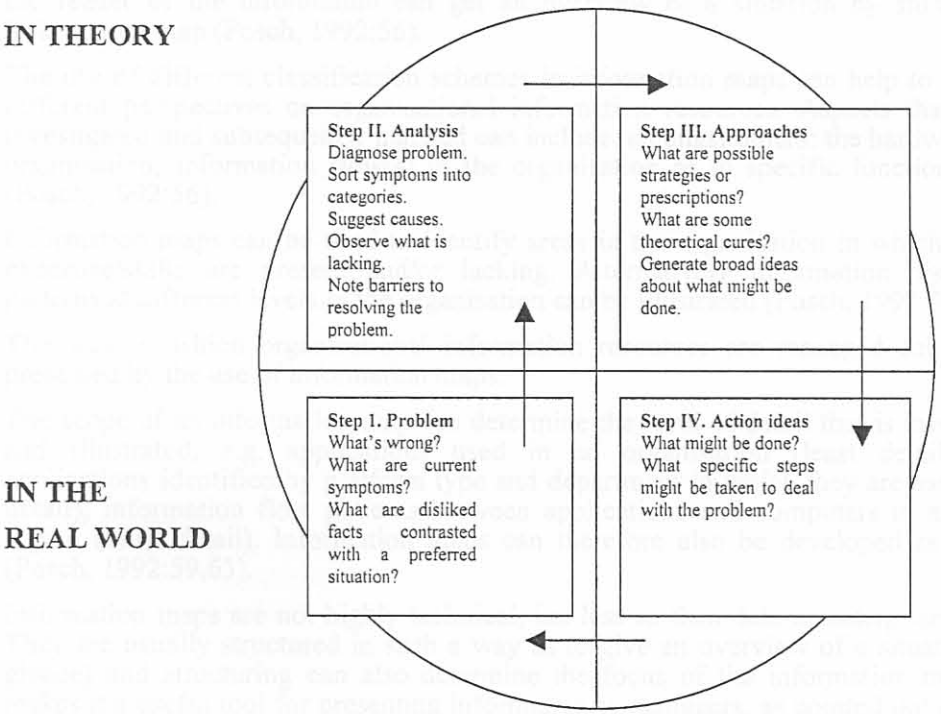
In analysing the results of the information map, gaps might be identified, e.g. problems relating to human resource management in the organisation. Questions that might be asked, include, amongst others, the following:

- Where does the human resource function stand in relation to the technologies that are presented?
- Where does the expertise of the staff lie?
- How many of the systems that are described, are staff members familiar with?
- What are the (potential) influences of the identified technologies on the organisation?
- What resources are needed in support of the identified technologies? (Cousins, 1981:48,50).

In conjunction with the information map, Cousins (1981:52) suggests the use of a Circle Chart to guide the auditor in finding solutions to the problems identified. The Circle Chart guides the user in inventing options. The Circle Chart (illustrated in Figure 3) guides the user thereof through four steps:

- Step 1: Problem – Identify the scope of the problem.
- Step 2: Analysis – Analyse the "technology 'gap' facing our particular situation in terms of causes and potential barriers to resolving the problem."
- Step 3: Approaches – This is an attempt to find solutions to the identified problems, e.g. possible strategies and/or approaches.
- Step 4: Action ideas – What must be done (in terms of specific steps) to solve the identified problems? Cousins (1981:52) states that expertise and insight, based on experience, usually lead to the best suggestions.

Figure 3: Circle Chart: The four basic steps in inventing options



(Source: Cousins, 1981:52)

The researcher finds the approach to information mapping as described by Cousins, very useful. The information map can be developed as part of an information audit methodology, while the Circle Chart for inventing options (i.e. finding solutions to identified problems) may prove useful in finding solutions to problems that have been identified.

In terms of the classification of this methodology as an example of either an advisory or compliance audit, the same comments that were made about the Best's information mapping not being an audit, apply to information mapping as described by Cousins – elements of the methodology can be used when developing an information audit methodology.

2.2.6 Posch

Posch (1992:56-65) describes information maps as visual communication tools that can be used to disseminate information on organisational information resources to members of management and staff. This is because information maps describe information resources according to their business functions as well as what their roles are in the organisation. According to Posch, information maps are used to support strategic information planning and as a tool during information auditing.

Posch's description and application of information mapping as a diagramming (i.e. visual) technique is in strong contrast with that of Underwood, who states that information mapping need not include graphical representations. Diagrams are used to present information in visual format, while matrices are useful when classifying information. Horizontal and vertical axes define categories. Research has furthermore shown that the visual presentation of information often makes it easier for readers to interpret the information. Furthermore, in technical writing, diagrams and matrices (tables) are often used to present information/concepts (Posch, 1992:56).

Information maps make use of matrices and diagrams "to provide a powerful and flexible means of communicating technical information to a nontechnical audience". The diagrams and matrices used also offer a means of summarising information, i.e. the reader of the information can get an overview of a situation by studying the information map (Posch, 1992:56).

The use of different classification schemes in information maps can help to illustrate different perspectives on organisational information resources. Aspects that can be investigated and subsequently mapped can include, amongst others: the hardware in an organisation; information flow(s) in the organisation or in specific functional areas (Posch, 1992:56).

Information maps can be used to identify areas in the organisation in which specific expertise/skills are present and/or lacking. Alternatively information distribution patterns at different levels in the organisation can be illustrated (Posch, 1992:59).

The way in which organisational information resources are managed can also be presented by the use of information maps.

The scope of an information map can determine the level of detail that is investigated and illustrated, e.g. applications used in an organisation (least detail); these applications identified by platform type and department in which they are used (more detail); information flow patterns between applications and computers in a specific region (most detail). Information maps can therefore also be developed as a series (Posch, 1992:59,63).

Information maps are not highly technical, i.e. less so than data or enterprise models. They are usually structured in such a way as to give an overview of a situation (at a glance) and structuring can also determine the focus of the information map. This makes it a useful tool for presenting information to managers, as pointed out earlier in the discussion (Posch, 1992:59).

It is relatively easy to illustrate relationships between items on an information map, e.g. the relationships between information resources, between information resources and organisational functions, or even between information users and information resources. Clearer illustration of relationships also contributes to more effective descriptions of the resources involved. Information maps are especially useful in helping to identify strengths and weaknesses, as well as areas of duplication and obvious gaps, e.g. regarding information resources of information skills (Posch, 1992:59).

Posch (1992:63) identifies the first of the two most popular uses of information maps as follows: to support strategic information planning and/or to be used as a tool during information auditing. Information maps have proved especially useful as tools to reflect the results of strategic information planning, as well as to support ongoing planning and to communicate all of this to management. When strategic information planning is being done, information maps can be used to illustrate the value of an organisation's information resources.

From the perspective of management, information maps can also prove useful. Before management can start a strategic planning session they need to know what the role and value of information resources are in the organisation and to what extent and how these contribute to organisational goals and objectives. This information can be obtained by performing an organisational information (resource) audit, as this "describes an organization's information resource assets and liabilities." Posch (1992:63) states that information maps can be used to illustrate the results of such an information audit, clearly depicting the relationships between resources and allowing management to pinpoint areas where resources/expertise are lacking and/or present.

Another area where information maps are often used is in the area of systems development. The evolvement of an information system over a period of time can be illustrated in a series of information maps (Posch, 1992:63).

It is very important to note that information maps are rarely used in isolation. Despite all the advantages in presenting information, this information on its own, is often insufficient and all too frequently additional explanations or definitions are required for purposes of clarification.

For information maps to be used effectively as communication tools, it is important that an information map is simple (for the sake of clarity) and not too complex, i.e. as "clear and easy to comprehend as possible". According to Posch (1992:63,65) this is "the most fundamental rule in information mapping." In the instance of an information map becoming too complex, the creation of a second information map should be considered, resulting in a series of information maps, each focusing on a different level of detail. The use of multiple and/or layered maps should also be considered.

Another technique that is used to simplify information maps and the interpretation thereof, is the use of multiple colours in one map. Colours can be used effectively to illustrate relationships more clearly or to highlight specific aspects of the map (Posch, 1992:65).

In conclusion it can be said that information maps are useful tools for information specialists to be used for any type of presentation that relates to the field of information management (Posch, 1992:65).

Posch (1992:65) indicates that information maps can be compiled on an ongoing basis to reflect the information environment in an organisation. A full set of information maps can then be used to make of an "enterprise information atlas".

"Information maps can be self-explanatory and very descriptive [despite being relatively simple in their presentation] and can often answer specific management questions... [I]nformation maps can be used creatively and for purposes ranging from purely technical documentation to clarifying aspects of a strategic business plan" (Posch, 1992:65).

Once again, the strong emphasis on the visual presentation of information by means of information maps, stand out as a useful element of Posch's methodology. Furthermore, information mapping as described by Posch contains elements of the advisory audit in that diagnostic and evaluative components are present.

2.3 Information systems audit

The rapid development of information technology results in changes in the auditing process (not the technique), specifically the technological audit tools that are used. Flesher (1996:651) foresees that, in future, "all audits will be considered systems audits because organizations are placing greater reliance on information systems." This change in definition will have a direct impact on the role of the information systems auditor. It is foreseen that in future, all auditors, despite their specialisation will need skills in information systems auditing.

The discipline of information systems auditing has developed to such an extent that it is now possible for auditors to specialise. Specialisation areas include security, privacy, data processing, information systems, quality assurance, and internal and external EDP auditing (Flesher, 1996:651).

Information systems auditors investigate and evaluate the development, maintenance and functioning of components of automated systems (or of entire systems) as well as the interfaces between various types of systems in an organisation (EDP auditors, 1987:2). Information systems audits are usually conducted as part of internal audits. Information systems audits are sometimes performed by special information systems departments responsible for performing the EDP assignment in an internal audit (Flesher, 1996:249).

Due to the technical nature of information systems auditing and the limited focus on mainly automated, accounting information systems, the researcher will not discuss the information systems audit methodology in detail.

A number of problems/challenges that face information systems auditors have been highlighted in the discussion thus far, e.g. rapid technological development. Uncertainty pertaining to the auditing of computer applications resulted in the Institute of Internal Auditors (IIA) publishing a document with the title *Systems Auditability and Control* (SAC). This three-volume publication contained all known information on computer auditing up to 1977. The SAC was and still is regarded as a valuable resource for internal auditors, management, systems experts and users of information systems. An important aspect that was highlighted in SAC '77 was the risks associated with the auditing of computer applications. SAC '77 was followed up by another research project on auditing. This project resulted in the publication of SAC '91. SAC '91 focuses strongly on audit risk and controls as becomes clear from three of the objectives of the publication (quoted below):

- "To provide senior management with guidelines that would assist in establishing priorities for the implementation of controls to mitigate risks associated with information technology.
- To provide internal audit and information systems professionals with specific guidelines and technical reference material to facilitate the implementation and verification of appropriate controls.
- To extend the document's useful life by emphasizing control principles and technologies rather than specific implementation methods, and by providing a modular format to make updates easier and more timely." (Flesher, 1996:655).

The scope of information systems audits is flexible as one or more aspects of the information systems environment can be audited. These include:

- Data integrity and system security: The auditing of data integrity and system security is one of the most important and common assignments of the information systems auditor. The best way to ensure data integrity and system security is for the auditor to be involved during the systems development process in order to address these issues at an early enough stage.
- Controls: The auditing of controls is also an important assignment, but of even greater importance is the task of the auditor to ensure that the controls suit the needs of the specific organisation.
- Contingency plans: A contingency plan is a plan providing back-up in the case of a disaster, in other words a plan that ensures that no operations are interrupted in case of a disaster. The information systems auditor is also responsible for auditing the effectiveness of the contingency plans of an organisation (Flesher, 1996:250).

Information systems audits can be classified as both advisory audits and compliance audits, depending on the specific aspects of the information systems environment that are audited. For example: the auditing of data integrity and security is an example of an advisory audit; the auditing of controls are evaluative (ensuring that the controls suit the needs of the specific organization) – this being an element of an advisory audit but at the same time there is also an element of a typical compliance audit (i.e. the monitoring of the controls themselves); the auditing component that focuses on contingency plans can be regarded as an example of an advisory audit.

2.4 Knowledge audit

The researcher will give a short overview of what knowledge auditing is but will not go into detail, as the main focus of this dissertation is the information audit. According to the evolution of information management, knowledge management is an expansion of information management. The same applies to the knowledge audit.

The purpose of the knowledge audit is "... to survey the data, information and knowledge that your association has or takes in and then processes and distributes for use by members and staff" (Kirrane, 1999).

When performing a knowledge audit, answers have to be found to specific critical questions, e.g.:

- What do we know and how do we know it?
- How useful is it and to whom?
- How often is this knowledge used?
- How critical is it to have this knowledge? For how long? At what cost? With what updating?

Many organisations assign monetary values to their (intangible) knowledge resources. In the USA, this balance sheet is bound by "laws and generally accepted accounting standards" (Kirrane, 1999).

The result of a knowledge audit is a knowledge map which is used to record, track and monitor the knowledge created in an organisation. The knowledge map therefore gives an overview of:

- Where the organisational knowledge resources are situated
- How it is screened, verified, organized and distributed
- Who is responsible for these knowledge activities and for disposing of unnecessary and outdated information (Kirrane, 1999).

As is the case with communication audits and the majority of information audits (cf. Chapter 5), knowledge audits can be classified as examples of advisory audits because of their investigative and evaluative characteristics.

2.5 Intelligence audit

Fuld (1991) focuses his discussion on the management of organisational intelligence programmes. As a part of such a program, it is necessary to perform an organisational needs assessment, i.e. an "intelligence snapshot". During this three-part phase the true information needs within the organisation are determined, the resources that are used to satisfy these needs and the communication channels through which information is sent and received. Another part of the organisational intelligence programme, is the intelligence audit. The main aim of the audit is to discover so-called "hidden" information resources, such as those that can be found in unused filing cabinets or the desk drawers of individual staff members. "An intelligence audit goes beyond an inventory of the physical resources; it attempts to capture the company's existing expertise. The successful intelligence program catalogues its information assets, much as a company library catalogues its books and magazines" (Fuld, 1991).

The intelligence audit can be classified as an advisory audit based on the classification of Ellis et al.

3. Conclusion

The researcher concludes that none of the processes or audit types described in this chapter can be regarded as the same as an information audit. Elements of some of the processes and audits can be taken into account when designing an information audit methodology, as has been pointed out.

CHAPTER 4: THE INFORMATION AUDIT – AN OVERVIEW

Chapter 4: Overview

The main aim of this chapter is to provide the reader with extensive background information on information auditing. In this chapter the researcher will give an overview of different definitions of the concept information audit and will develop a working definition. The reasons for performing an information audit will be discussed and the real aim/purpose of an information audit will be identified. The researcher will pay attention to the advantages that result from performing an information audit and the role of the information audit in the information management process will be investigated.

1. Introduction

Many different types of audits currently exist in the commercial world, e.g. financial audits, communication audits, technical audits, environmental audits etc. This can be ascribed to the fact that auditing is a recognised management technique that is applied to different types of organisational resources. These resources can include basically anything, ranging from buildings, equipment and book orders to so-called "shadowy" assets such as goodwill (Hamilton, 1993:75). In analogy with this, managers have realised that this technique, i.e. auditing, can also be applied to information resources (Robertson, 1994:34).

At the beginning of the 1990s, the term "information audit" was not commonly used in information science (Lubbe & Boon, 1992:215). In doing the research for this dissertation over the period 1995-1999 the researcher has found that from 1990 onwards there has been a new (and increased) awareness of information auditing, as is evident from the number of publications focusing on this topic (cf. Bibliography). This awareness seems, however, to be limited to a small section of the information science community. The majority of (general) managers still do not realise the full value of organisational information auditing, i.e. that the results/findings of an information audit form the basis for proper organisational information management, while at the same time often helping to resolve information (and communication) problems that have not been apparent. These findings of the researcher are verified by a statement made by Robertson (1994: 34): "At present, information audits are usually conducted as specific projects to address particular issues", e.g. mergers, introduction of new information technology into an organisation etc. Convincing managers of the value of information auditing remains a challenge, as the real benefits of this process are intangible and largely unquantifiable.

In recent years, information has increasingly been recognised and accepted as an organisational resource. Hamilton (1993:75) even goes as far as suggesting that information is the "core commodity" of a company. In view of this, it seems imperative that the information function in a company should also be audited.

2. Definition: Information audit

In the literature on the topic one finds that individual authors define the concept of the "information audit" in different ways and describe different methodologies for performing information audits. The researcher will start this section of the discussion by giving an overview of some of these definitions.

As has been discussed in Chapter 2, an audit is a process whereby something is evaluated, studied, discovered and/or monitored. The information gained from an audit, is typically used for planning, decision making and the implementation of improvements (Lubbe & Boon, 1992:215).

The information audit is used to determine "among other things the value, functioning, evaluation and utility of information entities in an organization." Furthermore the audit

should be used to determine if and how the information entities contribute to the attainment of corporate objectives and goals. This is not a once-off process, but an ongoing one (Lubbe & Boon, 1992:215). Booth & Haines (1993:224) also stress the importance of repeating the information audit at regular intervals.

A commonly accepted definition of the concept *information audit*, is the one developed by the Information Resources Network: "An information audit is a systematic examination of information use, resources and flows, for the verification by reference, with people and existing documents, in order to establish the extent to which they are contributing to an organisation's objectives" (Gibson, 1996:12). This definition was used by Swash (1997:314) as a working definition for an information audit during a project of the King's Fund Centre in London to develop a new information policy for the Regional Health Authority. Booth & Haines (1993:224) also use this definition and in so doing contradict their statement that an information audit is the same as a needs assessment (see the discussion below: *What an information audit is not*, paragraph 2.1).

St Clair (1995a:1) quotes a definition for an information audit by Orna. According to this definition an information audit is used to determine:

- the information holdings of an organisation;
- how an organisation uses information;
- who manages the information within an organisation;
- the relationship between the information-related issues listed above and the overall functioning of the organisation.

In another article St Clair (1996:9) states that he regards LaRosa's definition of the concept "information audit" as the best one and quotes it as follows: "a systematic method of exploring and analyzing where a library's various publics are going strategically and of determining the challenges and obstacles facing those publics". In layman's terms it can be explained as follows:

- An information audit determines the users' (i.e. Employees') information needs;
- It evaluates the impact of information usage on the way in which the employees do their jobs;
- It identifies barriers to the contribution of the information services department to the success of the employees' performance;
- It determines the state of information resources within the organisation and decides whether alternative information sources are needed in order to successfully satisfy users' needs;
- It results in appropriate action being taken (St Clair, 1996:9).

In summary it can be said that the information gained from an information audit should give the library/information manager a clear indication of the current and future information needs of its users/clients and this in turn directs strategic planning.

In a study performed by Evan-Wong (1997:2) the information audit is used and defined as a tool to assess the resources that are available and that can be used to develop information products and services. Riley (1975:24-25) describes the information audit as a structured (disciplined) process whereby information products are evaluated.

Quinn (1979:18) defines an information audit[1] as a process whereby:

- An overview is given of the state of information in an organisation.
- The provision of information is reviewed.
- An opinion is given of the efficiency of the information system.
- It is determined whether the information system supports the attainment of corporate goals.

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[1] In this context, the concept INFORMATION AUDIT is a registered trademark of Arthur D. Little, Inc. (Quinn, 1979:18).

- The way in which users' real information needs are met, is evaluated.
- The current information system staff members are evaluated in terms of their expertise.

The researcher regards Quinn's definition of an information audit as limited in the sense that the concept information system as used in the definition refers exclusively to the corporate library/information centre and not to all organisational information resources.

De Vaal & Du Toit (1995:122) highlight a number of definitions of the concept information audit. The information audit is described as:

- a tool to determine the existence of corporate as well as personal records management systems;
- a method to identify corporate information resources; and
- a process whereby it is determined whether, and how, information resources support corporate, as well as department goals.

The working definition used by De Vaal & Du Toit (1995:122) state that an information audit is an ongoing process whereby corporate information resources are identified, and the value, functioning and usage of these resources are analysed with a purpose to establishing effective information management processes in an organisation.

Stanat (1990:2) defines the concept, strategic information audit. According to her, a strategic information audit evaluates:

- An existing organisational information system/network;.
- Current information needs, specifically information needs by functional unit.
- How effectively existing information sources and services satisfy the above-mentioned needs.
- How effectively information is disseminated throughout the organisation.
- The use of information technology (Stanat, 1990:2).

Furthermore a strategic information audit identifies:

- The information management objectives of the organisation.
- Areas where information gaps and/or inconsistencies exist, as well as areas where duplication takes place.
- Alternative/new information sources and services that could satisfy identified information needs.
- What could be added to the information system/network or what could be changed in order to make it more effective.

The ideal scenario is to interview as many employees from as many different units within the organisation, as is possible. The answers and suggestions obtained during the interviews help the auditor to compile a broad picture of the state of information resources within the organisation (Stanat, 1990:2-3).

Dubois (1995:21) defines an information audit as the mapping, analysis, costing and rationalisation of "resources devoted to information". This allows one to determine the contribution of these resources to the effective functioning of an organisation. Previously unrecognised or "hidden" information resources might become more visible, e.g. undocumented formal and informal communication flows in an organisation that might be of crucial importance and value to an organisation.

Dubois' (1995:21) definition of an information audit is based on the definition by Stanat, but he points out that Stanat's definition does not provide for or make mention of "follow-up mechanisms" as part of the information auditing process. This point of view is supported by the researcher who has detected a similar gap in other definitions of the process.

Barker's (1990:15) definition of the concept "information audit" exceeds the limits of a definition. She gives an extensive discussion of what an information audit entails,

instead of merely defining the concept. Her discussion focuses on three issues, i.e. the nature, subject and scope of the information audit.

- Nature of the information audit

Barker (1990:17) identifies two main types of audits, i.e. compliance and advisory audits. An example of the compliance audit is the traditional financial audit whereby aspects regarding financial resources in an organisation are monitored. Advisory audits are used to evaluate the effectiveness and/or efficiency of a specific operation in an organisation. The results are used for long-term, strategic planning. The majority of information audits are advisory audits, but Barker (1990:17) admits that there is a place for compliance information audits (cf. also Robertson's view on this issue, as discussed in Chapter 1).

Barker (1990:17) warns against combining the characteristics of both the above-mentioned types of audits into one type of information audit, as the validity of such an audit might be negatively affected.

- Subject of the information audit

The subject of an information audit is the organisational information system (Barker, 1990:17).

- Scope of the information audit

Barker (1990:22) discusses the scope of the operational information audit in terms of its typical objectives. These include, amongst others, the following:

- Determine the purpose of the information system and the successful accomplishment thereof (i.e. satisfying users' information needs) – this is usually determined through user surveys and analysis.
- Determine the purpose of the information system and how successfully this supports the achievement of organisational objectives. (this presupposes a thorough understanding and knowledge of organisational functioning, philosophy and culture.).
- Determine the relevance and reliability of the information system.
- Measure the usage of resources – information audit methodologies are often lacking in this aspect as they concentrate on qualitative rather than quantitative results.
- Monitor whether regulations and standards are adhered to (if this aspect is incompatible with the objectives of the advisory information audit, it can be addressed in a separate audit).

2.1 "What an information audit is not"

Another way of defining a concept, is by focusing on what it is not. The researcher will investigate the misconceptions that surround the concept of the "information audit".

The first (and most common) misconception is that an information audit is the same as an information needs assessment. For example: Booth & Haines (1993:224) regard the concept "information audit" as a synonym for "information needs analysis". St Clair (1995a:1) stresses that this is not the case. According to him the information audit is used when one wants to determine the real role of information in an organisation. Once this has been done, the role of information is examined within the context of the users' needs. In-depth interviews help the auditor to compile a holistic picture of the state of information resources in an organisation. This information can be used for various purposes, e.g. when developing an organisational information system.

Jurek (1997:42) also points out that an information audit (performed within the context of secondary research) differs from a traditional needs assessment. The scope of the information audit goes beyond the mere identification of information needs. An information audit also includes a phase during which the monetary value of

information resources is calculated. This information is important in determining budgetary priorities and in working out a cost-effective information management plan for the organisation (Jurek, 1997:42).

The researcher comes to the conclusion that a typical information audit would include, amongst other things, an information needs assessment.

Furthermore, the information audit is not just an inventory of computers, information sources and the like. When the expenses of these types of equipment are added up, the result reflects the money spent on information conduits, whereas the information audit attempts to determine the real value of information content within the context of the specific organisation (St Clair, 1996:9).

A third misconception is that an information audit is a form of industrial espionage. This originates from the well-known fact that the term *audit* often creates fear. Owing to this connotation, it is often thought that an information audit is aimed at identifying staff who should lose their jobs, or seizing personal documents, i.e. a form of industrial espionage. This is not the case (Webb, 1994:9).

With this explanation of what an "information audit is not", one can clarify what type of results can be expected from an information audit. An information audit attempts to provide a realistic picture of the state of the information resources in an organisation. Therefore, the information audit is more comprehensive than a traditional "needs assessment", as the information audit "links the provision of information services with a healthy examination of 'accounts'" (Orna, 1990:44). The information audit is also used to determine/investigate accountability and responsibility in terms of organisational information resources (St Clair, 1996:9).

Many, if not all, of the aspects mentioned in the previous paragraph may be included when an information audit is conducted in an organisation, but the nature of a proper information audit is not limited to one of the above (St Clair, 1996:9).

2.2 Working definition: Information audit

For the purpose of this study, the researcher has formulated the following definition of the concept "information audit":

An information audit entails the systematic examination of the information resources, information use, information flows and the management of these in an organisation. It involves the identification of users' information needs and how effectively (or not) these are being met. In addition to this, the (monetary) cost and the value of the information resources to the organisation are calculated and determined. All this is done with a view to determining whether the organisational information environment contributes to the attainment of the organisational objectives and furthermore, to the establishment and implementation of effective information management principles and procedures. This is done so that information can be used to help the organization maintain its competitive edge.

3. The aim of an information audit

Following on the discussion of the various definitions of the concept, "information audit", the researcher will determine what the major (and minor) aims/purposes of the information audit are. Different authors describe the aim/purpose of an information audit in different ways. A number of these perspectives will be examined.

The researcher has determined that auditing is a recognised management technique. According to St Clair (1995a:2) auditing is used to provide managers with an overview of the present situation regarding specific resource(s) and services within an organisation. It then follows that the purpose of an information audit is to determine the users' needs as well as how well these needs are met. In the information environment it is significant that the information audit brings about a shift in focus from storage-related issues to service-oriented issues. During the information auditing process there is also a strong focus on determining accountability and responsibility.

Three authors, Haynes (1995:30,32), Underwood (1994:61) and Hall (1996:iv), describe the main purpose of an information audit in the same way. According to them the main purpose of an information audit is to improve organisational performance by ensuring that users' needs are being met by information systems and products. The identification of the real information needs within an organisation and the compilation of an inventory of information resources available to the organisation are central to the information audit. All the information that is gathered during the auditing process is used to compile an overview of the state of information in an organisation and this in turn, is used for, amongst other purposes, the identification of information problem areas and/or gaps in information provision, irrelevant information sources and the need to find new/alternative information resources.

The main aim of a strategic information audit as identified by Stanat (1990:1,2,21) is similar to that identified by the three authors above. Stanat states that the main aim of the information audit is to assess the utility of information, information services and products within the organisation by identifying strengths and weaknesses of this system/network. Furthermore the attitudes of the users towards the system are determined, as well as the way(s) in which they use and disseminate information (Stanat, 1990:2). The information audit can therefore be regarded as a powerful tool to help determine organisational information needs and the findings of the audit can be harnessed for effective strategic planning and proactive decision making (Stanat, 1990:21).

From a different, technology-oriented perspective, the main aim of an information audit differs from what has been discussed thus far. According to Hamilton (1993:77) the main aim of the information audit is to prove that information management should be integrated with the management of the information technology function in an organisation. Current situations where the two functions are managed separately, have been proven to be ineffective, resulting in duplication, inefficient access to information and wasting of financial resources (Hamilton, 1993:77-78).

Yet another perspective is provided by Riley (1975:24-25) who states that the main aim of the information audit is to evaluate the (potential) value of an information product before acquiring it.

From the discussion thus far it becomes clear that it is difficult to generalise the aim/purpose of an information audit. The goal(s) of an information audit will vary, depending on the environment within which the audit is performed, as well as the scope of the audit. According to Jurek (1997:42) four basic audit goals can be identified. These are:

- clear articulation of information needs/services
- target identification of information sources/resources
- proper profiling of information users
- development of an actionable improvement plan (Jurek, 1997:42).

Ellis et al (1993:134) attempt to generalise the aim/purpose of the information audit and list the objectives of a typical information audit as follows:

- to establish the major goals of the organisation and to identify the organisational constraints that affect organisational information systems;
- to identify users' information needs;
- to compile an inventory of the available information resources;
- to use the information gathered during the first three stages to develop an overview of how the organisational information systems function.

According to Lubbe & Boon (1992:215) as well as De Vaal & Du Toit (1995:122) the eventual aim of an information audit is to implement effective information management practices and to improve on existing information management practices in an organization.

The researcher comes to the conclusion that the main aim of an information audit is specific to the environment in which it is performed. If one were to attempt to generalise the main aim of an information audit, it could be said that an information

audit would be performed with the aim to ensure the collection of information that is needed to manage organisational information resources effectively, i.e. so that organisational objectives are met.

4. Benefits of an information audit

Based on the research conducted thus far, the researcher has determined that an audit is regarded as a comprehensive process for collecting information on a specific aspect of an organization. In the same way an information audit yields detailed and accurate information on organisational information resources. Specific benefits result from performing an information audit in an organization, as will be explained in the next section of the discussion.

Before moving on to a discussion of the benefits to be derived from the performance of an information audit, it is interesting to look at the article by Stanat (1990:3). In this article she includes a number of examples (taken from practice) through which she illustrates that not performing an information audit, may have one or more of the following consequences:

- inability of the company to react in time to business/market developments and therefore money being wasted on information;
- unnecessary expenditures on information that is not being used by the organisation;
- due to insufficient/irrelevant information resources, the company loses its competitive edge in the marketplace.

It is common knowledge that the business environment today is highly competitive. In such an environment it is of the utmost importance that the information sources that an organisation uses, be current, relevant, and flexible enough to meet information needs that are constantly changing due to business and environmental changes (Stanat, 1990:4). From the discussion in the rest of this chapter, as well as the next one, it will become clear that an information audit can help a company to meet its specific information needs and thus help the company to maintain its competitive edge.

4.1 Benefits according to Downs

In contrast to the approach taken by Stanat (i.e. focusing on the disadvantages of not performing an information audit), Downs (1988:5-9) discusses a number of benefits that result from performing a communication audit. In studying the literature, the researcher has determined that these benefits are similar to the outcomes of an information audit. The categorisation of benefits as discussed by Downs (1988:5-9) will subsequently be used to discuss the benefits of an information audit. These benefits are:

- Validity benefit
- Diagnostic benefit
- Feedback benefit
- Information benefit
- Training benefit

4.1.1 Validity benefit

One of the results of a properly performed information audit, is valid and accurate information on the status of information as a corporate resource. The quality of planning and management should therefore improve, as accurate, relevant and valid information is readily available (adapted from Downs, 1988:5). To illustrate this, the researcher will include statements by various authors who refer to the validity benefit.

Webb (1994:11) regards the information audit as an invaluable tool for planning because it can be used to keep in touch with the latest (information-related) developments in the organisation. Probably the most important benefit resulting from

the auditing process is that it provides management and staff with information that will make it possible for them "to maximize the potential of information in achieving the organization's objectives."

The validity benefit is also discussed by Hamilton (1993:78) who states that the main benefit of an information audit is that it provides management with "a proper, complete picture of the information resources within an organization".

This is possible because the results of a typical information audit will provide information on:

- what information resources are in use;
- how these are used;
- whether any marketable products exist;
- what equipment is being used by whom;
- exact cost(s);
- the value of information to the organisation.

This means that a clear picture is provided of the contribution of information (resources) to achieving corporate goals and that this information can be used to develop and implement a corporate information management plan (De Vaal & Du Toit, 1995:122). Another author, Dubois (1995:20-21), states that information auditing can contribute to the good management of information resources. He points out that the results of an information audit, when implemented, can have a profound effect on (management) structures within an organisation.

Booth & Haines (1993:231) discuss the validity benefit under the heading of "Outcome benefits", i.e. the benefits accruing from the implementation of recommendations made in the report. Examples include the following:

- A large collection of information is made available that can be used for planning purposes.
- Owing to the increased corporate awareness of information resources, these can be incorporated with the business objectives of the organization.
- A framework can be developed for common standards and procedures.
- Responsibilities can be defined for individual information functions, e.g. current awareness services, records management, information technology, etc.
- Individual areas of expertise, skills gaps and common training needs can be identified (Booth & Haines, 1993:231).

The validity benefit also becomes evident in specific situations, e.g. in the article by LaRosa (1991:17). She lists a number of marketing questions which typically arise when planning for a new year has to be done. She states that the best information one can use when doing such planning, is the results obtained from a corporate information audit.

Yet another perspective on the validity benefit is given by two authors (Quinn and Orna) who describe this benefit from a financial perspective: "The information audit can make the difference between the company overwhelmed by the burden of changing information and one that can manage the incoming data in a way that reflects corporate goals, serves employee needs, and gives top management the best information for the money" (Quinn, 1979, 19). Orna (Gibson, 1996:12) states that the information audit helps to obtain "a 'hard' value of information, rather than a 'soft' value." This in turn contributes to the increasingly cost-effective management of organisational information resources. The researcher has identified this phase, during which the value of information is determined, as very important, as this helps to quantify the so-called "information phenomenon" in the organisation.

The researcher concludes that the validity benefit relates directly to the long-term strategic benefits that an information audit has. From the discussion above it is clear that the information gained from an information audit can be used strategically, e.g. in

support of decision making, planning, and various types of management functions (including information management, financial management), to name just a few.

4.1.2 Diagnostic benefit

The researcher has determined that the diagnostic benefit is one that is characteristic of the majority of audits. This has already been illustrated by means of various definitions of the concept "audit(ing)" as discussed in Chapters 2 and 3. For illustrative purposes, one of these definitions is included here: The term *audit* traditionally refers to the legal requirement to formally examine the way in which an organisation has conducted and recorded its financial transactions. A more general definition of auditing is "a methodical examination and review of a situation" (Webb, 1994:9). The diagnostic element of an audit allows for strong points and weak points (or "gaps") to be identified. This information can be used to build on the strong points and to eliminate the weak ones (adapted from Downs, 1988:6).

St Clair (1995a:1) refers to Orna who discusses the diagnostic benefits of an information audit. For many people the term "audit" brings to mind a connection with accountancy. According to Orna this enables the information auditor to perform "a healthy examination of 'accounts', an activity which [gives] ... an appropriate perspective from which to think about information and information delivery."

Booth & Haines (1993:231) also refer to the diagnostic benefit as one of the "outcome benefits" of an information audit (i.e. a benefit accruing from the implementation of recommendations made in the report). This enables the auditor to identify areas of duplication and so-called "information gaps" and to address the identified problems.

4.1.3 Feedback benefit

An information audit is an important element in the process of feedback. The information audit is used to determine whether specific information inputs deliver the expected/desired information outcomes. The information audit is therefore an instrument of evaluation and provides information that can be used to plan and implement corrective actions (adapted from Downs, 1988:7).

Mention of the feedback benefit is made by LaRosa (1991:9). According to her the results of a well-performed information audit are relevant information on the state of information (resources) in an organisation. Once one has an understanding of the way different types of information are being used in an organisation, so-called "information gaps" can be identified and new information products and services can be developed. Following on this, the researcher has identified a "fringe benefit", i.e. that once the information specialist has customized the information service to satisfy basic information needs of users, he/she is left with more time to focus on satisfying complex information needs/requests of users.

More specifically, an information audit provides the librarian with a sound basis from which to evaluate his/her contribution to the organisation. An information audit "forces" the librarian to allocate time to investigate service-related issues, for which there normally just is no time. Once the librarian has a clear picture of the role of the library and information within the organisation, strategic repositioning can take place (St Clair, 1995a:3).

A practical example of the feedback benefit of an information audit, is explained by Jurek (1997:42-43). He had determined that secondary research analysts are often faced with the problem of identifying internal client information needs. In view of this, he recommends that the secondary research analyst performs an information audit. A formal information audit will provide the analyst with information needed to match information needs to information resources, as well as information that will enable him/her to provide needed information proactively (Jurek, 1997:42).

A very important observation is made by St Clair (1996:9) who notes that an information audit enables librarians/information services managers to evaluate their department on the same level as other departments in an organisation. He concludes with the statement that a properly conducted information audit can only enhance the performance and value of the information services department to the organisation.

4.1.4 Information benefit

A communication audit focuses attention on the process of communication in an organization and the improvement thereof. In the same manner an information audit can help to focus staff members' attention on the value and benefits of the use of information as a corporate resource (adapted from Downs, 1988:7). This benefit is discussed by various authors.

Dubois (1995:20,24) states that information auditing can contribute to increased corporate awareness of the role of information services and resources. Following on this an information audit can also help to create a more positive perception of the value of information in an organisation and this in turn can convince top management of the benefits of employing qualified information professionals to manage information resources and services (Gibson, 1996:12; Booth & Haines, 1993:23).

Performing an organisational information audit provides the librarian with an excellent marketing opportunity. Not only will personnel throughout the organisation be made aware of the value of information as strategic resource, but the librarian will have the opportunity to raise awareness of available information products and services offered by the library (St Clair, 1995a:2; LaRosa, 1991:9).

Eddison (1992:9) also recognises the information audit as an effective marketing tool. She suggests that the auditor tell interviewees about potential information resources (already available within the organisation) that can satisfy their information needs.

Following on this, Web (1994:11) states that the results of the audit can be shared with everyone in the organisation, thus creating a means of "wider information sharing". This in turn, will help to raise the level of information awareness in an organization.

Finally, a "fringe benefit" of the "information benefit" of an information audit is that it not only increases awareness of the importance of information services and the costs of these, but that these in turn, raise the status of information professionals (Hamilton, 1993:79).

4.1.5 Training benefit

According to Downs (1988:9) this benefit is the one that is most often overlooked. An information audit provides the ideal opportunity to involve staff in the auditing process and at the same time to teach them more about the processes, philosophy and structures that support the usage of corporate information resources. By the time the information audit has been completed, these staff members will have a better understanding and picture of information and its role in the organization (adapted from Downs, 1988:9). The researcher feels that an information audit provides the opportunity to train staff members who will become information managers, or who will be involved in corporate information management processes in future.

Booth & Haines (1993:230-231) give examples of training benefits in a discussion of "Process benefits", i.e. the benefits accruing from the auditing techniques used. Examples are:

- Staff members who formed part of the auditing team, also serve as a source of knowledge of information(-related) activities in the organization.
- Staff members who conducted interviews, have new skills that can be used in the organization.
- The above-mentioned staff members have a greater understanding of the role of information in the organization, because of their participation in the auditing process.

Booth & Haines (1993:225) also suggest that staff members be involved in the process of information auditing and that the process be used to train staff in various steps of the

strategy. The researcher sees this as an investment for companies where information audits will be performed periodically.[2]

4.2 Benefits according to Underwood

Another perspective of the advantages of information auditing, is provided by Underwood (1994:62) who discusses the value/benefits of information mapping. These are similar to the benefits of the information audit, as discussed above and the researcher will briefly list and discuss these and also classify the benefits according to the categorisation of benefits as proposed by Downs:

- The involvement of staff in supplying information during an information mapping exercise, can increase awareness of information resources in an organisation, as well as their value to the organisation (Underwood, 1994:62). [Information benefit]
- When the findings of the exercise, are presented graphically, it is relatively easy to identify groupings of information resources, as well as areas where information gaps exist (Underwood, 1994:62). [Diagnostic benefit]
- The results of information mapping can be used to improve information management in an organisation, through strategic planning and recommendations for improved information handling (Underwood, 1994:62). [Validity benefit]

4.3 Specific benefits: Case studies

As can be seen from the discussion on the aims/purposes of an information audit, it becomes evident that in many situations, an information audit is performed with a view to obtaining *specific* results, e.g. in a study performed by Alderson (1993:2), the main benefit resulting from the information audit, was relevant information that enabled the organisation to take steps to control the costs associated with online information. Orna (1990:20) performs an information audit in order to obtain the information that is needed to develop an organisational information policy. The typical results of the information audit are knowledge of all the information resources/activities in an organisation – depending on what the scope of the audit was, i.e. departmental or organisational (Orna, 1990:20).

Another example is of the results (benefits) of the audit performed by De Vaal & Du Toit (1995:122-128) in the insurance company. These can be summarised as follows:

- Top management realised the value of proper records management in the company (i.e. that proper records management will ensure that records are used to support decision making, planning, the solving of problems, as well as other tasks in the company).
- Top management realised that information is actually a strategic resource in the company, and should be managed as such;.
- The information inventory that has been compiled could be used as a basis for implementing a records management strategy in the organisation (De Vaal & Du Toit, 1995:127).

The researcher comes to the conclusion that the majority of the benefits described above, can also have long-term positive financial implications for an organisation, directly or indirectly. This is a very important benefit in view of the highly competitive economic environment that companies have to "survive" in.

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[2] It is necessary to perform information audits periodically, as a typical information audit only provides "... a snapshot of information resources, activity and flow frozen at a given point in time" (Swash, 1997:317).

5. The value of information

The determination of the value of information products/entities/services has been, still is, and most likely will remain a controversial topic in the literature and in the information environment. This is pointed out by Willemse & Du Toit (1996:9): "Assessing the value of information represents a very large and complex set of problems. Furthermore, there are no reliable, simple or even standardized or generally acceptable ways of assessing information value."

In the next section of this discussion the researcher will give a brief overview of the problems surrounding the process and methods of determining the value of information. The researcher will not, however, attempt to provide solutions to these problems as this topic warrants extensive research as an independent research topic.

5.1 Information as a resource

Information can be defined is that which a person needs on a daily basis in order to perform tasks. Some organisations regard information is that which reduces uncertainty; as that which is used for problem-solving; and as that which provides the organisation with a competitive edge (Britz, 1992:5). All the previous statements about information are true, resulting in the increase of productivity and also the recognition of information as a corporate resource.

As a resource, information shares the following characteristics with other resources:

- Information is used in the management of other resources.
- Information is used to manufacture products.
- Information has to be processed, as other resources, before it can become a product.
- Information is scarce, meaning that it is difficult to find the right information and provide it at the right time, in the right place, to the right person (Britz, 1992:6).

In contrast to other recognised resources, information resources have unique characteristics that make it extremely difficult to determine the value thereof:

- Information exists only through human perception.
- Information can be packaged in different formats and is easily transportable by means of information technology.
- Information is shareable, i.e. it can be given away or sold, while the seller retains that information.
- Information is substitutable (it may save money by substituting the use of other resources).
- Information is diffusible – it tends to leak despite attempts to contain it.
- Information has value, cost and a price.
- The value of information is relative (Willemse & Du Toit, 1996:8).

5.2 Determining the value of information

Value is an abstract concept that is discussed in a variety of disciplines. Value can therefore not be defined on its own. The concept must be defined in conjunction with a qualifier in order to make the definition meaningful. This is explained by Griffiths (1982:269): "Value is an attribute (it does not exist independently) that can be applied to almost any entity. The act of attributing a value to something, in effect establishes an equivalence relationship (or set of relationships)...". The characteristics of value include the following:

- Value is a subjective criterion that can be awarded to a specific characteristic of an entity, by any person or group.
- The determination of value is situation dependent and may vary as time passes.
- Value can be awarded to a specific characteristic of an entity in the form of a positive or negative value (Griffiths, 1982:270).

From the statements above it becomes clear that value is subjective, i.e. different people with different perspectives will award different values to the same entity or characteristic of that entity. For example: a student who needs to pass his final year Information Science examination will most probably attach no value to a copy of a final year Obstetrics examination paper, except if this student sees an entrepreneurial opportunity of making some money and selling the paper to a number of medical students.

Historically, the value of information was determined by the number of people who were prepared to pay a given price for an information entity, e.g. for a specific book (Griffiths, 1982:272). In such instances, value is usually determined according to the principles of cost and price. It was found that the method that was based solely on the economic principles of determining value, could not be used successfully to determine the value of usage, i.e. the real value of the content to the user thereof (Repo, 1986:373). This is the case because the value of information can only be determined *after* it has been used.

The value of information is determined in one of two ways, i.e. either by determining the use value or the exchange value of the entity.

Exchange value is defined as that which a person is willing to pay for a specific product – whether it be monetary or not (Griffiths, 1982:270). Exchange value is expressed in terms of price and cost and can therefore be measured quantitatively. The monetary value that the owner of the product wants for it, is the price of the product. The money that was involved in producing the product is expressed as the cost of the product. In view of these explanations/definitions, the exchange value of an information product only reflects the quantitative value of the product and is therefore not a reflection of the value of the content of the product.

Use value is determined by the user of the information. Use value is defined as the value that a person derives from using a specific information entity/product. According to Taylor (in Griffiths, 1982:270): "The value of information has meaning only in the context of its usefulness to users. There is no way of analysing value of information except by reference to the environment of those who are its intended clientele." There is therefore no accurate way to determine use value. Attempts are made at determining use value and this is usually done by determining whether a person is willing to pay for information, or by measuring the time that is saved by using the information (Repo, 1986:275).

As has been pointed out at the beginning of this section of the discussion, it is extremely difficult to determine and to measure the value of information, as the value of information is not intrinsic. The value of information is in the meaning that the information has to the user thereof, taking into account the specific context within which the user finds him-/herself. The researcher wants to stress the importance of determining information value and calculating costs when performing an information audit – cf. discussions by Dubois (1995:21); Jurek (1997:43); Worlock (1987:52); and Underwood (1994:60). The method that is used for determining value is dependent on the choice and approach of the specific auditor.

6. The role of the information audit in the information management process

Information is increasingly recognized as valuable and important to organisations. The realization of the importance of information as a resource can be attributed to:

- increasingly complex organisational structures;
- the recognition of the role that information plays in attaining organisational goals;
- the realization that information costs money and has value; and
- the shift from information technology to information content as the main solution to information problems (Lubbe & Boon, 1992:214).

In view of the recognition of information as a resource, it follows logically that it should therefore be managed as such. A distinction is made between information as an

economic resource, as opposed to a management resource. In instances where information is used as a production aid and in support of basic decision making, it is regarded as an economic resource. In situations where information is used to manage other resources more effectively, it is regarded as a management resource. Lubbe & Boon (1992:214) view the concept "economic resource" as the umbrella term, with the concept "management resource" as an important component of information as an economic resource.

Seeing that information is a resource and should be managed as such it becomes important for organisations to develop and implement an information policy as part of an information management plan. An information management policy is aimed at ensuring the availability of appropriate resources, organisational structures and training to meet the information requirements of the organisation (Booth & Haines, 1993:225).

It is ironic that many organisations invest a lot of money in information resources, without paying any attention to the management thereof. Information is an expensive resource in terms of its acquisition, storage and processing. Information resources are dispersed throughout the organisation and include internal as well as external sources of information. Information can also be found in different formats, ranging from paper to the expertise of an employee. Swash (1997:312) highlights the importance of also identifying hidden (or unexploited) information sources. The same is done by Burk & Horton (1988:22) and Fuld (1991) who call these "hidden information entities". According to these two authors information sources may only be called information resources once their strategic worth to the company has been identified/measured.

The development of information technology has led to a heightened awareness of information and the value thereof, but at the same time this has also highlighted the accompanying problems, e.g. the pervasiveness of information. The focus during the 1990s is on so-called knowledge workers, who process information, rather than raw materials, as has been the case in the past. In view of this development, Drucker stresses the importance of suitable tools for handling information. A large number of businesses now recognise the value of information, i.e. information is increasingly being recognised as a corporate resource. This has implications in terms of the management of information resources, as effective information management can increase productivity and help a company to gain and maintain a competitive and strategic advantage over its competitors (Swash, 1997:312).

In view of the complexities surrounding information as a resource and the problems experienced, information management is an organisational necessity. Information management includes the control and co-ordination of corporate information resources. It should also be ensured that information systems and services provide accurate, relevant and timely information (Lubbe & Boon, 1992:215).

6.1 Definition: Information management

Prior to defining the role of the information audit in supporting information management, it is necessary to define the concept *information management* and to determine exactly what it entails.

In the literature one finds a large number of definitions and interpretations of the concept *information management*. The researcher will look at a few of definitions before developing a working definition of this concept, for the purpose of using it in this dissertation.

For example: Many authors (e.g. Wilson, 1989:204) define information management by focusing on information technology. According to this school of thought, technology seems to be the main component of the information management process, while the functions that make up the information life cycle, as well as the content of information messages, seem to be ignored or largely undervalued. Ponelis & Fairer-Wessels (1998:6) also stress the fact that in the business/practical world (as opposed to the academic/theoretical environment), information management is incorrectly defined (as far as the academic world is concerned) as the management of information technology and systems.

Orna (1990:19) gives a much more comprehensive overview of what the information management function entails:

- The acquisition, recording and storing of information.
- Patterns of information flow in an organisation.
- Information usage in an organisation.
- The way in which information is handled and the co-operation that goes with this.
- The use of information technology.
- The management of the budget.
- Ensuring that all these information-related activities contribute towards the objectives of the organisation.

The confusion as to how information management should be defined, is highlighted by Wilson (1989:204): "It is not always clear ... whether even the schools and departments of information studies are talking about the same thing when they use the term information management." The same opinion is expressed by Broadbent (1990:5): "at present ... the case [remains] that definitions and explanations of 'information science' and 'information management' are contextual in nature and the term 'information' is not 'owned' by any one area of study or professional grouping."

The researcher comes to the conclusion that it is difficult to develop or identify a general, all-encompassing definition of the concept, information management, as this concept is used in a variety of environments, in different contexts, implying something different in each of these. For the purpose of this dissertation, the researcher will define information management from an 'academic' perspective (cf. Ponelis & Fairer-Wessels above), as follows:

Information management can be described as the process whereby resources are used with the purpose of optimising the use and dissemination of information within an organisation. This information is organised and repackaged according to specific, pre-determined information needs so that the information needs of users can be satisfied. Furthermore, the supply of the right, accurate, relevant information to users and their subsequent use of this information ought to give them a competitive edge, thereby supporting them in attaining the mission and goals of the organisation. The dissemination of information and the usage thereof are optimised through the application of management functions to organisational information resources.

6.2 The need for information management: Typical information problems

The value of (or necessity for) effective information management will subsequently be discussed by looking at typical information problems that are the results of the absence of proper information management procedures.

Lack of an information management plan, can lead to one or more of the following problems:

- Information not being recognised as a corporate resource (and the accompanying lack of financial resources).
- No corporate responsibility for managing information resources strategically.
- No co-ordination, i.e. Information resources that should be managed in an integrative manner, typically resorts under different organisational heads.
- Information costs and values are not reflected in the financial statements of the organisation.
- Lack of a corporate information policy to guide the management of information resources.
- Information technology is acquired and utilised in an uncoordinated fashion (Lubbe & Boon, 1992:215).

The value of (or necessity for) effective information management is highlighted by Swash (1997:321) who also discusses a number of problems that result from the absence of proper information management procedures. These include, amongst others:

- duplication of effort and reproduction of existing information;
- the failure of employees to respond to important developments;
- a lack of information awareness that in turn results in an inability to optimally exploit existing information resources.

A common problem of the "information age" is information overload which in turn results in information fatigue (also referred to as IF). The sheer volume of information has implications for the management thereof, e.g. the acquisition of information, by whom, the method of processing information as well as the results thereof. Swash (1997:313) summarises this discussion by focusing on the question (that should be) central to organisations today and that is whether information is critical to achieving the strategic objectives of the organisation and how this is done. The researcher has determined this to be the central issue of information management today, i.e. the purpose of organisational information management.

Information problems also arise from an "information insensitivity", i.e. when people are unaware of available information sources and how these are disseminated. The information management process in an organisation must be geared towards ensuring that all (and that includes new) employees are aware of the scope of information sources and services as well as the information management procedures. During times of organisational change, the information management process should contribute towards maintaining continuity of information usage and flows (Swash, 1997:314).

In recent years information technology has heightened the expectations that customized/value-added information is readily available through electronic information delivery. In reality, however, information technology has added to the problems experienced when managing information sources, e.g. the availability of seemingly "free" information in the electronic environment, have obscured the real value of information. The electronic availability of information has also contributed to problems with duplication and overlap (Worlock, 1987: 51).

Swash (1997:314) concludes that all the problems discussed above, point to the need for "a co-ordinated and top level approach to the management of corporate information resources". In turn, the organisational information management plan and process can be facilitated by an information audit. The latter is regarded by Swash (1997:314) as an invaluable management tool. This will be explained in more detail by the researcher in the next section of the discussion, paragraph 6.3.

6.3 Information auditing and information management

The next section of the discussion will be devoted to an investigation of the contribution of the information audit, if any, to the process of information management. In paragraph 6.3.1 the researcher will investigate the relationship by linking the typical functions of information management to information auditing. Different authors' viewpoints of the contribution of the information audit to information management will be discussed in paragraph 6.3.2. The researcher will conclude the discussion on the contribution of information auditing to information management by highlighting the actual benefits that were derived from an information audit that was performed at a university (paragraph 6.3.3).

6.3.1 The functions of information management

Following on the discussion of what information management is, the researcher will examine the typical functions of the information management process, before drawing conclusions as to the value of information auditing for the information manager, if at all.

The most comprehensive approach to explaining the functions of the information management process, is provided by Boon (1990:320-321). He identifies different

levels of information management and links different functions of the information management process to these levels. It should be noted, however, that these levels are complementary to each other and that the distinctions between the functions on the different levels, are not mutually exclusive.

Boon (1990:321) identifies four different levels of information management, namely personal, operational, organisational and corporate strategic.

Level 1: Personal information management

Information management function	**The role of the information audit in supporting the information management function**
Use of information	The knowledge of the information sources that are available and where these are can contribute to the use of information.
Archiving information and disposing of information	The information inventory is analysed in terms of the usefulness of the information sources and according to this information, decisions regarding archiving and disposing can be made.
Marketing of information	An information audit is an effective marketing tool in itself as it heightens information awareness.
Dissemination and reproduction of information; Organising information; Making information accessible; Protecting and storing information (Boon, 1990:321).	A sound knowledge base of the status of organisational information resources can aid information management decisions about the dissemination, reproduction, organisation, accessibility, and protection/storage of information sources.

Level 2: Operational information management

Information management function	**The role of the information audit in supporting the information management function**
Identification of information needs	A very important component of the information audit, is an information needs assessment.
Information is generated and/or needed information is procured; information is disseminated	The comparison of the information inventory to the identified information needs will highlight where and what types of information is needed as well as to whom it should be made available.
Relevant information is identified	Identified information sources are evaluated in terms of their value to the users thereof.

Level 3: Organisational information management[3]

Information management function	**The role of the information audit in supporting the information management function**
Development and provision of an information technology infrastructure	The information audit can be structured to include an examination of information technology tools that can be used to support the effective management of information sources.
Determination of the value and cost of information	Not all information audits include this as a phase but the researcher reckons that it is essential that the valuing and costing of information sources should form part of an information audit (also see the discussion on this in Chapters 5 and 6).
The compilation of an inventory of information entities	This is an essential component of the majority of information audits.
The co-ordination and implementation of an organisational information policy	This can be a result of an information audit. Orna, for example, performs an information audit with the aim of developing and implementing an organisational information policy (cf. Chapter 5, paragraph 3.19).
The organisation of information in an information system	Once again the information audit renders sufficient information to make decisions as to how organisational information sources should be organized.
Information education	The information audit can be used as a sensitising tool, i.e. to make people aware of information and the value thereof.
Information consultation	The information audit is performed with the purpose of consultation.
The planning, development and continuous evaluation of information systems.	The information audit should be repeated at regular intervals for the purpose of evaluating information systems and sources.

[3] The functions that make up organizational information management are typically performed while keeping in mind the organisational mission and goals, as well as the resulting organisational information and marketing needs (Boon, 1990:321).

Level 4: Corporate, strategic information management

Information management function	The role of the information audit in supporting the information management function
The formulation of an organisational information policy	As indicated in the previous table, the results of the information audit can be used for formulating an organisational information policy.
The management of financial, physical and human resources in order to provide information systems; The facilitation of the sharing of organisational information that is relevant to planning; The co-ordination of the development of information resources for improved organisational and strategic decision-making; The management of the access to information needed for the accomplishment of organisational goals and objectives, as well as the dissemination of this information	The information audit provides a knowledge base that can be used for making management decisions about information sources.
The identification of strategic information needs (Boon, 1990:321).	As has been indicated before, the information needs assessment is an essential component of the information audit.

Boon (1990:321) concludes that the functions on the personal and operational level are mainly information activities, while management processes are dominant on the organisational and corporate strategic levels. These management processes are aimed at ensuring that resources are managed in such a way as to optimise information management functions.

The researcher comes to the conclusion that an information audit can contribute significantly to effective information management.

6.3.2 Different perspectives from the literature

This part of the discussion is based on various authors' statements that the information audit is a basic (and important) information management tool. For example: "The information audit is a management tool which can help an organisation to begin to understand how its information assets are being put to use and how these can be more effectively harnessed to achieve optimum productivity and strategic advantage" (Swash, 1997:318). Also: An information audit is a useful management tool that can help evaluate the information management situation in an organisation. In using the results to suggest improvements, the way in which information is managed, can be maximised, i.e. in terms of information provision, use, providing quality access to information, and information retrieval (Webb, 1994:9).

The researcher will investigate and provide an overview of how different authors view the relationship between information auditing and information management.

Information management is becoming increasingly complex. This can be attributed to a number of developments in the information environment, e.g. the increase in the volume of information that is available, the rapid development of information technology, more legislation governing the handling of information and the trend to

access information external to the company (as opposed to buying all the information that is needed and stocking it in the organisation) (Quinn, 1979:18).

Quinn (1979:18) suggests that the information manager use an accepted management tool to solve information management problems. One generally accepted management tool is the audit, e.g. the financial audit that provides a manager with an overview of the state of financial records in an organisation as well as their accuracy. In a loose correlation with the financial audit, Quinn (1979:18) suggests conducting an information audit to obtain an overview of the state of the information environment in a company.

Eddison (1992:8) also regards the information audit as a solution to many information(-related) problems experienced in organisations. This is the case since the information audit is used to determine how employees currently use information and from where they obtain this information. The audit also sheds light on the information-seeking behaviour and needs of non-users of the information centre and helps to explain why they use alternative information sources. The information gained from the information audit can therefore be used to help to solve information problems and in this way contribute to effective information management.

An information audit is a useful management tool that can help evaluate the information management situation in an organisation. Upon completion of the information audit, the auditor ought to have "an accurate description of the information system currently in operation". The information that has been collected will enable the auditor to give an opinion on the efficiency of the current organisational information system. Problem areas can be identified and recommendations made for the improvement of these. The auditor will also be able to indicate whether the organisational information environment supports corporate goals, as this comparison is done throughout the auditing process. The different pieces of the profile must be adjusted to fit into the proposal for improvement, i.e. the new information management plan (Quinn, 1979:19). In using the results to suggest improvements, the way in which information is managed, can be maximised, i.e. in terms of information provision, use, providing quality access to information, and information retrieval (Webb, 1994:9).

The findings of the audit will provide the analyst with an overview of individual information needs, as well as an overview of trends of information needs. This information must be used to develop an information management plan (the so-called "action plan") aimed at delivering a value-added information service (Jurek, 1997:43).[4] Furthermore, the extent to which information contributes to the business objectives of an organisation, can be investigated by means of an information audit (Booth & Haines, 1993:224).

One of the problems that hamper effective information management is the negative perception regarding the value of information sources and the accompanying ignorance regarding the potential value and role of information professionals in organisations. Dubois (1995:20-24) proposes that an information audit be performed to help solve some of these problems - or rather, to find possible answers. According to him, the information audit is an important tool for information management, even though there exist no standardised methodologies/guidelines for performing information audits. Currently, in many information centres/corporate libraries there is a constant threat of cost-cutting. The ideal scenario is that the value of information be recognised and that information be used for decision making at all levels in an organisation. Few companies have the ability to identify and evaluate whether information is available internally and at what cost. Dubois (1995:20-21) regards information auditing as a potential solution to these and other information problems that occur in organisations. Jurek (1997:43) is another author who stresses the importance of building a phase into the information audit during which the cost of information sources/resources will be determined. The cost of information must be connected with the value of information in the organisation. Worlock (1987:52) discusses the information audit as a tool to help determine the value of information and to examine whether the use of information technology could increase the value of information. Following the same line of

[4] The development of an information management plan forms an integral part of the information audit methodology proposed by Jurek (1997:42-43).

thinking, Underwood (1994:60) points out that even though organisations view information as "important" to them, the value and existence of information remain largely unrecognised. According to him the main value of an information audit lies in the fact that it can help an organisation to survive various periods of crises, as far as information management is concerned.

According to Alderson (1993:4) the a "new" approach to organisational information management is to deliver appropriate information services, by limiting information resources to those *actually used* within the organisation, as opposed to managing *potentially useful* information resources. As the researcher has determined, the information audit is the ideal tool to use to identify those information resources of real value to the organisation, as well as the costs of these information resources to an organisation.

The information manager must find answers to two questions. These two questions form the basis for proper information management:

- Is the information service geared towards supporting corporate goals?
- Is the information service being managed in a cost-effective manner? (Quinn, 1979:18).

Swash (1997:314) characterises the information audit as "a basic management tool" since the purpose of an information audit is to identify *what* information exists in an organisation; *where* it is; by *whom* it is used; at what *cost*, and to what *effect* [own italicisation] (Swash, 1997:314).

While finding answers to the questions listed above, it is important to determine what information needs exist within the organisation and to evaluate whether these are satisfied and if not, what the implications are. The information audit will furthermore help to determine redundant or irrelevant information sources and this in turn will result in suggestions for corrective action (Swash, 1997:314). It is important to note that these issues also apply to the so-called hidden (i.e. under-utilised) information sources in an organisation.

The results of an information audit can be used to formulate an organisational information policy (Webb, 1994:9). The policy is a core element of an organisational information management programme.

Major changes in an organisation, e.g. restructuring, a re-examination of its main business, etc. provide an excellent opportunity for reviewing the role of information in the organisation. According to Booth & Haines (1993:224) the information audit " is an information management tool that facilitates such a review."

Hamilton (1993:78) explains the importance of performing an information audit, by pointing out that very few, if any, other management functions in the organisation would tolerate ignorance to the extent that it exists about the information function.

The information audit should not be conducted with the promise of eventually saving an organisation money. The focus should be placed on increasing the competitive edge of the organisation, through the optimal use of information resources. The results of an organisational information audit can be used when looking towards the formulation of an organisational information policy. In the case where management is not interested in an organisational information policy, the results of the information audit will be useful for compiling a plan for the future development of the information resources (or even the information management function) of the organisation (Hamilton, 1993:96).

6.3.3 The role of the information audit in the information management process: A practical example

A more specific application of the information audit is where it is used as a tool for the development of a better corporate library/information service. According to Quinn (1979:18) the obvious (and easiest) solution to the information management problem, is the development of an improved library/information service. Before resorting to such drastic measures, the information manager needs to have an overview of the information centre in relation to its position in the organisation, i.e. "where and how it fits in the company".

A university functions as an information-intensive organisation where information resources are used to support the four main functions (teaching, research, management and community service) of a typical university. Examples of information entities in the university environment include, amongst others, the following: the university library, the computer centre, general administration, academic support services, personnel administration, the public relations department, the finance department, management information systems, the physical facilities department, posts and telecommunications services, etc. These information entities are usually dispersed throughout the organisational environment. Lubbe & Boon (1992:215) regard the mentioned information entities as strategic organisational information resources in that they are used to support the internal functions of the university, as well as to maintain a competitive edge.

In view of the discussion above, it is clear that information in a university environment should be recognized as a corporate resource and should subsequently be managed as such. Information management includes the control and coordination of corporate information resources. It should also be ensured that information systems and services provide accurate, relevant and timely information (Lubbe & Boon, 1992:215).

The results of the information audit that was performed at Vista University enabled the auditor to identify various shortcomings and needs relating to the objectives, management, use, value and cost of the corporate information resources. In view of these results, the auditor suggested the development of an integrated, corporate information management plan (Lubbe & Boon, 1992:222).

The results of an information audit performed at Vista University were used to find answers to a number of questions regarding the state of information management at the University, e.g.:

- Is information recognized as a corporate resource that should be managed as such?
- Is there anybody who has the responsibility for corporate information management?
- Is there an information policy in place?
- Are the purchase and utilization of information systems, sources and technology done according to proper planning and co-ordination?
- Does the University [organisation] know what the costs and value of its information resources are?
- Are information investments constantly re-evaluated in terms of its current use and value to the organisation?
- Do current information resources meet information needs and are those resources which become obsolete, removed?
- Are there any information standards/guidelines?
- Is information flow understood, recorded and monitored?
- Are strategic planning/organisational goals and objectives taken into account when planning for information services? (Lubbe & Boon, 1992:221).

7. Conclusion

The researcher comes to the conclusion that the information audit is a critically important information management tool. The information audit does not only contribute to effective organisational information management by providing detailed and accurate information on the organisational information environment, but also by providing an understanding of the way in which the organisation functions.

CHAPTER 5: INFORMATION AUDIT METHODOLOGIES

Chapter 5: Overview

The purpose of this study is to investigate the concept and process of information auditing by investigating different information auditing methodologies discussed in the literature. It is not intended to be a definitive or exhaustive study but, rather, a contribution to the debate on information auditing techniques.

1. Introduction

An increased interest in information management has led to an increased interest in the use of information audits (Ellis et al, 1993:134). As example of this interest, the SLA produced an information audit kit – as it is a topic that is important to information professionals (Hall, 1996:iv).

From the literature studied by the researcher it becomes clear that many authors do not regard a project as an information audit if it does not, at some or other stage, calculate the cost and determine the value of information resources. According to some information audit methodologies, the process is limited to identifying information needs, identifying information resources and determining how well the information resources meet the identified information needs.

2. Different approaches to information auditing

The researcher found discussions of a variety of different approaches to information auditing in the literature. For example: Ellis et al (1993:134) categorise information audit methodologies as follows:

- Cost-benefit methodologies
- Geographical methodologies
- Hybrid methodologies
- Management information audits
- Operational advisory methodologies

2.1 Cost-benefit methodologies

"The objective of a cost-benefit analysis is a list op options compared to each other on the basis of their cost and perceived benefit" (Ellis et al, 1993:135).

2.2 Geographical methodologies

The term *geographical approach* reminds the researcher of the process of Infomapping, as developed by Burk & Horton (1988) whereby the identified information resources are presented graphically by plotting them on an information map (infomap). From the description of this approach given by Ellis et al (1993:136), the similarity becomes clear as "the intention [of the geographical approach] is to identify the major components of the system and map them in relation to each other".

2.3 Hybrid methodologies

The information audits that are based on the hybrid approach, typically combines elements from more than one of the other approaches listed here. The example identified by Ellis et al (1993:136) is the methodology as developed by Quinn (1979:18-19). This methodology contains elements of the geographical approach, but

at the same time emphasises the calculation and determination of the costs and values of information resources, according to the cost-benefit methodology.

2.4 Management information methodologies

Booth & Haines (1993:231) describe the information audit as part of "a relatively new discipline, but one that builds upon established techniques from information science". In contrast to this, Ellis et al (1993:137) identify interest from role players in other fields, e.g. role players in the auditing, management consultancy and accounting professions. Although "[t]his has been mainly in the audit of management information systems (MIS)", there is "potential for broader application".

2.5 Operational advisory methodologies

Ellis et al (1993:138) define the scope of a typical operational advisory audit in terms of what the objectives should be:

- To define the purpose of the audited system and to establish how effectively it is being accomplished.
- To establish whether the purpose is in congruence with the purpose and philosophy of the organisation.
- To check on the efficiency and effectiveness with which the resources are used, accounted for and safeguarded.
- To find out how useful and reliable the information system supporting the organisation is.
- To ensure compliance with obligations, regulations and standards.

2.6 Compliance, advisory and inventory-oriented audits

Two possible approaches to information auditing are suggested by Haynes (1995:30), i.e.:

- a compliance-based approach similar to the approaches used by financial auditors (where the compliance of the organisation with financial procedures, standards and laws are evaluated);
- an inventory-oriented approach identifying and listing organisational information assets/resources.

A similar perspective is offered by Ellis et al (1993:134) who point out that there are two main types of auditing, i.e. compliance and advisory audits.

- The compliance audit is concerned with financial systems. It is an example of the traditional, financial audit that was conducted to investigate whether procedures were being followed and that legal and fiscal standards were being adhered to.
- In contrast, the advisory audit is concerned with strategic planning. The function of the advisory audit is to inform (potential) users of existing information systems and products. Furthermore the purpose of the advisory audit is to evaluate the effectiveness of organisational information systems in terms of how these contribute to attaining organisational goals.

The majority of information audits are of an advisory nature, though elements of the compliance audit may be found in some methodologies.

3. Methodologies

The researcher will provide an overview of different discussions on information auditing that were found in the literature. Each of these methodologies will be categorised according to the classification scheme proposed by Ellis et al (paragraphs 2.1 to 2.5). The researcher will conclude the discussion of individual methodologies with critical comments as to the usefulness and strong and weak points of each.

3.1 Barker

Barker (1990:27-34) bases the information audit methodology (1990:27-34) on work by Chambers, Diamand and Taylor. Barker's methodology consists of 10 stages.

Phase 1: Define the organisational environment

Identify the major goals of the organisation and determine what constraints affect the organisational information systems.

Phase 2: Identify the users' information needs

Barker (1990:28) regards this as the most crucial stage of the audit as this information must be used to determine whether the users are receiving relevant information from the organisational information systems, i.e. information that they need to perform their tasks and in so doing, obtain the organisational objectives and goals.

Phase 3: Compile an inventory of the available information resources

The inventory should not be limited to formal information systems, but should focus on the organisational information environment as a whole. The purpose of this stage is to determine whether resources are used efficiently (Barker, 1990:29-30).

Phase 4: Identify the strong and weak points of the information system(s)

Use the information that was gathered during the first three stages to develop an overview of the strong and weak points of the organisational information systems and resources. Key control points should also be identified (Barker, 1990:30-31).

Phase 5: Evaluate the weak points of the system

Identify the deep-seated reasons for system failures and determine the effect of these on organisational performance (Barker, 1990:31-32).

Phase 6: Test the key control points of the system

Barker (1990:32) states that the key control points of the system should be tested, whether or not system failures were identified.

Phase 7: Generate alternative solutions for system failures

Generate alternative methods for solving the system problems that have been identified. Input from management and staff can be invited. According to Barker (1990:32) this specific stage does not necessarily form part of an operational information audit, but is not it excluded by the definition of the audit either. Barker includes this stage in order to prevent the suggestion of only vague improvements. Real solutions to identified problems should be offered.

Phase 8: Evaluate the alternatives generated during phase 7

Make recommendations for changes – if necessary.

Phase 9: Monitor that the system adheres to existing standards and regulations

The researcher identifies this stage as being based on the principles of the compliance (financial) audit.

Phase 10: Make recommendations

In accordance with the audit findings a detailed report must be compiled. According to Barker (1990:33) "[t]he final audit report should be a full documentation of recommendations, reasons for them and supporting evidence from tests, etc." This is important because management needs to have accurate, complete information from which to make and implement decisions. The information in the report may also prove useful as a platform for performing future audits.

Comments by researcher

According to the researcher this methodology can be classified as an operational advisory audit for the following reasons:

- It is determined whether the purpose of the information system is in congruence with the purpose and philosophy of the organisation;
- The efficiency and effectiveness with which the information system is used, are determined;
- The usefulness and reliability of the information system is tested;
- The information system is monitored to determine adherence to regulations and standards.

An element of compliance forms part of the methodology – phase 9, where adherence to standards and regulations are determined. A possible limitation of Barker's methodology is the lack of a phase during which the cost and value of information resources are determined.

3.2 Hamilton

Hamilton (1993) discusses the process of information auditing extensively. Practical examples of how to go about implementing the various phases of the process are included for those organizations who would prefer to perform the audit themselves. These examples are taken from a case study of an actual information audit that was performed in an organisation.

Hamilton's methodology for performing an information audit, entails the following:

Phase 1: The proposal

The success of an information audit depends on preparing and submitting a good proposal. The proposal can be used to convince management of the importance of performing an information audit. Once the proposal has been approved, it can be used as a guideline for performing the actual audit (Hamilton, 1993:79).

Hamilton (1993:79) suggests that one should follow the in-house style (if there is a prescribed one) when drafting the proposal. The proposal should contain most of the following elements:

- Title of proposal: include the word *proposal*, to distinguish it from the final report.
- Introduction: give background information on the reason for wanting to perform an information audit and a brief overview of what it will entail.
- Methodology: describe the method that will be followed, listing it item by item.
- Staffing: indicate the number of people who will be involved in the audit and what they will be doing.
- Timescale: include due dates for each of the phases described in the methodology. Allow ample time for each of the phases (i.e. leave time for things to go wrong).
- Costs: include a budget, indicating costs that will be incurred, e.g. external consultancy fees (Hamilton, 1993:79-80).

Hamilton (1993:80) stresses the importance of allowing extra time and also budgeting generously, as it creates a much better impression if the audit is finished earlier and within budget than when the auditor "overshoot[s] in both areas."

Proofread the proposal and present it in a professional manner, i.e. typed, with wide margins, in double spacing and with headings in bold and uppercase (Hamilton, 1993:80).

Phase 2: Preparation for performing the information audit

Before one starts collecting data, all the needed equipment/instruments should be in place, e.g.:

- properly designed questionnaires;
- staff who have the skills to conduct interviews and/or analyse questionnaire results;

- record formats for each of the databases that will be used for storing the collected data;
- support staff from both the functions of information management and information technology (Hamilton, 1993:80).

Depending on time and financial constraints, a choice should be made whether to use external consultants or staff members. There are various advantages and disadvantages to using either of these groups, but a final decision should be made with a view to the specific circumstances within the organisation (Hamilton, 1993:80-81).

o Questionnaires

Questionnaires should be kept as short as possible. For the actual information audit that was performed, only one questionnaire was designed. This questionnaire served a dual purpose as it was sent out and also used during the interviews (Hamilton, 1993:81).

It is a good idea to use a structured questionnaire for interview purposes. This ensures that all interviews yield the same information. The headings can be used as guidelines to questions that must be asked (Hamilton, 1993:81).

A disadvantage to using questionnaires is the poor response rate, especially when these are sent out and respondents are responsible for returning the completed questionnaires. Research has proven that no more than a 10% response rate should be expected when sending questionnaires via mail. Such a poor response rate would render results useless when performing an information audit. For an information audit a response rate of at least 95% is desirable. Attaching an explanatory memo to individual questionnaires might help to improve the response rate (Hamilton, 1993:81).

For the audit that was performed by Hamilton (1993:81) a questionnaire was designed for the purpose of identifying the information resources that were used in the organisation. A need for a second questionnaire was identified and one was designed in order to determine the use of technological equipment in the organisation. The response rate to this questionnaire was 100%, as the questionnaire consisted of Yes/No responses with only the last question needing a written comment (Hamilton, 1993:81-84).

o Selecting interviewees

It is of the utmost importance to select interviewees so as to be representative of the staff composition of the organization. This will enable the auditor "to gain a full picture of the information resources in [the] organization." The telephone directory of the organization can be used to assist with choosing interviewees. Alternatively a staff list can be used. It is important to use a source that has information on the functions of staff members and the departments in which they work. Try and avoid interviewing staff who perform the same functions. It is furthermore important to obtain the names of the Heads of Departments, as they need to be informed of interviews that will be conducted with their subordinates (Hamilton, 1993:84-85).

Appointments must be made with all interviewees. Phone them individually and give each a brief explanation of the reason for the interview, explaining that it will not take up a lot of their time (Hamilton, 1993:84).

Phase 3: Conducting the interviews

Hamilton (1993:85) suggests asking questions in a conversational manner, rather than asking narrowly focused questions which result in narrowly focused answers, e.g. instead of asking whether IBM PCs are used, ask what type of PCs are used. This interview style will result in the interviewer being exposed to a lot information, some of which may be irrelevant. The interviewer needs to concentrate and judge what to include in the final results (Hamilton, 1993:85).

In the same manner, staff can be encouraged to talk about their jobs, the functions they perform and the information they use in support of this. An interview situation that encourages to the interviewee to talk freely, may yield very useful information and suggestions, e.g. suggestions of key staff members who should also be interviewed. The auditor can use this information to amend the list of potential interviewees (Hamilton, 1993:86).

Phase 4: Setting up databases

All the information that is collected during the auditing process, must be loaded onto a database. It seems senseless not to save all the information that has been collected. Loading the information on the information resources onto a database has the added advantage that this information can be made accessible to all the staff. In cases where a database management system (DBMS) is being used in the organisation, the auditor should try and use this same system, as it will need a minimum amount of training, if any, and staff will already be familiar with using the system (Hamilton, 1993:86).

Despite careful planning during the initial phase of the audit, it may be necessary to adapt the original record structure by adding or deleting some fields. Field names must be chosen carefully and if possible, should relate to the headings used in the questionnaires. If necessary, different security levels should be built into the database structure, e.g. available to anyone; available to all staff; available to a specific department only; available only to the interviewee. During the interviews, mention can be made of security measures. This should encourage interviewees to talk openly about all information sources (Hamilton, 1993:87).

Phase 5: Keying in data

Information from completed questionnaires/interviews should be keyed in regularly and Hamilton (1993:89) suggests that one should do this at least once every three days, or even more often, if possible. Interviewers will suffer from information overload and keying in the information regularly will help them remember more than if time is allowed to pass, especially if they did not write everything down because they "[will] remember it".

When scheduling the interviews, time should also be scheduled for keying in the results of these. It is preferable that the interviewer key in the data from the interview sheet (Hamilton, 1993:90).

Consistency can be ensured by keeping some type of "authority file", e.g. to indicate preferred forms of entry. Such an authority file will prove invaluable later on, when it can be used as a searching aid by users of the database (Hamilton, 1993:90).

In instances where a hard copy of the database is required, it is a good idea to do a test run print-out when there are only a few records entered. Adjustments can be made if necessary at a relatively early stage (Hamilton, 1993:90).

Phase 6: The cost of information

Many authors, including Hamilton (1993:91), regard the valuing of information as the most difficult part of an information audit. Factors that complicate the calculation of actual costs include amongst others: costs that are passed on to clients/departments; costs that are incurred that are not usually charged for, e.g. online search costs, telecommunications costs; costs to which built-in profit margins are added; the fact that costs are not limited to resources in the library/information centre but must be calculated for all the information sources in the organization (Hamilton, 1993:91-92).

In view of the complexities of calculating the actual costs of information sources, Hamilton (1993:92) suggests a compromise, i.e. "that the costing of information use throughout the organization will have to be based on what information is available, plus a best guess (an estimate)." A session with the organizational accountant can be useful, but as there are currently no accounting standards that can be applied to information resources, an estimate will have to do.

Phase 7: The value of information resources

The issue of how to determine the value of information resources is a controversial one. Much has been written about this, cf. the overview given in Chapter 4.

As is the case with calculating the costs of information, the problem of a lack of standards applies to valuing of information sources as well. According to Hamilton (1993:92-93) it comes down to the fact that "it is simply not possible to put a monetary value on anything – unless it is a service for which a charge is made."

The researcher will not go into detail as far as the problems of determining the value of information resources are concerned. This is an issue that can be addressed in another research project.

Phase 8: The final report

After all the phases discussed above have been completed, the information can be analysed and a final report can be compiled. The results of the information audit should yield information on patterns of information flow in the organisation; highlight areas where duplication takes place; and identify gaps in information provision (Hamilton, 1993:93).

The final report should include some or all of the following sections (not necessarily in this order):

- Introduction
- A summary of main points
- Brief explanation of what an information audit is and what the process entails
- Information on the identified organizational information resources and how these are used
- Cost and value of information resources
- Examples of questionnaire forms
- A list of people interviewed
- A copy of the original proposal (Hamilton, 1993:94).

The major part of the report should be made up of details of the identified organizational information resources. This section should be divided into subsections. Hamilton (1993:94) states that if the database was designed properly, a hard copy print-out can be made of the records with information on the identified information resources and this can then be included in the report.

The section on the cost and value of information resources need to be supported by an explanation of the complexities involved in doing the actual calculations and determining real value. The lack of (accounting) standards should also be pointed out (Hamilton, 1993:94-95).

A section can be devoted to discussing gaps in information provision that were identified, as well as other problems, such as duplication. A few recommendations can be made, but not too many, because "strictly speaking, an audit is simply an accounting function and not an opportunity to comment" (Hamilton, 1993:95). The researcher has determined that this statement of Hamilton is inaccurate, as it has been determined that one of the four main phases that make up an audit, is the phase during which reporting is done (cf. discussion in Chapter 2). Credit has to be given to Hamilton (1993:95) as she also points out that "since one point of carrying out an information audit is to see where improvements might be made, it would be foolish to simply list everything without comment."

Phase 9: Presenting the report

The auditor should get an opportunity to present the final report, at which time more detailed explanations of specific aspects can be given. It furthermore provides the auditor with an opportunity to acknowledge those staff members who have shown interest as well as those who participated and offered help. The presentation should preferably be limited to no shorter than 30 minutes and no longer than an hour and a half, depending on the specific situation in which the presentation is to be made. (Hamilton, 1993:96). These statements of Hamilton are in line with the findings of the researcher after investigating the characteristics of financial audits. According to the latter, an audit is performed with the purpose of "...expressing an opinion thereon...". Furthermore one of the stages that make up an audit is the phase during which evaluating, concluding and reporting takes place (The principles and practice of auditing, 1992:44,56).

Comments by the researcher

The researcher finds it difficult to classify the approach as described by Hamilton, as this approach does not fit perfectly into any of the categories as identified by Ellis et al (see the discussion at the beginning of this chapter). The reasons for this are that even though the costs and value of the identified information resources are calculated and determined, this is not done as a cost-benefit analysis. The approach as described by Hamilton could be classified as an example of the hybrid approach as it contains elements of the cost-benefit approach and elements of the operational advisory audit.

As a point of critique, Hamilton's methodology does not make provision for the definition of the organisational environment, e.g. the specific identification of organisational objectives, nor are these related to the use of organisational information resources. On the positive side, Hamilton's methodology focuses on the identification of information technology resources and only in instances where these are used as tools for handling/managing information resources (i.e. not technology for the sake of it being technology). The methodology as described by Hamilton contains many practical suggestions.

3.3 Alderson

Information auditing principles are integrated with accounting principles in the methodology discussed in this article. The methodology focuses strongly on determining the cost and value of information used in an organisation. The information audit was conducted with the purpose of monitoring the use of an online database by determining the online expenses and patterns of use.

In the case study discussed by Alderson (1993:2) the corporate library managed the information audit.

Phase 1: Patterns of use

The first phase of the information audit entails gathering information on the usage of online information services by staff within the organisation. Questions that could be asked, include, amongst others:

- What services are used?
- How frequently these are used?
- Which departments use these services?
- For what purposes are these services used? (Alderson, 1993:2).

Phase 2: Valuing information resources

Alderson (1993:74-78) does not offer any further discussion on the information auditing methodology that was used, except for a brief discussion on measuring the value of information resources. He briefly discusses a number of ways in which the value of information resources can be calculated, e.g.:

- Actual cost-savings can be calculated (e.g. when accessing a database through one vendor as opposed to a more expensive one);.
- The actual costs of online searches can be calculated.
- King Research conducted a study in which they calculated the return on investment to the organisation (by comparing information access costs to established goals which are satisfied) (Alderson, 1993:4).

o Results of the information audit

The main advantage resulting from the information audit, was relevant information that enabled the organisation to take steps to control the costs associated with online information (Alderson, 1993:2).

Comments by the researcher

The researcher finds it difficult to comment on this information audit, as the full methodology is not discussed. The researcher finds the comments on calculating the value of information resources useful. It is a pity that the specific methods are not discussed in any detail. According to the classification of information audit types by Ellis et al (1993:135) the researcher identifies Alderson's methodology as a cost-benefit approach.

3.4 De Vaal & Du Toit

De Vaal & Du Toit (1995:122-128) performed an information audit in an insurance company. The company experienced problems with records management and the information audit was used to identify the problems in managing the records of the company, the problems with information flow because of poor records management, and eventually to make suggestions towards the solving of these problems.

De Vaal & Du Toit (1995:123-124) base their information audit on Burk & Horton's Infomapping methodology. As discussed in Chapter 3, Infomapping consists of four main phases, i.e.:

- Compilation of a preliminary inventory
- Costing and valuing information
- Analysing the inventory, costs and values
- Identification of strong and weak points.

o Application of the methodology to insurance company ABC

Firstly, De Vaal & Du Toit (1995:124) point out a limitation in the methodology as developed by Burk & Horton, i.e. that it does not provide guidelines for determining patterns of information flow in an organisation. Initially the methodology was applied to only one department of the insurance company. An information inventory was compiled. The value and costs of the identified information resources, were not calculated. The phases that were performed (phases 1 and 4), were chosen based on the specific environment and taking into account the time and financial constraints. Burk & Horton indicate that it is not necessary to perform all the phases of their methodology in order to obtain useful results (De Vaal & Du Toit, 1995:124).

Top management recognised the value of business records for the effective functioning of the company and therefore it was not really necessary to convince them of the necessity of performing an information audit (De Vaal & Du Toit, 1995:124).

The job description of the administrative officer responsible for managing the records department was analysed. A new information inventory was compiled as no previous inventories existed and existing information that could have been useful, was outdated.[1] Following on this, the identified information records were classified according to a system proposed by Burk & Horton, i.e. as information sources, information services and information systems. Forms were designed to assist the auditor in collecting information on the records (De Vaal & Du Toit, 1995:124,125).

o Information collection and evaluation

All the identified information sources, systems and services were listed, but not prioritised. The pattern(s) of information flow in the organisation were identified through an interview with the postal clerk. The findings were presented in diagrammatical (visual) format. Problems in terms of information flow were also identified (De Vaal & Du Toit, 1995:125-127).

[1] According to Burk & Horton, the compilation of an information inventory ought to be an integral part of the strategic planning of an organisation.

- Conclusions and recommendations

The insurance company did not manage information as a resource and to its competitive advantage. De Vaal & Du Toit (1995:127) suggest that a corporate information audit be performed. Further recommendations include the following:

- The appointment of a qualified staff member in the position of records manager;.
- The formulation and implementation of a corporate information policy (that should also address records management issues).
- The compilation of manuals with guidelines for the management of records.
- The development of a thesaurus to be used when indexing records.
- The implementation of measures to monitor the flow of records in the organisation.
- An investigation into alternative methods for storing records (De Vaal & Du Toit, 1995:127).

It is also emphasised that an information audit must not only be conducted once, but that it should be an ongoing process (De Vaal, 1995:122).

The results (benefits) of the audit can be summarised as follows:

- Top management realised that proper records management could be of value to the company (i.e. That proper records management will ensure that records are used to support decision making, planning, problem solving, as well as other tasks in the company).
- Top management realised that information is actually a strategic resource in the company, and should be managed as such.
- The information inventory can be used as a basis for implementing a records management strategy in the organisation (De Vaal & Du Toit, 1995:127).

Comments by the researcher

According to the researcher the process that was conducted does not qualify as a proper information audit as only phases 1 & 4 of the methodology as developed by Burk & Horton, was used. The technique that was used, is known as Infomapping and according to the researcher this term is not a synonym for information auditing (refer to the discussion in Chapter 3). This finding is verified by Posch (1992:63) who identifies one of the main uses of information maps as a *tool* during information auditing.

The researcher classifies the approach as developed by De Vaal & Du Toit (1995:122-128) as a geographical approach to information auditing. The reason for this is that the technique used, Burk & Horton's infomapping, emphasises the visual presentation of information resources. De Vaal & Du Toit (1995:1626-127) also do a visual (diagrammatical) presentation of their findings on the patterns of information flow in the company.

3.5 Dubois

Dubois (1995:20-24) proposes that an information audit be performed to help solve typical information(-related) problems experienced by organisations - or rather, to help to find possible answers. He proposes an information audit methodology that unfortunately, is not always discussed in sufficient detail.

In the United Kingdom, research has shown that the majority of managers use mainly internal (financial) information for decision making. The role of external information is ignored to a large extent. External information may include information on the activities of competitors and information on the economic, social and political environment in which an organisation functions. External information can therefore also be a valuable resource for managers responsible for decision making. Despite managers mainly using internal information for decision making purposes these information resources are often described and managed as "non-productive overheads" (Dubois, 1995:20).

Ironically, despite the picture painted of the information situation in companies, a significant financial contribution is made towards information resources and services. Unfortunately, these contributions are "often both substantial and disorganized." In situations of emergency external consultants are often hired to act as information scientists in order to obtain information for a specific project. It is difficult to determine whether the use of external consultants are the most cost-effective option, as few companies have the ability to identify and evaluate whether information is available internally and at what cost (Dubois, 1995:21).

Dubois (1995:21) regards information auditing as a potential solution to the information problems discussed above. An information audit can be performed at corporate level (preferably), but also in smaller units/departments within an organisation.

The role of the information audit becomes clearer when one looks at what is included in an information audit. This might include the following:

- "identifying resources, services and information flows;
- verifying the existence of appropriate services;
- rationalizing resources;
- controlling costs;
- improving the marketability of services by increased visibility;
- exploiting the resulting improvements." (Dubois, 1995:21).

Dubois (1995:21) breaks the information auditing process down into the following phases:

- Planning phase
- Survey (of resources, services, flows and needs)
- Blueprint of situation
- Report (with recommendations for action)
- Establishing regular monitoring mechanisms.

Each of these phases will now be discussed in more detail.

Phase 1: Planning

Proper and detailed planning will ensure the success of the information auditing process. Planning should include the following aspects:

- Define the objectives of the information audit and identify constraints.
- Use this information to obtain support from top management for the project. This support is especially important as this will ensure the availability of needed resources as well as establishing future communication channels.
- Obtain organisational charts. These are used as a starting point for "mapping communication flows" and identifying potential survey respondents.
- Define the survey methodology to be used and determine and identify the sample of respondents.
- Select the members of the audit team. This will depend on the size and nature of the organisation or subunit that must be audited, as well as the size of the survey sample. The audit team can be made up of staff members, external consultants or even a combination of members from both these groups. It is of the utmost importance that the members of the audit team understand the organisation dynamics and culture.
- Contact all survey respondents and inform them of their participation in the information audit. It is also important to explain the process to them (Dubois, 1995:21).

Phase 2: Survey

The sample of survey respondents should include staff from all levels and units within the organisation. Organisational charts and other relevant information sources can be used to ensure a representative selection of respondents. The method of information collection proposed by Dubois (1995:21) is a questionnaire, supplemented by interviews.

Types of information that should be gathered during the survey, include the following:

- General information about the work of the respondent and his department (this should include information on the "perceived role of the department" as well as information on internal, external and interdepartmental relationships);
- Priority should be given to critical success factors as identified by the respondents.[2]
- Identify information sources (internal and external) that are used;
- Identify information needs in terms of strategic objectives of the organisation;
- If it is relevant to the specific situation, hardware and software needs should also be identified (Dubois, 1995:21-22).

It is important to note that Dubois' survey methodology is designed to determine the role of information as a key resource in the organisation, rather than as a marginal extra.

Finally the collected information must be transferred to a database – it is preferable to use a database program that is already in use in the organisation. The database structure should be designed to simplify data analysis (Dubois, 1995:22).

Phase 3: Audit blueprint

The results of the survey are used to develop a blueprint in which the creation, identification, cost, use and communication of information is addressed (Dubois, 1995:22).

The blueprint will help identify, "in a fully costed manner", resources such as staff, services and materials and indicate their location in the organisation. This in turn helps the auditors to identify gaps, areas where duplication take place, overlaps, the under utilization of resources and technological problems. The blueprint can also be used to determine the financial cost of information use as well as the contribution of information sources and their usage to the effective functioning of the organisation. If the blueprint contains suitable information the advantages of information use in the organisation can be quantified (Dubois, 1995:22).

The blueprint can consist of charts, "resource listings, itemization of cost elements and descriptive analysis" (Dubois, 1995:22).[3]

The purpose of the blueprint is "[in] effect .... [to] reveal what actually happens and [to] show up corporate nerve centres and gatekeepers together with informal communication networks." (Dubois, 1995:22).

Phase 4: Report

The results of the survey must be presented in the form of a written report. The report will describe areas identified for rationalisation, areas where information needs are not being satisfied, and will also include proposals for improvements/possible solutions. (Dubois, 1995:22).

Whether this quantification is possible or not, the audit report can make the role of information resources and systems visible. This is very important as the report is presented to top management in the end. Areas where additional resources are needed should also be highlighted (Dubois, 1995:22).

According to Dubois (1995:22) "[the] visibility factor alone may be sufficient to justify the audit in terms of its contribution to general management."

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[2] Dubois (1995:22) prefers the identification of critical success factors in an organisation, rather than the identification of information needs at such an early stage of the survey.

[3] It is not clear what Dubois means by this, as no detailed explanation is given.

Phase 5: Monitoring mechanisms

The audit report (discussed above) should include proposals with respect to the implementation of mechanisms that can be used to monitor the data included in the blueprint, e.g. transactional databases. Such a mechanism has the advantage that a full-scale information audit need not be repeated in the near future, except if extensive organisational restructuring takes place or if there is a radical change in corporate objectives and strategies (Dubois, 1995:22).

Dubois (1995:22-24) follows the discussion of the methodology with a detailed discussion of a case study of an information audit performed in an information centre where the results of the information audit were used for developing a pricing strategy for the information centre.

Comments by the researcher

The researcher comes to the following conclusions, after studying the case study: The determination of organisational information needs as essential, as is the report *with recommendations for action*.[4] The format of the blueprint that was developed during the case study, is unclear. It is noted that it is very important to implement regular monitoring mechanisms, but what these would look like and how they should be managed, are still unclear. Other aspects that are unclear as they are not discussed in detail, include: the way in which costs were determined; and the method(s) used to determine the cost of information use. Proposals were made. It is important to note that communication flows were also identified and included in the audit.

As is the case with Hamilton's information audit methodology, the use of information technology is investigated as a tool to effective information management. Dubois' however, is not as practical discussion of the methodology that was used, as for example, the one by Hamilton (cf. paragraph 3.2).

In terms of classification, the researcher classifies this audit as an example of the operational advisory approach, for the following reasons. The audit is used:

- To determine whether the use of organisational information resources are in congruence with the purpose and philosophy of the organization;.
- To check on the efficiency and effectiveness with which the resources are used, accounted for and safeguarded.
- To find out how useful and reliable the information systems and resources supporting the organization are.

This method could have been classified as a cost-benefit approach if more emphasis had been placed on the cost-benefit component.

3.6 Eddison

The author briefly discusses information audit methodology.

Phase 1: Interviews

Identify employees who must be interviewed. Potential interviewees must be chosen from all the management levels in the organisation. Make appointments with the interviewees. Eddison (1992:8) suggests that an interview lasts approximately 30 minutes. If more time is needed this time can be asked for during these 30 minutes. In order to prepare the interviewees, a list of questions can be distributed to them beforehand with a request that they look it over before the interview. An aspect that is even more important than having the interviewee prepared, is for the auditor to prepare. He needs background information on the organisational culture, goals,

[4] Own italicization – recommendations are not included as a component of all information audits, but the researcher regards it as essential.

objectives and functioning. This information will help him interpret the answers he gets during the interviews.

Eddison (1992:8-9) includes examples of the types of questions the auditor can ask during interviews.

Phase 2: Analyse information

Following the completion of the interviews the auditor must interpret the information that has been collected. St Clair (1995c) gives a detailed discussion of the way in which can interpret the statistical as well as impressionistic information. Eddison (1992:9) proposes a similar approach, e.g. she suggests that the results of the interviews be translated into increased requests for specific information services and products. This information can form the basis for the development of a strategic plan for the information centre.

Eddison (1992:9) also stresses the importance of follow-up audits. The purpose of such an audit is to determine whether the level of user satisfaction has increased, based on adaptations to the information centre, its information services and products.

Comments by the researcher

Eddison's is a limited application of information audit methodology, as the audit is performed within the organisational information centre and does not investigate the existence of other organisational information resources. This however, is acceptable as the scope of different information audits vary – as pointed out by Robertson (1994:34) who states that an audit can be limited in order to find a solution to a specific (operating) problem. The purpose of the audit as it was conducted in this case study, was to identify ways and means for improving the services rendered by the corporate information centre.

The researcher classifies this specific information audit as an operational advisory audit for the following reasons:

- The purpose of the audited system is defined and it is established how effectively it is being accomplished.
- It is established whether the purpose is in congruence with the purpose and philosophy of the organisation.
- The efficiency and effectiveness with which the resources are used, accounted for and safeguarded, are determined.
- It is determined how useful and reliable the information system is in supporting the organisation.

3.7 Gibson

Gibson (1996:12-13) discusses an information audit within the context of a library. He focuses on the basic elements of an information audit, popular misconceptions surrounding the process, and offers practical suggestions for performing an information audit.

Even though no standardised methodology exists, there are "recognised approaches to the audit process" (Gibson, 1996:12). As the basis to one such an approach, Gibson (1996:12-13) proposes the following three phases:

- Identify the users of information;
- Identify the technology used to handle information;
- Analyse the findings.

Each of these phases will consequently be discussed in more detail.

Phase 1: Identify the users of information

Once the user group has been clearly defined, it is relatively easy to determine whether the information service suits their needs. During this phase of the auditing process questions such as the following should be asked:

- Who uses information?
- What information do they use?
- What is the information used for (in terms of e.g. Task completion) - this in turn helps to determine the value of information
- What is the frequency of information use?
- How is the information stored, updated, retrieved and disseminated? (Gibson, 1996:12).

Phase 2: An investigation of the technology

Gibson (1996:12) reckons that an investigation of the technology used to handle organisational information, should form part of the audit process.[5] Questions pertaining to technology could include, amongst others:

- What "electrical" resources are used?
- Who has responsibility for purchasing the above?
- How reliable and appropriate are these resources?
- Are these resources compatible with other systems/technologies in the organisation?
- Who is responsible for the management of the technology? (Gibson, 1996:12)

Phase 3:Analyse the findings

Once the auditor has answers to the questions listed above, it is relatively easy to make comparisons and to draw distinctions. For example: it can be determined whether the resources that are used satisfy the requirements and the information needs of the users.

Comments by the researcher

Gibson's information audit methodology is similar in its approach to that described by Eddison, i.e. it focuses on a specific information system. The value of information resources is addressed, but not in much detail, i.e. only the relative value of the resources is determined. An "information technology audit" is included as part of this specific information audit methodology. The researcher classifies Gibson's methodology as an operational advisory audit because it is used:

- To establish whether the purpose of the information system is in congruence with the purpose and philosophy of the organisation
- To check on the efficiency and effectiveness with which the resources are used, accounted for and safeguarded;.
- To find out how useful and reliable the information system supporting the organisation is.

3.8 Jurek

In the article by Jurek (1997:42-43) the information audit is discussed from the perspective of the secondary research analyst. The article contains useful elements to keep in mind when conducting an information audit.

[5] Some authors suggest a separate "technology" audit for hardware and software or an information systems audit.

Phase 1: Articulate information needs/services

This phase closely resembles a traditional information needs assessment. The researcher has determined that many organisations who complete this phase successfully claim to have conducted an information audit. In view of the definition of an information audit, as well as what it is not (see Chapter 4, paragraph 2), it is clear that an information audit is much more than just an information needs assessment.

During this phase where the information needs of patrons must be identified, an answer must be found to *what* the clients in the organisation need as far as information sources/services and products are concerned.

When analysing the findings of this phase, duplication of services to individual clients can be eliminated, because the auditor will be able to identify areas where standardized information services/products can be delivered (Jurek, 1997:42).

Phase 2: Identify information sources/resources

It is important to identify which information sources/resources clients prefer, when alternatives exist for the same information source/resource. The main question to which an answer must be found is *who-has-access-to-what*.

The findings will be useful for identifying main "information streams" used or preferred by clients, as well as for planning the value-added information services/products (e.g. in terms of delivery format, as well as content and context analysis) (Jurek, 1997:42-43).

Phase 3: Compile proper profiles of information users

Jurek (1997:43) classifies information users according to the two extremes of a continuum of information users, i.e. power users and nonusers. Power users are "information independent" and are capable of satisfying their own information needs. Nonusers on the other hand, usually make use of an information mediary to satisfy their information requests.

During the information audit the analyst should determine where on the continuum the information user should be classified, as this will help in developing the information service. It is suggested that individual files be created for the different information users with a summary of their information profiles on the cover of the file. It is of utmost importance to update these profiles regularly as this will ensure the delivery of a relevant, customized information service (Jurek, 1997:43).

Phase 4: Develop an information management plan

Jurek (1997:43) stresses the importance of building a phase into the information audit during which the cost of information sources/resources are determined. The cost of information must be related to the value of information in the organisation.

The findings of the audit will provide the analyst with an overview of individual information needs, but also an overview of trends of information needs. This information must be used to develop an information management plan (the so-called "action plan") aimed at delivering a value-added information service (Jurek, 1997:43).

Comments by the researcher

Jurek is the only author who includes the development of an information management plan as part of the information audit methodology. This is in stark contrast with authors such as Burk & Horton whose Infomapping methodology is only aimed at discovering and identifying information resources and Orna, whose information audit methodology does not include the "blueprint" with suggestions. The thoroughness with which Jurek conducts the information needs assessment component of the audit, moving beyond a traditional needs assessment and also compiling information profiles of the users, could be looked at when developing an information audit methodology. Despite it being a very good basic information audit methodology there are gaps, especially regarding the investigation of the organisational environment.

Jurek's methodology can be classified as a hybrid approach to information auditing for the following reasons:

- the methodology includes a phase during which the efficiency and effectiveness with which information resources are used, are checked (operational advisory audit);
- the methodology also allows for the calculation of the costs of information resources and determining the value of these (cost-benefit approach).

Jurek's methodology therefore contains components from both the operational advisory audit and the cost-benefit audit.

3.9 LaRosa

LaRosa (1991:7-9) discusses guidelines for performing an information audit. The aim of the information audit is discussed from a marketing perspective, while the methodology itself is based on the method of interviewing.
LaRosa (1991:7) indicates, like a number of other authors, that there is no set methodology for an information audit. She describes an information audit as "more of an evaluative art [rather] than a science". She discusses guidelines that could be followed when performing an information audit within an organisation, based on gathering information by means of interviews rather than using questionnaires.

Phase 1: Identify the potential markets

Make a list of current and potential clients of the library (LaRosa, 1991:7).[6]

Phase 2: Select specific markets

Decide which of the client groups and/or organisational units will be included in the information audit. The ideal is to audit the entire company but this may not always be possible. LaRosa (1991:7) suggests that one take into account the "information intensity" of various organisational units when one has to decide which units to audit.[7]

Phase 3: Identify appropriate contact persons

At least one contact person should be identified for each of the organisational units to be audited. Contact persons will probably be managers or heads of departments or divisions. According to LaRosa (1991:7) the auditor should also try and identify employees involved in planning activities, product management or analysis.

Phase 4: Send a memo to each prospective interviewee

LaRosa (1991:7) suggests that the auditor send a memo to each prospective interviewee in which he explains the purpose and scope of the audit and in which he indicates that he will be contacting him/her in the near future to set up an appointment for an interview. Informing the individual in advance often leads to greater success.

Phase 5: Call and make appointments with each interviewee

Draw up a schedule of interviews. Allocate approximately one hour per interviewee and space the interviews properly, in order to allow for longer and shorter interviews. Spacing the interviews properly with enough time in between interviews, also allows the auditor to review the information he has obtained. The auditor should take into account his own preferences, e.g. whether he functions better in the morning or in the afternoon. Confirm the appointments with the various interviewees. At this point the auditor should also request copies of the goals of the various organisational units and/or information on the functions performed. This background information is important as it will help the auditor to identify critical issues, before conducting the interviews (LaRosa, 1991:7-8).

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[6] The auditor can use an organogram in order to determine the way in which the organisation is structured.

[7] The information intensity refers to the volume of information required by users on a regular basis and which supports them in the execution of their tasks.

Phase 6: Conduct the interviews

Arrive on time for the interview and start the interview by giving the interviewee an overview of the scope, purpose and expected results of the information audit. The best method to follow is to use a structured questionnaire as basis for the interview. This ensures that the same type of information will be obtained from each interviewee and that all the information needed will be gathered. LaRosa (1991:8) stresses that it is important to keep track of time during the interview. The auditor should be sensitive to the interviewee's biases and should focus on obtaining relevant information. He should give the interviewee an opportunity to make additional comments at the end of the interview and leave a telephone number where he can be contacted if the interviewee wants to comment on specific issue(s) at a later time.

LaRosa (1991:8-9) makes an important comment in terms of the questions one ask in order to obtain information during the audit. The questions should not ask directly "What information do you need?" The reason for this is that not many people have a clear idea of the types of information they need and use regularly. The questions the auditor asks should rather focus on the activities being performed and where information is obtained for these purposes. In this way the auditor will be able to determine "how, when and why each group seeks information".

Phase 7: Compile and analyse the results of the interviews

LaRosa (1991:8) states that it is a good idea to review the information one has gathered after the completion of one or two interviews. Determine whether any of the questions are too vague or misleading and might therefore confuse the interviewees. Make changes, if necessary.

Once the interviews have been completed, the auditor must make sense of a large collection of information. Group together the results of interviews for each organisational unit. Summarise the findings and focus on critical issues and challenges facing each of the units. Lastly, identify common trends.

Comments by the researcher

LaRosa presents the reader with a very practical discussion of how to go about performing an information audit. Even though the costs of information resources are not calculated and the benefits of these are not determined, the methodology focuses strongly on the organisational environment and how the information resources contribute to the goals of the organisation. For this reason LaRosa's methodology is classified by the researcher as an operational advisory audit.

3.10 Lubbe & Boon

The information audit methodology that was developed by Lubbe & Boon (1992:215) was based on the general systems approach (as reflected in the methodology for the design of information systems, as described by Boon & Op't Hof, 1990:183-186).

Lubbe & Boon (1992:214-223) performed an information audit at Vista University. The authors based the information audit methodology on the process of infomapping (Burk & Horton). The following adjustments were made to Burk & Horton's methodology:

- The audit was conducted on a macro graphic level.
- Lubbe & Boon (1992:216) also combined steps one and two of Burk & Horton's methodology, i.e. the identification of the information resource entities and costing and valuing of these, were performed simultaneously.
- Personal information resources of staff members were not identified.

- The identified information resources were evaluated by the managers as well as the users thereof.
- The ultimate purpose of the information audit was to identify the corporate information resources and to specify guidelines for a corporate information management plan (Lubbe & Boon, 1992:216).[8]

Prior to performing the audit, the support of top management was obtained. Following on this a letter was sent out by the Vice-principal, encouraging staff to participate in the information audit. The information audit form was tested in a trial run. This helped to ensure that the questions asked were relevant and clear. The audit was initially performed at the main campus and thereafter at the various satellite campuses (Lubbe & Boon, 1992:216).

Phase 1: The organisational environment

This phase involved the determination of the mission and objectives of the University, as well as the structures/environment of the information resources.

Phase 2: Identification of all internal and external information resources

This phase was aimed at the identification (by means a survey) of all the internal and external information resources that were used by or in possession of the University. The auditor identified strategic information resources through interviews with managers. The managers helped to identify and determine the management methods, objectives, user groups and utility of each of the resources. Since the audit was conducted on a macro graphic level, information resources were only recorded in so far as they were of use within a specific department, as well as outside, i.e. to University officials. (Personal information resources were not included in the inventory.)

The questionnaires were either sent out or handed to different users, e.g. students (library users) and lecturers. Where possible, the researcher assisted users with the completion of the questionnaires. Users received questionnaire forms for each information resource that they used. Two letters were attached to each form: the letter from the Vice-principal, explaining his support of the audit; as well as a letter from the auditor, explaining the background to the audit and the purpose thereof. The second letter also contained guidelines on how to complete the questionnaires. The auditor also used sources such as annual reports, to collect relevant information (Lubbe & Boon, 1992:216).

Forty-four information resources were identified. Examples included: management information systems, library services, financial systems, post and telecommunications services, academic support systems, vocational information for students – to name just a few (Lubbe & Boon, 1992:216).

Phase 3: Evaluation and valuation of the information resources

The identified information resources were evaluated and valued by the users as well as managers thereof. In addition to this, the capital and operating expenses of the information resources were calculated (Lubbe & Boon, 1992:215-216).

Phase 4: Calculation of the capital and operating expense of the information resources

Two cost elements were used in calculating the financial value of the identified information resources, i.e. operating costs and capital costs (Lubbe & Boon, 1992:217).[9]

- The information audit forms

Lubbe & Boon (1992:216) used different audit forms to collect different types of information during the auditing process. The first, the information audit form, was

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[8] Burk & Horton's methodology only suggests a way of compiling an inventory of corporate information resources. No mention is made of using the results for developing a corporate information management plan.

[9] A detailed explanation is given of how the various costs were determined – see Lubbe & Boon, 1992:217.

used to collect information on the "medium, management, objectives, users, utility, value and cost" of information resources (Lubbe & Boon, 1992:216).

A second, separate form was developed for the evaluation of information resources. This form was completed by identified users and added to the evaluative information that was supplied by managers. A set of value criteria was included in the form and guided the users in evaluating an information resource.[10] The criteria were grouped in two sets of 10 criteria each. The first set was used to measure the value of the information resource itself and the second set to evaluate the quality and availability of the information resources. For information resources where the information content was of no relevance, only the first set of criteria was used to measure the value of the resource, e.g. the telephone system.

- Evaluation

A semantic value scale was used to determine the value of information resources, as evaluated by users. The mean value for each information resource was determined by adding the different scores allocated to each information resource by individual users and calculating these as a percentage – see example below:

Criterion	User 1	User 2	User 3	Total	Percentage
Accessibility	3/5 +	2/5 +	4/5	= 9/15	= 60%
Ease of use	4/5 +	4/5 +	3/5	= 11/15	= 73%

(Lubbe & Boon, 1992:217)

- Results

The main conclusion from the audit results, was that the University does use information extensively, but does not recognize information as a resource *per se* (Lubbe & Boon, 1992:217).

Comments by the researcher

The methodology as developed by Lubbe & Boon is quite a comprehensive one, especially when compared to some of the other methodologies discussed in this chapter. The organisational environment is carefully investigated and costs as well as values of information resources are calculated and determined. The audit is advisory by nature (in terms of the specification of guidelines for the development of an organisational information management plan.) The audit methodology does not contain any compliance elements, i.e. evaluating the adherence of information resources to standards and policies. The researcher classifies this specific methodology as a hybrid approach since as it contains elements of the geographical approach (infomapping), the operational advisory audit approach (by investigating how the organisational information resources contribute to the goals and objectives of the organisation) and the cost-benefit approach.

3.11 Quinn

It is important to note that the concept INFORMATION AUDIT is a registered service mark of Arthur D. Little, Inc. (Quinn, 1979:18).

Phase 1: Profile current set up

The main purpose of the information audit is to obtain enough information to compile a picture of the current state of information resources in the organisation. Quinn (1979:18) suggests that one starts this process by compiling an inventory of the

[10] The researcher identified these criteria as based on those included in the Value-added model, as developed by Taylor 1986.

information resources in the organisation. A profile must be developed for each identified "information center".

The profile for each identified information centre should include the following elements:

- Purpose/goals: The first step is to determine the reason why the specific information resource (under investigation) exists. This will help in determining whether the information resource supports the corporate goals (Quinn, 1979:18).[11]
- Scope: Determine what type of information is supplied to whom. The information that is provided to users can be grouped according to subject area. This overview can in turn be used to evaluate whether the information supplied supports users in performing the tasks that make up the organisation, e.g. whether the collection contains mostly historical information or whether it is updated as frequently as is required (Quinn, 1979:18).
- Services: It is a logical step to investigate the information services rendered, because these are closely linked (or supposed to be closely linked) to the goals of the information resource. The auditor can, for example, look at whether an active or passive information service is rendered (Quinn, 1979:18-19).
- Role: Obtain a clear definition of what the role of the specific information resource is in the organisation. Quinn (1979:19) suggests looking at the organisational chart and determining where the information resource fits into the organisational structure. This will also clarify the reporting relationship of the information resource which in turn influences the way in which it can be managed, e.g. the decision making authority that the manager is allowed. On a more positive note, the findings of this phase of the information audit can be used effectively to restructure or reposition the information resource so that is in a better reporting relationship.
- Cost: According to the methodology proposed by Quinn (1979:19) the cost of the information resources must be calculated by the way it is paid for, i.e. by the users (from departmental budgets) or as an overhead. The problem that is created in the latter instance is that the notion is reinforced that information is "free" or of little value.
- Users: Rate each information resource in terms of the users' perceived value thereof, e.g. the relevancy of the information resource, as well as the frequency with which it is consulted/used. At the same time reasons for dissatisfaction with services or aspects of services can be identified (Quinn, 1979:19).
- Staff requirements: Evaluate the qualifications and responsibilities of staff who manage/handle information resources, e.g. the proportion of clerical staff as compared to professional staff. The findings will clarify whether the staff members are able to manage the specific information resource(s) (Quinn, 1979:19).

Comments by the researcher

The researcher does not agree with Quinn's (1979:18) statement that the "company [information] resources can be easily identified" using this methodology. Quinn bases this statement on a very limited view of what corporate resources encompasses, i.e. "the corporate library or information center and any specialized libraries serving specific divisions such as marketing and R&D". The researcher reckons that this limited view of organisational information resources exclude many information resources, e.g. so-called "hidden information entities", personal information collections, etc.

Quinn places a strong emphasis on taking into account the organisational environment by mentioning it in almost every phase. The cost of the information resources are related to the users' perceived value thereof, i.e. according to the cost-benefit approach. Unfortunately there is no phase for the writing of a report and making recommendations based on the findings of the audit. According to Ellis et al

[11] The researcher wants to point out at that obtaining background information, such as the corporate goals, is invaluable to the success of the information audit.

(1993:136) Quinn's methodology can be classified as a hybrid approach to information auditing, seeing as it includes components of the cost-benefit approach and shows similarities to the geographical approach.

3.12 Riley

The information auditing process as described by Riley (1975:24-25) is made up of a number of relative cost factors. The following are the typical cost factors that should be considered when acquiring a new information product:

- Time: Riley (1975:24) states that "it is necessary to quantify the time saved in data collection by using new [or existing] information products versus the development of the needed information by one's own means."
- Space: Calculate (at annual cost per square metre) how much space is currently being used for storing information collections. Do the same calculation for the new information product that is under consideration (Riley, 1975:24).
- Equipment: Calculate the costs of acquiring new equipment that will be required for using a new information product.
- Personnel costs: Determine the number of people currently employed to manage (collect, record, file, etc.) data/information. A new information product may not necessarily need fewer people, but they might be used in a different (e.g. more productive) way or used for performing new tasks (Riley, 1975:25).
- Redesign efforts: Calculate the costs involved in developing a product from scratch, as opposed to buying a commercially available product (Riley, 1975:25).
- Currency, completeness and accuracy: The specific environment and the type of information and information needs will determine the requirements for currency, completeness and accuracy of information. An example is to calculate the cost of archiving, whereas in some environments there may be no or very little need for historic information (Riley, 1975:25).

Comments by the researcher

Riley's methodology places a strong emphasis on measuring quantifiable costs, therefore this methodology can be classified as a cost-benefit approach, even though the benefit component is not addressed directly. The organisational environment and information needs are not taken into account. The researcher regards the different cost factors as useful and these can be considered when developing an information audit methodology.

3.13 Robertson

Robertson (1994:35) provides an overview of guidelines on how to perform an information audit.

Phase 1: The organisational environment

A prerequisite for performing an organisational information audit is a sound knowledge and understanding of the culture and functioning of the specific organisation (Robertson, 1994:35). This is important as information should be used to support the achievement of organisational objectives and goals – whether this is the case will be determined by conducting the information audit..

Phase 2: Determine the purpose of the information audit.

This will be influenced by the resources available for conducting the audit as well as expectations from management. With this information as a basis, guidelines for the execution of the audit should be drawn up. Keep in mind how long it will take to perform the full audit and what it will cost the organisation in terms of financial, human and/or physical resources (Robertson, 1994:35).

Phase 3: Identify who will perform the information audit

The "information auditors" can be either employees or external consultants. Robertson (1994:35) suggests that for the first information audit to be performed in an organisation an auditing team should be compiled consisting of employees as well as external consultants. The size of the team will be determined by the above, i.e. the scope and purpose of the information audit to be performed.

Phase 4: Analysis

The final step is to analyse the information that have been gathered during the performance of the information audit. The findings of the analysis should highlight organisational strengths, weaknesses, opportunities and threats. Conclusions drawn from this information should be summarised in a written report and should include suggestions for improvement and/or possible solutions to identified problems (Robertson, 1994:35).

Comments by the researcher

This methodology places a strong emphasis on the organisational environment. It is not clear whether an information inventory is compiled. Unfortunately Robertson does not provide the reader with details of what happens during the audit itself – it seems as if only the first and last stages of the audit are discussed. The researcher classifies this audit methodology as an operational advisory audit because of the strong focus on the organisational environment and determining how the information resources contribute to fulfilling the organisational goals and objectives.

3.14 St Clair

St Clair (1995a:3-5) describes a basic information audit methodology. This is done in a series of three articles that include many practical examples and suggestions that can be used when performing an information audit.

Phase 1: The questionnaire

Distribute a questionnaire to managers, as well as users and potential users (the so-called "information indifferent") of the library. St Clair (1995a:3-5) concludes his first article with an example of a questionnaire that can be used when performing an organisational information audit. This questionnaire can be customised in order to be used within different environments (see Addendum E).

Phase 2: Interviews

The second article in the St Clair's series on information auditing provides a detailed discussion of the interview component of the information audit (St Clair, 1995b:6-8).

St Clair (1995b:6) indicates that the auditor will need two different kinds of information in order to perform a successful information audit, i.e. statistical information and impressionistic information. The first type of information can be gained from the questionnaires that are distributed to the users, while the interviews will provide the auditor with an opportunity of collecting more subjective information. When the auditor interprets the information that has been collected he must create a relationship between the statistical information on the one hand and the more subjective information on the other hand. For this purpose the questionnaire must be designed and distributed.

As a next step, it is important to obtain support from management for the interviews which the auditor plans to conduct. Such support is important in view of the time it will take up, i.e. the time of the interviewees as well as of the librarian. In instances where the librarian does not have the time to conduct the interviews, an external consultant has to be appointed for this purpose. This decision has to be cleared with management (St Clair, 1995b:6).

The auditor has to decide which format the interviews are going to take. He has a choice between one-on-one interviews or focus groups.[12] The ideal is to combine these two methods. In making a decision the auditor has to take into account the organisational politics, as some departments work very well together and would therefore be suited for a focus group, while personality clashes might make one-on-one interviews more desirable in other departments (St Clair, 1995b:6).[13]

Select the employees who will participate in the interviews (regardless of what format they take). The librarian is in an ideal position as he has first-hand experience and knowledge of who uses the library and its services and who does not use it. He can therefore compile a balanced list of participants. St Clair (1995b:7) suggests that before one makes appointments for interviews, one reviews the list of participants. One must review one's choices and the reasons for these choices, e.g. make sure that one or two members of strategic management are also interviewed. Though they might not make use of the library they do use information and one needs to find out from where they obtain it. A good idea is to present the list of potential interviewees to the manager/supervisor of a specific department. Based on his input one might decide to include or exclude specific employees.

St Clair (1995b:7) states that some auditors prefer to interview only those users who did not fill out questionnaires. He disagrees with this methodology. He argues that users who have already completed a questionnaire are better prepared for questions the auditor wants to ask during the interview. The auditor is more likely to get a holistic picture when he interviews a user who has completed a questionnaire, as the purpose of the interview is to cover different issues than those already addressed in the questionnaire.

It is important to follow a professional approach during the interview process. St Clair (1995b:8) suggests the following: send a memo to the users one has decided to interview (explain the purpose of the interview and information audit in the memo); contact them in order to set up appointments (suggest several times during which one can meet them - this ensures better participation). Draw up a schedule of interviews. Allocate approximately one hour per interviewee and space the interviews properly, in order to allow for longer and shorter interviews. Spacing the interviews properly with enough time in between interviews, also allows the auditor to review the information he has obtained.

St Clair (1995b:7) concludes with an example of questions which the auditor can ask during the interview. These questions can be customised for different environments (see Addendum F).

Phase 3: Analysis

This phase entails the processing of the results of the interviews and questionnaires and the interpretation of these within the context of the organisational mission, goals and functions.

The third article in St Clair's series on the information audit offers practical guidelines for the interpretation of data collected during the information audit, specifically comments made during interviews and responses to questionnaires (St Clair, 1995c:5-7).

The first set of information to be interpreted relates to the response rate, i.e. the percentage of completed questionnaires that is returned to the auditor. If the response rate is higher than was expected the auditor can state that a specific percentage of the employees who were questioned exhibit an interest in the library and its services and products. Furthermore, as the auditor had carefully chosen the employees to be questioned so as to ensure that they are representative of the employee community within the organisation, the auditor can state that a specific percentage of the employees of the organisation are actively interested in the library. The result is a statistical indication of the value of the library "to a significant portion" of the employees of the organisation (St Clair, 1995c:5).

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[12] The latter is also referred to as group interviews, though theoretically speaking there is a distinction.

[13] The American Management Association has rated the advantages of focus groups as the best method for determining customers' real needs.

Besides indicating the value of the library within the organisation, the librarian can interpret the response rate in terms of his own significant role within the organisation (St Clair, 1995c:5).

The questionnaire used also contained a number of questions that produced subjective responses (cf. Addendum F). St Clair (1995c:5-6) describes these as "'warm and fuzzy' questions and answers", e.g. "Briefly describe your job". These are included in order to familiarise the person who has to fill out the questionnaire with the type(s) of questions. Once the user has completed the introductory questions, questions regarding information-seeking behaviour follow. From the answers the librarian can determine whether the users are comfortable with searching for and retrieving information. If the answers are negative, the librarian needs to determine what the problems are and then has to develop a strategy to improve the situation.

The next set of questions is more specific, e.g. "Do they use the library for marketing information? For management/decision making? ..." Answers to questions like these will indicate whether the library, its collection, information services and products are relevant to the needs of users within the organisation (St Clair, 1995c:6).

The rationale behind the interpretation of the questionnaires is that the librarian should look for guidelines which will help him to satisfy the *real* information needs of the users. The aim is to customise the library so that it will provide what the users *want*, in stead of what the librarian *thought* they wanted. That is after all the purpose of the information audit: "to listen to your users, to learn about the information needs that they think are important" (St Clair, 1995c:6).

The result of this stage is documented proof of the information needs of the users within the organisation and also of what has to be done in order to satisfy these needs (St Clair, 1995c:6).

The auditor has found out by this time that interviewing is not easy. Nor is it easy to interpret the information that has been collected from the individual interviews and focus group interviews. Most probably the answers indicated that users expected a lot more of the library than is currently on offer. If the interviews and focus groups were conducted by the librarian, he might be very worried about the expectations. St Clair (1995c:6) assures the librarian that he still has the upper hand in this situation as he has expert knowledge on what can and what cannot be done in terms of information services and products. Therefore, before the librarian decides on new plans of action the subjective information must be interpreted in terms of the statistical data.

The result of the above phases of interpretation is "a package of information about information", indicating what the users' needs are, how these needs can be met as well as how well the library is currently performing and how satisfied the users are (St Clair, 1995c:6).

Phase 4: Writing the report and implementing the recommendations

In conclusion, the findings of the information audit have to be documented in a formal report. This report is presented to the management of the organisation, while a summary of the findings contained in the report should be distributed to those users who were involved in providing information for the audit. Furthermore, St Clair (1995c:6-7) suggests that a "press release" on the findings of the audit be published in the newsletter of the organisation. Another way in which to distribute the findings of the audit is to report on it during meetings and informal gatherings. The researcher has found that it is important to distribute the findings and recommendations of the audit in a positive manner, as audits often invoke feelings of fear and uncertainty. Furthermore one owes it to the participants who have sacrificed time in order to help provide information for the audit – they have a right to know about changes that will be made.

St Clair (1995c:7) makes a number of suggestions that should be kept in mind when writing the report. It must be written with a positive "tone": stress how good the library currently is and how much better it can become once the recommendations have been implemented. Be realistic and honest: if it was found that some users satisfy specific information needs through external sources, this should be recognised. The report should also define the boundaries of the library in terms of the information services and products it can realistically and cost-effectively provide.

Once management has accepted the report, the librarian and selected members of management can start work on implementing the recommendations that have been made. In some cases it may be necessary to go as far as to formulate a mission statement for the library. In instances where there is already a mission statement, it has to be decided whether it should be re-formulated in view of the findings of the information audit. Based on this a plan can be developed for the implementation of a strategic plan for the library. The term "strategic" indicates that the purpose of the library and its information services and products are to help the organisation fulfil its strategic objectives. At the same time, the librarian is on "[his] way to the strategic management" of the library (St Clair, 1995c:7). In the long-term the library can become the true information centre of the organisation (St Clair, 1995c:7).

Ironically some librarians do not appreciate "'too much' attention". Users' new awareness of available information services and products may rapidly increase the size of the user population. St Clair (1995a:2-3) stresses that such an increase in users' numbers is an indication of the success of the information audit. One of the purposes of the audit is to document the users' needs for specific information products and services.

Comments by the researcher

As is the case with the articles by Hamilton and LaRosa, St Clair's discussion of information audit methodology is very practical and includes many examples. The organisational environment is carefully investigated, but the cost of the information resources is not calculated. The value of these to the users thereof is determined. There is no specific phase during which an information inventory is compiled. Even though St Clair (1995a:1-5) discusses the information audit within a one-person library, the basic principles can be applied to any information-intensive environment.

The writing of the final report and making recommendations are included as a final phase of the audit. Even though St Clair's methodology does not contain any compliance procedures, this approach to information auditing can be classified as an operational advisory audit for the following reasons:

- the purpose of the audited system is defined and it is established how effectively it is being accomplished;
- it is established whether the purpose of the information system is in congruence with the purpose and philosophy of the organisation;
- the efficiency and effectiveness with which the resources are used, accounted for and safeguarded, are checked;
- it is determined how useful and reliable the information system supporting the organisation is.

3.15 Stanat

Stanat (1990:1-21) discusses the strategic information audit and explains two different approaches. These approaches are the top-down and bottom-up approaches and have been used in practice when performing information audits.

o Top-down approach

Stanat (1990:5) discusses how a strategic information audit was conducted for a consumer packaged goods firm with 10 000 employees worldwide.

The top-down approach is appropriate for use in large companies with several branch offices and a large number of employees. This approach ensures commitment (financially, as well as otherwise) from strategic, functional and divisional management for the performance of the information audit as well as for the implementation of recommendations resulting from the audit (Stanat, 1990:5).

Stanat (1990:5) stresses how important it is to obtain support from top management before attempting to perform a strategic information audit. The manager must have some status in the company, because he will act as an "internal or corporate sponsor."

The researcher has determined that support from top management ensures that the auditor has access to corporate information resources and also encourages employees to lend their support to the audit.

When attempting to obtain support from top management for the performance of a strategic information audit, the auditor should convince them of the potential long-term benefits resulting from the audit, e.g. the fact that information provision will be customised in order to support the achievement of the strategic goals and objectives of the company. Support from top management will in turn ensure that the auditor has the necessary resources for performing the audit (Stanat, 1990:5-6).

Several "arguments" can be used in order to convince top management of the necessity of a strategic information audit, e.g.:

- Emphasize the cost-effectiveness benefits that can result from the audit, e.g. cost savings in terms of the elimination of duplication of effort and information resources; the cost and other advantages resulting from sharing information resources by means of networks; the customisation of information resources to meet the specific information needs within the company. Seen holistically, the competitive advantage of the company will be increased (use real-life examples to strengthen one's case).
- Convince top management that in the long-run the information audit will turn out to be cost-effective (Stanat, 1990:6).

o Bottom-up approach

An alternative to the top-down approach, is the bottom-up approach – also referred to as the division approach. This approach is suitable for companies in which there are a number of divisions with differing but specific information needs. Take for example the situation within a publishing company: the production division may have different information needs than the needs of the editorial division. The most appropriate way in which to determine these information needs as well as how they can best be met is by means of a strategic information audit that follows the bottom-up approach (Stanat, 1990:6-7).

The author discusses how a strategic information audit was conducted for the operating division of a bank. The operating division was structured according to specific unique lines of business. Based on this a survey was designed to determine the information needs at the different levels within the operating division. In contrast to the top-down approach, the bottom-up approach does not require extensive support from top management. One of the advantages resulting from this is that the recommendations of the audit can be implemented faster (Stanat, 1990:5).

o Strategic information audit methodology

As have been indicated before, a strategic information audit is used to determine the information needs within a company. The following step is to determine if the information resources available within the company meet these needs and if they do, how effectively. The findings are interpreted and the result of the audit is a "blueprint for a more effective corporate information or intelligence system." (Stanat, 1990:4).

Phase 1: Planning

During this phase the support of top management has to be obtained (cf. discussion above). A choice must be made as to who will perform the audit. There are two options when it comes to performing a strategic information audit, i.e. the company can either use a group of external consultants or appoint a group from within the company. There are various advantages and disadvantages to both these groups, as will be discussed below.

The advantages of using a group of external consultants are that they are professionals when it comes to conducting the interviews and that they are objective when analysing the results. Often they also have experience in performing information audits. A disadvantage is that they do not have the same insight into the company and its functioning as a company employee might have (Stanat, 1990:9).

On the other hand, an internal task force has the required insight into the culture of the company and the way in which it functions. An internal group however, might lack objectivity in analysing the results. Often such a group also lacks experience (i.e. professionalism) in performing an information audit.

The obvious solution to the problems experienced with the different groups, is to combine the strengths of the external consultants and internal personnel, e.g. appoint a number of employees to perform the audit under the guidance of an external consultant. By doing this, the company ensures the necessary insight into its functioning, while ensuring objectivity (Stanat, 1990:9).

Stanat (1990:16) also stresses the importance of obtaining copies of organisational charts before starting the information audit. The researcher has pointed out on various occasions that this provides the auditor with invaluable background information. For example: one advantage is that it will be easier to determine who should be interviewed. The organisational charts will also assist the auditor in determining the patters of information flow throughout the organisation (Stanat, 1990:16). The author (Stanat, 1990:12) emphasises that this is important information that needs to be obtained because the informal flow of information is often central to the effective functioning of a business (i.e. the informal information network).

Phase 2: Determine the organisational information needs

A questionnaire must be designed. This instrument will be used for gathering the needed information. Stanat (1990:8) includes an example of the types of questions that should be asked during an information audit (cf. Addendum G). The questionnaire can be customized, based on knowledge of the specific company.

Phase 3: Identify the information resources

During this phase of the audit it is important to determine who the person is who is at the "information nerve center" of the organisation, i.e. the person most involved in handling, managing and/or disseminating highly relevant information to the rest of the organisation. The auditor also needs to pinpoint information sources that contribute to attaining critical success factors in the organisation. Examples of such "information nerve centers or gateways" include amongst others: strategic planning departments, corporate libraries/information centres, technical libraries, etc. (Stanat, 1990:18).

Phases 2 & 3: Instruments for collecting information

The information for both phases 2 and 3 are gathered simultaneously by means of interviews. Prior to the interview process, it is useful to identify potential interviewees according to an organisational chart. The employees who form part of the audit team can be helpful in identifying informal networks within the formal structure and the interviews can be structured accordingly (Stanat, 1990:9-10).

The ideal is to interview as many employees as possible. Stanat (1990:4) suggests that one should begin by interviewing the CEO, followed by key executives, as well as managers and administrative staff members from all levels in the company. Furthermore, key staff members from the different functional units should be interviewed while the auditor should also attempt to interview staff members from various branch offices.

According to Stanat (1990:10) the best method to follow when conducting the interviews is to have personal, oral interviews. It must be ensured that the interviews are documented as this information is crucial for analysis.

Firstly, memos must be sent to each of the potential interviewees informing them of the purpose of the audit and emphasising the importance of widespread cooperation from the employees. Call each of the potential interviewees approximately 30-45 days in advance and set up an appointment at a time and place that suits both the interviewee and the interviewer. The interviews are the main means of collecting information and should therefore be at least one hour in duration. Stanat (1990:10) suggests that at least one or two interviewers and one interviewee is involved in each of the interviews. The information that they obtain during each of the interviews will help the auditors to compile a picture of information flow and use within the company.

Phase 4: Analyse and interpret the findings of the audit

Stanat (1990:13) suggests the quantification of information on users' information needs as this will increase the validity of the audit. In the case study that is discussed the company used a spreadsheet to present and analyse information on information needs. The categories that were used were the users' information requirements, the utility of information sources and the corporate information flow.

The findings were quantified and presented as the percentages of the information sources that the information users found relevant to their daily task performance in the organisation (Stanat, 1990:13).

The results can be repackaged in a grid format and this ought to give an overview of the current situation as well as a clear indication of future information requirements (Stanat, 1990:13).

Phase 5: Evaluate the corporate investment in internal and external information sources

The researcher has identified the costing and valuing of information resources as an important identifying criterion of what constitutes an information audit. Stanat (1990:19) also places strong emphasis on this phase of the auditing process. According to her answers should be found for the following questions: "What does it cost and organization to attain, gather, store, and disseminate information that is obtained either within the organization or from external and published sources?" The researcher has identified this as a very important result of the information audit, i.e. comparing information sources to information needs and by implication, corporate goals.

- Investment in internal information sources

Internal information sources are defined as all "those documents created on a daily basis by employees of the company." Stanat (1990:19) suggests using the following simple equation to calculate the monetary value of these information sources:

Corporate investment in internal documents	=	[Number of hours to generate document	x	Labour rate(s)]	+	Cost of input to develop the document	+	Cost of document materials

Stanat (1990:19) furthermore suggests that the calculation be done per department or organisational unit.

- Investment in external information

External information sources include those sources that have been purchased by the organisation (as opposed to the internal sources that are created in the organisation), e.g. newspapers, journals, books, reference materials, videotapes, etc. The following equation can be used to calculate the organisational investment in external information sources:

Corporate investment in external documents	=	Actual cost of the document	+	Manager's time to digest the document	+	Cost to distribute the document	+	Cost to store the document

(Stanat, 1990:20)

Phase 6: Develop a strategic intelligence "blueprint"

The results of the analysis phase must be used to develop a so-called strategic intelligence blueprint. This blueprint will point out any discrepancies between users' identified information needs and the information (re)sources used to satisfy these needs (Stanat, 1990:12). If possible these findings should be represented graphically as this

will make the presentation of the findings more accessible, especially to members of staff with busy schedules, e.g. top management (Stanat, 1990:12).

A second important aspect that will become clear in the strategic blueprint is an overview of the formal and informal information flows in the organisation. The informal information network ought to be clearly revealed (Stanat, 1990:12).

In developing the blueprint, the following aspects should be included:

- Discovering information needs.
- Tracking information flow.
- Identification of information nerve centre(s).
- Evaluation of the corporate investment in internal and external information sources.

Once the first information audit has been performed, smaller follow-up audits can be conducted to keep the planning information relevant e.g. annually (Stanat, 1990:4,21). This ensures that the company stays competitive and its information sources relevant.

Comments by the researcher

Stanat provides the reader with a very thorough discussion of how to go about performing an information audit. The methodology is complete in that it includes important components, e.g. defining the organisational environment; identifying information needs and information resources,; costing and valuing the latter; tracking information flows; writing a report and making recommendations. This methodology serves as a good example of what an information audit methodology should look like. The researcher identifies Stanat's methodology as an example of the hybrid approach to information auditing because of the geographical component and the components of the operational advisory audit that it contain.

3.16 Swash

Swash (1997:314) states that there is currently no standardised or prescribed approach for conducting an information audit. According to this author (Swash, 1997:314) the ideal scope of the information audit (in order to reap maximum benefit) is an organisation-wide survey performed with the purpose of identifying organisational information sources. This is done in correlation with the approach discussed by Burk & Horton (Infomapping, 1988) to determine the "information resource entities" (IREs) in an organisation. The identification of the organisational information sources is combined with the recording thereof and this in turn is followed by the analysis of the findings. The value of information audits performed on a smaller scale is not dismissed however (Swash, 197:314).

Phase 1: Planning

During the planning phase the scope of the information audit is determined; the objectives of the project are identified; and a plan of action is drawn up accordingly. A decision must be made regarding a data collection method (e.g. interviews or questionnaires or a combination of these). The choice of a data collection method is influenced by various factors such as the size of the population that will be included in the audit, as well as time constraints. Time can be saved by collecting data from focus groups.

The support of top management for conducting an information audit is essential to the success of such a project as the findings and recommendations from the audit will have an impact on the organisation as a whole (Swash, 1997:314-316).

Before conducting an information audit in an organisation there must be agreement upon the definition and scope of such an audit. This is a problem when one takes into account that variety of definitions of the concept "information" (Swash, 1997:315). The researcher has found that the same applies to the definition of the concept "information audit" (cf. the discussion in Chapter 4, paragraph 2). Furthermore the unique characteristics of information resources (e.g. the pervasiveness of information)

make it difficult to design a methodology for conducting an organisational information audit.

The next phase in the information audit, is to select members to serve on the auditing team. Swash (1997:315) identifies three possible scenarios, i.e. the use of an internal project group, the use of external consultants, or a combination of these two.

Phase 2: Data collection

The size of the organisation determines the size of the population to be included in the survey. In a very large organisation it is impossible to include all employees. There is no hard and fast rule either for determining the size of the survey population (Swash, 1997:316). It is once again clear to the researcher that the specific situation determines the size of the population.

Swash (1997:316) refers to Stanat when discussing guidelines for determining whom to include in an information audit survey. Identify those individuals who have insight into the organisation and its strategic functioning. In organisations where many individuals have to be interviewed, it is suggested that less detailed questionnaires be compiled. Interviews, specifically structured interviews are a preferred data collection method.

The disadvantage of using interviews, even structured interviews, as a data collection method is that the duration and scope of the interviews will vary and that unique answers will be given. It is therefore of the utmost importance to ensure that the collected data be processed according to a consistent method (Swash, 1997:316).

The main purpose of data collection during an information audit is to acquire information that focuses "primarily on business activity" and to determine what information is used in support of this. Unfortunately research findings have shown that few managers are able to specify what information sources they use and need - currently and with a view to the future. Swash (1997:316) also states that the nature of the activities performed by an employee determines the type(s) of information used and needed, e.g. highly specific information is needed in a research environment versus the relatively vague information needs that is found in a marketing department. The latter will be determined to a large extent by happenings external to the organisation and will only become clear shortly before the information is needed (Swash, 1997:316). The researcher reckons that data collection should be performed in such a way as to determine the users' perspective as the information will be needed to develop the organisational information management plan. The latter will in turn be focused on satisfying the users' information needs.

Phase 3: Analysis

The findings to the question of what information is needed in support of the primary business activity of an organisation should be weighted (in order of priority) according to Swash (1997:316). Information-related problems should also be recorded, e.g. the non-availability of information, the lack of timely and relevant information, etc.

Phase 4: Information technology audit[14]

In some instances the information audit can be used to audit the information technology that is used to provide access to information. Swash (1997:317) stresses that "[t]he concept of information, its value and its use, should be separated from the consideration of the technology on which it resides". There are aspects of information technology that will reveal useful information, e.g. the reliability, appropriateness, compatibility and usage of information systems.

Phase 5: Costing and valuing

Another issue that should be investigated during an information audit is the complex problem surrounding the value and cost of the information sources that have been identified. Value is best measured in terms of the benefits derived from the use of specific information sources. A lot has been written on the problems surrounding the way(s) in which to measure/determine the value of information sources (cf. Chapter 4). The simplest explanation states that the value of information is qualifiable (e.g. time

[14] This phase is optional to the information audit methodology.

saved or benefits arising from actions that were based on information), in contrast to the cost of information that is quantifiable. Swash (1997:317) stresses that the information audit should distinguish clearly between the value and the cost of information sources. Findings could even prove the value of information much higher than the cost thereof. Swash (1997:317) warns however that "[t]he problems of quantifying the exact contribution of a specific term of information may, however, prove insurmountable." The researcher identifies this as an aspect of the information audit where more research will have to be done. The development of a standardised method for determining the cost and value of information sources needs to be investigated.

Phase 6: The report

Finally the report must be prepared. The report will contain findings on the cost of organisational information activity, information gaps, as well as areas where duplication take place. The report will highlight information flows (whether effective or ineffective), information ownership and current involvement in and responsibility for information management. All these findings will contribute to drawing up a picture of the organisational information needs and priorities. Swash (1997:318) stresses that in order to obtain maximum benefit from the information audit and its findings, the results must be linked to the strategic objectives of the organisation and the necessary corrective action must be implemented.

Swash (1997:313) briefly discusses the "classification" of organisational information sources. The researcher has determined that the type of distinction made very often effects the way in which these information sources are managed. According to Swash (1997:313) the most common distinction is the one made between internal and external sources of information (cf. Table 5-1).

Table 5-1: Internal vs. external information sources

	Internal information sources	External information sources
Definitions	Defined as "hard, focused and closely aligned to operational requirements"	Defined as information that is typically "contained in publications such as books, etc."
Examples	Sales and production statistics internal company reports	Books, reports (external to the organisation), conference proceedings, trade literature, legal and technical documents, external databases
Information management	The focus of managing internal information sources is on managing the life cycle of these sources (i.e. the management of the acquisition, storage and maintenance thereof)	Traditionally external information sources are more difficult to manage than internal information sources. The main reason for this is that analysis and interpretation is necessary to determine the value (i.e. relevance and usability) of these information sources. Only information that has potential strategic value to the operation of the organisation is acquired. Providing access to the right users is of critical importance.
Value and cost	Internal information sources are highly valued, but because the management thereof is often not visible the costs of managing these information sources are seldom closely scrutinised.	These information sources are often not regarded as valuable on a daily basis, but the strategic value thereof is increasingly being recognised. External information sources are often perceived as very costly because of calculable purchase prices. The researcher has however determined that the cost of information cannot be evaluated accurately, without taking into account the benefits derived from the use thereof.

(Swash, 1997:313)

Comments by the researcher

As is the case with Stanat's methodology, the methodology discussed by Swash is also quite comprehensive. The organisational environment is taken into account, information needs and information resources are identified and the cost and value of the latter are calculated and determined. The methodology concludes with the writing of a report with recommendations for corrective action – Swash (1997:314) stresses the fact that the recommendations resulting from the information audit are of vital importance. The researcher classifies this methodology as an example of an operational advisory audit for the following reasons:

- the audit is used establish whether the available information resources are used to satisfy information needs in congruence with the purpose and philosophy of the organisation;
- the audit is used to check on the efficiency and effectiveness with which the resources are used and accounted for.

3.17 Webb

Webb (1994:9-11) describes the process of information auditing according to three clearly defined stages.

Phase 1: Initial audit (inventory)

An auditor needs sufficient information to work from. For this purpose an organisational profile must be compiled. Such a profile will typically include information on the organisation's main aims and objectives; the number of employees and departments/functions,; the number of sites (if geographically dispersed); and the size and make-up of the client population (Webb, 1994:9).

In addition to obtaining information about the organisation itself, the auditor will also need information on the organisational information environment. In order to get an overview of the current situation in an organisation the auditor needs to compile an inventory of existing (internal) information resources and systems (Webb, 1994:9).

The inventory needs to be followed by the collection of information on the users' information needs. This will enable the auditor to compare the available information resources to the identified information needs. An analysis of the information will indicate whether the available information resources support the organisational goals and whether the resources are relevant in satisfying the users' information needs (Webb, 1994:9).

The need for an information audit often evolves from the need for an organisational information systems review. Webb (1994:9) indicates that performing an information audit will be more beneficial to an organisation than an information systems review. This argument only seems to hold when an organisational information audit is performed, as compared to an information audit that focuses only on a specific organisational unit/units.

An information systems review can however still from part of information auditing. The results of an information systems review will provide the auditor with a "clear statement of services and sources", broken down according to a predetermined classification system. Factors that can be focused on can include: format, subject coverage, and even the quantification of each type of information source – the latter can be achieved by presenting results in percentage format. Additionally, the review can also focus on the information specialists and the typical tasks they perform, especially "non-information" (related) tasks (Webb, 1994:9-10).

Webb (1994:10) warns against examining organisational information systems and procedures in isolation from other organisational systems and procedures. In terms of the purpose of an organisational information audit it is important to compile a holistic picture. Webb (1994:10) therefore suggests following the compilation of an inventory of information systems with the compilation of an overall inventory of organisational systems and procedures. The purpose of this part of the information audit is to identify information-related equipment in the organisation in terms of characteristics such as range, type and location.

Tools/techniques that can be used during the initial stage of the audit to collect information include well structured checklists and questionnaires. Webb (1994:10) stresses the careful planning that should go into drawing up the checklists and questionnaires.

The initial stage represents the information audit in its simplest form. It proves an "up-to-date picture of information holdings and the related means of accessing it". The initial stage does not make provision for costing and/or valuing information resources, nor does it help in identifying users' information needs, or in identifying responsibility for managing information resources (Webb, 1994:10).[15]

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[15] The latter is emphasised in Burk & Horton's infomapping methodology.

Phase 2: Collecting the data

During the second phase of the audit contact is made with creators and users of information. It might be difficult to integrate all the information that will be collected as individuals might use a variety of approaches in creating and using information (Webb, 1994:10).

The researcher has determined that staff members' "information unawareness" can create problems for the auditor. Webb (1994:10) stresses the importance of the participants' positive attitudes towards participation in the auditing process as this influences the successful outcome of the information audit. Any investigation into the way that work is done can easily be regarded as threatening. The auditor should therefore stress the organisation-wide benefits to be derived from participation in the audit and furthermore should try and use questions that are formulated in neutral terms.

Those who will be expected to participate in the auditing process should be informed, leaving them with enough time to prepare for the interview. A sample of staff members should be chosen to participate and care should be taken to choose staff members from different departments, managerial and operational levels, and who are responsible for performing different functions in the organisation. Appointments must be scheduled with individuals who will be interviewed. The auditor should use this opportunity to inform participants of the duration of the interview and the purpose thereof.

The interview should include questions that seek to determine the individual's main responsibilities in the organisation; the nature of information typically required and/or used; the frequency of requirement; and the preferred format for receiving information. The auditor should also try and determine whether individuals have any personal information management systems that they rely on for satisfying their information needs (Webb, 1994:11).

The geographical dispersion of the organisation will determine whether a postal survey will be conducted and/or one-on-one interviews. It might be necessary to adapt the questionnaire slightly for a postal survey. If questionnaires are sent out by mail, a return date and destination address must be clearly indicated (Webb, 1994:11).

Phase 3: Data analysis

The data that has been collected must be analysed with the purpose of finding answer to questions such as:

- What information does staff need to do their jobs properly?
- Is the needed information available internally or externally?
- Is information needs currently being met?
- What systems and procedures are currently used for disseminating information?

After answers have been found to the questions the auditor should investigate what information resources are currently available but are not in use and try and determine the reasons for this. In instances where information resources have become irrelevant, alternatives should be identified, investigated and tested with potential users (Webb, 1994:11).

Comments by the researcher

The researcher classifies Webb's information audit methodology as an example of an operational advisory audit. This is because the objectives of the audit include the following:

- To define the purpose of the audited system and to establish how effectively it is being accomplished.
- To establish whether the purpose is in congruence with the purpose and philosophy of the organisation.
- To check on the efficiency and effectiveness with which the resources are used, accounted for and safeguarded.

- To find out how useful and reliable the information system supporting the organisation is.

The inclusion of the information systems review adds an interesting aspect to the information audit methodology. Furthermore Webb places a lot of emphasis on the follow-up phase, in terms of the identification and testing of alternatives. This phase extends Webb's audit past the scope of the majority of information audit methodologies that have been discussed in this chapter.

3.18 Worlock

In a business environment where information technology providers promise improved quality (while reducing costs) or an increased competitive edge, information auditing (as a decision-making audit) is suggested. According to Worlock (1987:52) an "[a]udit suggests that those payoffs at the top [i.e. the expansion of business scope] and bottom line [i.e. the reduction of costs] are at least measurable in some way, with the added bonus that the idea of an 'audit trail' leaves a line of clearly-made decisions available for subsequent managers to examine and evaluate." The information audit is said to guarantee accurate results, but it should be taken into account that good judgement determines the success thereof. Worlock (1987:52) discusses a framework of headings for the auditing process – the judgement of these suggestions rests with the auditor.

The information auditing process and variations thereof as suggested by Worlock (1987:51-56) were tested in different environments, e.g. where the main role players ranged from being information professionals to commercial information providers. The different methodologies were tested in accordance with different expectations of the results rendered by the information audit. The information providers for example, were interested in using the information audit to determine whether the value of information could be increased through the application of information technology. In order to do this, the information audit had to be designed in such a way that it could be used to audit the value of information that was "in use in the marketplace" (Worlock, 1987:52).

The results of testing different variations of the information audit methodology were the identification of five sets of audit criteria. These should not be seen as mutually exclusive, nor that they should be used in a specific order or that all of these be used every time. The five sets of audit criteria were chosen because they best represent the criteria needed "in situations were both internal and external, local and remote information resources had to be evaluated within global information requirements" (Worlock, 1987:52).

The five sets of audit criteria are:

- Utility analysis
- Quality values
- Productivity factors
- Implementation criteria
- Strategic impact statements (Worlock, 1987:52).

o Utility Analysis

Worlock (1987:52) found through market research that clients valued information not because of the value added to the information through specific processes, nor for the sake of the information products themselves. Information products that were most highly valued were those that delivered the right information at the right time. It therefore became clear that it was of utmost importance to be able to examine a client's business activities and the information needs resulting from these activities. The utility analysis enables the information auditor to create a hierarchy of information needs. In practice the information needs can range from everyday information queries that can be answered by a colleague to those for which the answers can be found in personal filing systems, or even the corporate library (Worlock, 1987:52).

Subsequently the hierarchy of information needs can be structured in terms of corresponding information service(s) that will satisfy these needs. Practical examples include the positioning of current awareness services for frequent, rapid updating of the latest developments in a field; the use of the Reference Collection in the corporate library for answering ready-reference type queries (Worlock, 1987:52).

Worlock (1987:52-53) points out that it is important to note that value-adding is ignored during the Utility analysis. The basis of good auditing is the "recognition of values" (Worlock, 1987:54).

Phase 1: Review of quality values

As indicated in the discussion above, value-adding is ignored during the Utility analysis. Values are examined under the phases of Quality values, as well as Productivity factors.

The selection criteria examined during this phase include the following:

- Speed of access (this is determined by the type of information system used, e.g. real-time vs. manual).
- Comprehensiveness.
- Cost (this is the auditable cost-saving of answering a query in a specific way).
- Recency (this involves the supply of the most up to date information that is available).
- Currency (Worlock, 1987: 54).

Evaluation takes place by awarding points according to the criteria listed above while taking into account the hierarchy of perceived information needs.

Phase 2: Productivity factors

Once the quality values have been determined in view of the hierarchy of perceived information needs, productivity factors are taken into account. This phase evaluates the technological characteristics of information sources, e.g. the retrieval software or text retrieval engines. Examples of textual enhancement can include one or more of the following:

- document structure
- indexing, thesaurus development or full text searching capabilities
- rule-based guidance systems (providing access to 'predictable' answers)
- knowledge-based systems (Worlock, 1987:54).

Phase 3: Implementation factors

Worlock (1987:54) points out that all the phases described thus far (phases 1 to 3) can be used in the design and development of an information system. In view of this application of the audit phases, a phase for the investigation of Implementation factors follows logically. Three issues deserve attention during this phase:

- Ownership. Examples of questions: Whose is it? Should it be acquired? Is it affordable?
- Locations. Is information held locally? Is it accessed via networks? What are the cost implications?
- Interfaces. Can an existing interface be used? Must a new interface be developed? Will the interface be familiar to the users of the system?

Problems may be encountered under each of the headings listed above. The price involved in solving these problems may need to be justified in terms of the initial justification for the audit.

Phase 4: Strategic impact statements

Following on the justification of the price of solving implementation problems, the auditing process may need to be re-started. The new focus might be on the improvements or solutions to the problems in terms of:

- Reducing costs
- Increasing standards of performance
- Differentiating products from those available from competitors
- The creation of new business opportunities (Worlock, 1987:55-56).

o Concluding remarks

The audit priority should be taken into account throughout the auditing process. The aim of the audit is to create a record of the "decision-making chain" that was used to implement change in an information business. This will provide a next manager with information on the rationale of the process.

Comments by the researcher

Information auditing is discussed from the perspective of the financial audit and can therefore be classified as an example of the cost-benefit approach.

3.19 Booth & Haines

Booth & Haines (1993:224-232) discuss an information audit that was conducted for a Regional Health Authority in the UK. The situation that necessitated the information audit was major organizational change, as well as a request for the development of a new information policy. In view of the development of a new information policy the following strategy was suggested:

- Identify and review the corporate objectives.
- Decide what information is needed to meet the corporate requirements.
- Conduct an information audit to determine if the required information currently exists in the organisation and if so, to describe how it is currently utilized.
- Address the identified information "gaps" and problems – where possible.
- Develop an information management policy (Booth & Haines, 1993:225).

For the purpose of the information audit performed by Booth & Haines (1993:225) a project team was put together. This team was made up of a Project Director, a Project Leader, as well as staff who would be responsible for data entry and analysis.

Phase 1: Review corporate objectives

The first phase of the proposed strategy, was to review the recently revised corporate objectives.

Phase 2: Devising a questionnaire

A pool of questions was compiled for inclusion in a questionnaire. These questions were submitted to members of staff, as well as the Information Management Steering Committee for comment. Comments were made regarding the inclusion of questions that address all the stages of information handling/management, e.g. acquisition, collection, evaluation, dissemination, etc. Suggestions were made that there be a balance of statistically encodable questions and free-text questions. Furthermore the auditors had to ensure that the questions were "universal", i.e. applicable to all staff members. After amendments had been made the questionnaire was tested in a "test-run" (Booth & Haines, 1993:227).

Phase 3: Training and support

Ten staff members were elected to conduct the interviews for the information audit and were sent on a one-day training session where they were trained in conducting and the consistent recording of data – while keeping in mind the audit objectives. Each interviewer was given a list of interviewees. While the interviews were conducted the Project Leader had weekly meetings with each of the interviewers (Booth & Haines, 1993:227-228).

Phase 4: Interviews

It is advisable to involve as many staff members as possible in the review of corporate information requirements. This will ensure that the identified information requirements are representative of staff's needs. The interviews lasted between 45 minutes and 1 hour each. Project managers where asked additional questions relating to information flows in the organisation (Booth & Haines, 1993:228).

The major structural changes in the organisation and the accompanying job insecurity hampered the information collection process (Booth & Haines, 1993:230).

Phase 5: Analysis

The results of the questionnaires were a mixture of free-text and coded responses. The responses were analysed using a specialised statistical software package (Booth & Haines, 1993:228).

Phase 6: The report

The current information situation was defined using the Soft Systems Methodology (SSM). This analysis technique enabled the auditing team to "reflect the relative importance of the perceptions and attitudes of staff" within the organization. The information situation in the organisation was presented in a visual format. Graphics were used, e.g. a snail was used to depict an information facility that had slow response times; information that was irretrievable was depicted as a dustbin; an unfriendly system as a maze; information resources that had restricted access were depicted by means of a brick wall. This "rich" information picture was broken down into its main components. In turn each of the components were described in terms of its key elements based on the CATWOE formula:

- **C**lients/customers
- **A**ctors who carry out main activities
- **T**ransformation processes which occur, whereby inputs are modified and outputs produced
- **W**orld view – the framework or outlook adopted
- **O**wnership, in terms of prime concern for the power over it
- **E**nvironment with which the system operates (Booth & Haines, 1993:228-229).

The performance of the specific system was evaluated and problems identified. Following on the systems review a balance sheet was compiled where the findings of the audit were integrated with information on the organisational culture. In conclusion, recommendations were made (Booth & Haines, 1993:230).

Comments by the researcher

Booth & Haines are the only authors besides Jurek who include the development of an information management plan as part of the information audit methodology. The description provided by Booth & Haines is a detailed discussion of the methodology that was used and tested in practice. The researcher classifies this as a hybrid approach since the methodology contains elements of the geographical approach as well as the operational advisory audit.

3.20 Orna

The methodology proposed by Orna (1990:17-72) for the execution of an information audit in an organisation was developed to be used as a basis for an investigation aimed at the formulation and implementation of an information policy in an organisation.

o Pre-audit procedure: The initial investigation

Orna (1990) discusses how one should go about developing an organizational information policy. A lot of groundwork has to be done before one can even attempt the formulation of such a policy. According to Orna the first phase (1990:27-32), is the Initial Investigation. The main purpose of this phase is to collect information, so as to enable the organisation to determine how close they are to having an information policy, or alternatively, to determine whether they really want/need one. Determine the role of information in the organisation and identify all the available information resources (Orna, 1990:28).

According to Orna (1990:28-29, 34, 44) as well as many other authors whose methodologies are discussed in this chapter a prerequisite for the execution of a information audit in an organisation is a sound knowledge and understanding of the philosophy/culture (i.e. mission, objectives and priorities) and functioning of the specific organisation. Orna regards information on the organisation itself as important in view of the consequent investigation relating to information policy: organisational "culture is a potent influence on how the enterprise values information, on the way information flows, and on how information is used" (Orna, 1990:38). The initial investigation should render information on the following:

- Organisational mission, objectives and priorities
- Organisational structure
- Management style in the organisation
- The relationship between the above and the environment in which the organisation functions (Orna, 1990:28).

This information that was collected during the initial investigation will prove invaluable when it comes to performing an organisational information audit (Orna, 1990:28-29).

The scope of an organisational information audit typically includes the following:

- Identifying all the organizational information resources
- Determining how information is used in the organization
- Determining the costs and values of the information function (Orna, 1990:29).

In view of the above Orna (1990:29) stresses that it is of the utmost importance to perform a proper initial investigation (to collect information on the organizational environment), because the auditor cannot interpret the audit results properly without sufficient background knowledge, i.e. the "findings about [the organisational] information resources and the way [the organisation] uses information."

The prerequisites for conducting a successful initial investigation are:

- Support from top management
- Skilled staff to conduct the investigation and the audit
- Sufficient time to complete the research
- Free access to relevant information and the right people
- Standardized methods for managing the investigation and reporting the results thereof (Orna, 1990:31).

- The information audit: methodology

It is interesting to note that Orna (1990:44) makes metaphorical use of financial audit terminology when discussing information auditing. This is because the information audit, as the financial audit is "... an authoritative examination of accounts with verification by reference to witnesses and documents – particularly since 'accounts' were originally oral, because the information audit depends greatly on face-to-face discussion."

The scope of the information audit as discussed by Orna (1990:44-61) includes the following:

Phase 1: Planning

The planning phase includes the following:

- Identify relevant findings from the initial investigation, i.e. everything that relates to information resources and how these are used by the organisation.
- Identify the departments and individuals who should be interviewed.
- Allocate responsibility to audit team members to interview specific individuals and departments.
- Identify the questions that should be asked during the interviews. Circulate these amongst the audit team members for comment. Set up the interview schedule. It is also advisable to provide management members who are responsible for the audit, with copies of the questions and the interview schedule. Furthermore, it may be of use to provide the interviewees with a copy of the questions prior to the interview.

Possible questions that could be asked, include:

- What information is acquired, created, processed and disseminated by the staff of a specific department?
- Who (people) and what (tools, technology) are involved in the above-mentioned activities?
- What is the size of the budget allocated to information sources and who manages it?
- Are any information resources only partially used or not used at all? (Orna, 1990:45).

There should also be questions focusing on the identification of the technical tools that are used to manage and/or handle information resources and furthermore, determining how the management of the technology relates to organisational information management.

Phase 2: An investigation of the information available in the organisation

The following question can be used as a guideline for identifying information resources: "Is this something that people need to know and apply in their work, to achieve their and the enterprise's objectives?" (Orna, 1990:46). It should also be noted that the information audit focuses on identifying information sources generated within the organisation as well as those generated outside.

Phase 3: Identify the resources that are available for making information accessible

This includes groups or individuals who are responsible for acquiring, processing, storing and disseminating information, as well as equipment used to acquire, process, store and disseminate information (Orna, 1990:47).

Phase 4: Determine how information is used to further the purposes of the organisation

Orna (1990:47-48) suggests that the picture of the information sources and activities be "superimposed" on the picture developed during the initial investigation of the organisational objectives and priorities.

At this stage Orna (1990:48-49) also suggests the compilation of rough diagrams that illustrate information flows in the organisation.

Phase 5: Identify those responsible for managing and processing information, respectively

This stage provides information on the lines of control in the organisation. The managers' backgrounds need to be investigated, i.e. their education and training, their function in the organisation and their previous work experience. This type of information is useful when trying to determine the value attached to information in the organisation.

Determine what kinds of information are processed by whom and where; what type of processing takes place; what is the background (training) of the people responsible for information processing and what are their functions in the organisation? Do the people who perform information processing regard this function of their work as information-related?

Orna (1990:51) stresses the importance of obtaining this information in a way that does not threaten the staff members who have to supply it. Reassurances are important as well as informing them of the purpose of the audit, i.e. that the audit is performed with a view to possible positive changes.

Phase 6: Identify and evaluate the information technology that is used to manage information resources

From an information management perspective it is important to consider information technology only after information content has been fully considered. The aim of this stage of the information audit is to obtain enough information so that an information map can be compiled of the information technology that is used to manage information resources. Orna (1990:54) states that information technology should be investigated in the widest definition of the concept, i.e. not only automated technology.

This stage will provide information on:

- What the technology is used for (i.e. specific tasks and procedures).
- The appropriateness of the technology, i.e. ease of use; in-built help functions; reliability; compatibility with other organisational systems and equipment.
- Who is responsible for buying technology – are these the same people responsible for managing the information sources?
- Are the managers of the technology the same as the managers of the different information sources?

Upon obtaining all the needed information the map of technology can be related to the rough diagrams of the organisational information flows to determine where the technology contributes to or hampers information flow (Orna, 1990:56).

Phase 7: Calculate the costs and determine the value of organisational information resources

Orna (1990:57) describes this stage as "a difficult but *essential* part of an information audit" (own italicisation). In order to complete the basic information on the organisational information resources, it is necessary to determine what the information resources cost the organisation as well as what their value are in terms of meeting organisational objectives.

As has been pointed out in Chapter 4, it is difficult, but possible to calculate the monetary cost of information resources. Orna (1990:57) suggests the use of costing objectives and methods which are currently used/accepted by the organisation. If this is not possible, provisional costing objectives will have to be applied and the limitations will have to be highlighted in the final report.

Orna (1990:57) refers the reader to the Burk & Horton's discussion of how to value information resources (see the discussion in Chapter 3 of this dissertation).

In contrast to Burk & Horton and Lubbe & Boon, Orna (1990:57-58) does not regard the relating of costs to values as a possibility. The reason for this is that one has to quantify the values that have to be determined (cf. Burk & Horton, phase 2), before the comparison can be done and Orna cannot see this being done accurately.

Calculating the total cost of the organisational information resources, determining the value of these and relating the cost to the value.

This concludes the process of information auditing as discussed by Orna. The recommendations that follow from the result of the audit, i.e. the "balance sheet", are regarded as separate from the audit. This is explained by Orna's (1990:44) use of the term "inventory" as a synonym for "information audit".

Comments by the researcher

Orna provides the reader with a detailed discussion of information audit methodology. Buchanan & Gibb (1998:40) point to a limitation in Orna's methodology, i.e. a lack of practical tools and techniques. This may prove to be a problem when the audit has to be performed by an information professional, who according to Buchanan & Gibb (1998:40) "... who may lack one or more of these required skills."

In contrast to Burk & Horton's infomapping methodology that focuses on static information resource entities, Orna's methodology focuses on dynamic information flow (Buchanan & Gibb, 1998:39). Furthermore Orna is one of the few authors who include an investigation of information technology as part of the information audit methodology.

The researcher classifies Orna's methodology as an example of the hybrid approach to information auditing, since it contains elements of the cost-benefit approach (not the benefit component), the operational advisory audit and the geographical approach.

3.21 Haynes

BPR is one of the latest buzzwords in the commercial environment. It is offered as a solution to organisations trying to survive in an increasingly competitive environment. BPR is a holistic approach to organisational change. In other words, it focuses on the organisation as a whole – taking into account organisational objectives, strategies, priorities etc. A sound knowledge base of organisational functioning and culture is needed in order to determine the best way to achieve organisational goals. BPR usually suggests the achievement of organisational goals by processing inputs into value-added outputs (Haynes, 1995:30).

BPR can be defined as follows: "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (Haynes, 1995:30).

In view of the above, it becomes clear that Haynes (1995:30) regards the information audit as a tool to support the development and design of organisational information systems. Radical changes brought about by BPR, often lead to new demands for information services and products. An information audit can provide the information necessary for improving and/or implementing information services and products to satisfy users' needs.

Haynes (1995:30) touches on the problem of a lack of information auditing standards by stating that information auditing has been performed in various different ways in different environments over the years. This phenomenon can only be attributed to a lack of standardisation.

The step-wise information audit methodology suggested by Haynes (1995:31-32) should not be misinterpreted. The steps are listed sequentially, but some of them may be performed in parallel with others.

Phase 1: Analysing users' information needs

The logic behind the first step suggested by Haynes (1995:31) becomes clear when one considers that he regards an information audit as an information system design instrument. The first and most important information needed when designing an information system is information on the information needs of the (potential) users of the system. Within the context of using an information audit as follow-up to or in parallel with BPR it is important to understand that users' information needs reflect organisational needs.

Information needs determination is a difficult process and a hotly debated topic in the literature. The researcher will not discuss this process in detail. Haynes (1995:31) briefly discusses a number of techniques that can be used to assist in gathering information on information needs. These include reference interviews, telephone interviews and questionnaire surveys. The auditor needs the following information on organisational information needs:

- Responsibilities of the information user
- Current and/or required channels for information dissemination
- Specific types of information required (i.e. topic, format, speed at which it is required)
- Existing information sources used and/or available to the user
- Identification of information needs that are not currently being met, identification of redundant information, etc. (Haynes, 1995:31).

The purpose of the list above is not to limit information auditors in terms of the information to be collected on users' information needs. The list should only be used as a guideline and "there should be some leeway for unanticipated areas to be dealt with".

Phase 2: Information resource mapping

Haynes (1995:31) states that this phase may be conducted in parallel with step 1, as information users are also often generators/providers of information.[16] The purpose of this step is to get a (visual) overview of existing organisational information systems and products. The format of the mapping process may vary depending on the specific environment within which the information audit is conducted. One possible method of information mapping is suggested by Burk and Horton who map information resource entities in terms of their characteristics (refer to the discussion in Chapter 3).

Phase 3: Mapping of information flows

This phase is important because information and communication cannot be separated. During the execution of this phase it is important to focus on formal as well as informal channels for the distribution of information. (The latter may be difficult to identify.) (Haynes, 1995:31).

Phase 4: Matching/comparing information needs against/with existing information resources

Haynes (1995:32) identifies various factors that influence the information needs of users in an organization. Identifying the real information needs is therefore a complex process (as has been mentioned during the discussion of phase 1). At a very basic level an organisational information audit is performed in order to determine which information needs are not being met (i.e. information gaps or holes) as well as to identify areas where duplication of effort takes place.

Phase 5: Designing a solution

The information that has been collected up to this point must be used to find solutions to identified problems. There are different ways to go about designing a solution, depending on the purpose of the information audit. It is also possible that top management will have to be convinced of the advantages of implementing suggested solutions. One of the best ways to do this is to make use of the "no-change" scenario and to compare this with the advantages which would result from a changed scenario (Haynes, 1995:32).

Phase 6: Implementation plan

Once a proposed solution has been accepted it will be necessary to formulate an implementation schedule – taking into account factors such as costs as well as available time, staff, physical resources, etc. At this stage Haynes (1995:32) also suggests informing those who will be affected by the changes.

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[16] In the terminology of Burk and Horton: information users may also act as information functionaries.

o Conclusion

Business process reengineering can lead to organisational information systems and products being declared redundant, or it can provide an opportunity for the development of new information systems and products as well as the definition of the roles existing systems and products have to fulfil. The effect of BPR on organisational information systems and products as well as on information auditing, depend on the attitude of information scientists. They should regard and use BPR as an opportunity for increasing organisational information awareness and for the development of the information service function.

Comments by the researcher

This is another thorough discussion of information audit methodology. Unfortunately the cost and values of information resources are not included in any of the phases. Haynes' methodology can be classified as an example of the geographical approach as it contains various phases during which mapping is done.

3.22 Buchanan & Gibb

These two authors discuss a "universal" information audit "model" that they developed after studying a number of information audit case studies and more specifically, the infomapping methodology of Burk & Horton and the strategic information audit methodology of Orna. Buchanan & Gibb (1998:41) describe their "universal model" as "[a]n integrated strategic approach to information auditing". This specific methodology was developed with a view to it being used in different environments and for the purpose of developing an effective information strategy for organisations.

The comment is made that when organisations find that they already possess some information that will be discovered through the audit they can skip this particular phase of the methodology.

The audit methodology is designed to be performed by an information professional (external consultant or a staff member) and a working group (representative of senior members of the organisation who were chosen for their information-related backgrounds). Buchanan & Gibb's methodology consists of five phases.

Phase 1: Promote

During this phase the auditor and his team must obtain support and cooperation for the information audit. This phase consists of three steps, each of which should be performed by the working group or the auditor as will be indicated:

- The promotion of the benefits of the information audit by increasing awareness of the importance of information management and by reducing suspicion and hostility amongst staff members – performed by the working group.
- A so-called "passport" letter is used to introduce the auditor and to serve as a sign of top management support for the information audit. In this way co-operation is fostered – performed by the working group.
- Conduct a preliminary survey of the organisation. The purpose of this is to ascertain the level of information awareness and information appreciation in the organisation – performed by the auditor.

Phase 2: Identify

This phase follows the example of Orna's information audit methodology by starting with a top-down strategic analysis of the organisation. This phase consists of six steps – the first four are performed by the working group in a workshop and the last two are the responsibility of the auditor:

- Identify and define the mission of the organisation. This can be done by making use of Abell's business definition framework, Synnott's interpretation of Portfolio analysis and Pellow and Wilson's CSF approach[17]
- Identify and define the organisational environment in terms of PEST (political, economic, social and technological influences).
- Identify and define the structure of the organisation.
- Identify and describe the culture of the organisation.
- Identify information flows according to the approach described by Orna.
- Identify the organisational information resources, i.e. finalise the preliminary inventory that has been compiled during the preceding steps.

The result of this phase is a comprehensive database with information on organisational information resources – linked to the mission, goals, objectives and activities of the organisation (Buchanan & Gibb, 1998:44).

Phase 3: Analyse

The purpose of this phase is "to analyse and evaluate the organisation's information resources and to formulate action plans to improve problematic situations and achieve objectives identified during [phase 2]". Phase 3 consists of four steps – the first three are completed by the auditor in cooperation with staff members and the fourth step is completed during the workshop by the working group.

- Evaluate the information resources in terms of their strategic importance, utility and management problems.
- Produce the detailed information flow diagram for the purpose of illustrating "who is using what, where and why" (Buchanan & Gibb, 1998:44-45).
- Write the preliminary report.
- Formulate action plans.

Phase 4: Account

The purpose of this phase is to calculate the cost of the organisational information resources and to relate these to values/benefits. Buchanan & Gibb (1998:45) recognise the problems associated with costing and valuing information resources and therefore they list three approaches that can be used for calculating costs. These are ABC (activity-based costing), OBS (output based specification) and Glazier's model.

"Given the potential complexity of the exercise this stage is not represented by a rigid methodology" (Buchanan & Gibb, 1998:45).

Phase 5: Synthesise

During this phase the report is presented on the complete information auditing process Furthermore the purpose is "to provide integrated strategic direction for the organisation's future management of information" (Buchanan & Gibb, 1998:46). The first step of this phase is the responsibility of the auditor (the compilation of a detailed information audit report), while the second is to be completed by the working group (the preparation of an integrated information strategy for the organisation).

[17] These frameworks were chosen because of their acceptance and use in business analysis.

- Evaluation

Buchanan & Gibb (1998:46-47) evaluate their "universal model" for information auditing as follows:

- Benefits
  - ➢ It is a complete "pragmatic solution to information auditing".
  - ➢ It serves as a management toolkit that can be customized according to individual needs.
  - ➢ The relationship between the business and information strategies of the organisation is identified and evaluated.
  - ➢ It provides a new approach to costing information resources.
  - ➢ It allows for the creation of a detailed information resource database inventory.
  - ➢ It provides strategic direction and management guidelines for the future management of information within the organisation.
- Potential barriers
  - ➢ The scale of the audit and the resources that are required may make it impractical for some, especially smaller organisations;
  - ➢ "Synthesis between stages may not always be clear and unambiguous due to the multi-disciplinary nature of the exercise";
  - ➢ The methodology is predominantly task-oriented and functional in nature.

Comments by the researcher

The researcher regards Buchanan & Gibb's methodology as a very good attempt towards developing a "standardized" information audit methodology. Very practical suggestions are made in terms of specific frameworks that can be used. This will prove important when wanting to standardize information auditing. The researcher classifies this approach as an example of the hybrid approach since it contains elements of the operational advisory and geographical approaches.

4. Other information audit applications

4.1 O'Flaherty: Information user audit

The information audit that is described by O'Flaherty (1997) is very limited. The term "information audit" is not defined. It is also used interchangeably with the term user audit.

The aim of the audit as performed in this project was to determine whether there were any changes in information seeking prior to the development and implementation of the new system (EURILIA) as compared to the information seeking behaviour exhibited after using the new system. The post-project information audit was aimed at obtaining additional, evaluative information and the results were used to make recommendations to improve aerospace access.

EURILIA was a three-year, ECU project aimed at enhancing "the Libraries R&D and education process which underpins the aerospace sector." For this purpose information needs were researched and a new service was developed (O'Flaherty, 1997:1).

The three initial phases of the project were as follows:

- The information needs of aerospace workers were identified.
- Subsequently a literature review of aerospace information was performed.
- The commercial viability of the newly developed aerospace information system was researched (O'Flaherty, 1997:2-4).

- Project user audits

Two types of user audits, pre-project and post-project audits, were performed. Both of these involved a number of interviews with aerospace users. The main aim of the interviews was to determine what the users' *attitudes* were towards information and to obtain *feedback* on the utility of the newly developed system (O'Flaherty, 1997:4).

The interviews were conducted at the beginning of the project (pre-project audit) and again at the end of the project (post-project audit). The same questionnaires were used for both audits in order to obtain comparable answers. For the post-project audit, a number of additional questions were added. The purpose of these was to *evaluate* the EURILIA system in terms of its effectiveness of retrieval, content, document delivery, and screen layouts (O'Flaherty, 1997:4-5).

4.2 EARL: Information needs assessment

The researcher regards the EARL information audit (Earl, 1995) as an information needs analysis. The "audit" was conducted to determine how the various libraries in the consortium could be assisted in creating WWW pages. The results gained from a questionnaire that was sent out to participating libraries, are discussed, as well as how these were analysed and what the findings were. The audit is evaluated in terms of problems that were experienced. The information audit is concluded by making suggestions in terms of possible solutions to the problems identified.

Phase 1: Questionnaires

EARL is a public library consortium in the United Kingdom. This consortium was created with the purpose of helping public libraries (through support and advice) in harnessing the full potential offered by the Internet. In order to customize these services to the public libraries, it was decided to conduct an information audit.

A questionnaire was sent out to the participating libraries. The purpose was to gather different types of information:

- Library information, i.e. the scope of library materials that libraries had on themselves.
- Non-library material – to ascertain the scope of material that libraries had access to and that they wished to make available through their web pages.
- Networking – to determine the extent to which libraries were already networked (this included the Internet as well as library management systems).

Phase 2: Analysis of questionnaire results

The questionnaires rendered the following types of information:

- Library information: The information results from this part of the questionnaire were also an indirect measure of the availability/existence of marketing material within the various libraries.
- Non-library information: This part of the questionnaire focused on the material held by the various libraries. The results indicated that the majority of libraries wished to place community-related information on their Web pages or provide access thereto from these Web pages, e.g. information on museums and galleries, district councils, social services, education, leisure services and tourism.
- Networking and automation information: The final aim of the information audit was to ascertain the current state of information technology in libraries who were members of the consortium. The results were analysed in terms of different types of library systems that were in use as well as the percentage of stock handled through information technology. The existing types of Internet connections held by the EARL members were also determined.

The results were analysed and presented in the form of comparative graphs. The article concludes with a discussion and interpretation of the results of the questionnaire.

Comments by the researcher

According to the researcher the Earl audit is not an information audit in the proper sense of the word, as this was a very limited exercise that only determined what information existed in the various libraries (i.e. an information inventory), and to a limited extent, where (i.e. which library). Aspects that were not addressed were by whom the information is used, at what cost and to what effect [cf. the purpose of the information audit according to Swash (1997:314)].

4.3 Lewington: Information needs assessment

A survey of information needs and currently available health information sources on the channel island of Guernsey were performed. The purpose of the research was to determine the current state of health information provision: whether or not it is sufficient and to determine in which direction health information provision on Guernsey should develop. This was done against the background of the UK Patient's Charter according to which consumers of health information services should have access to health information they require. Also: on the channel island of Guernsey developments in the health information services highlighted the need for better access to health information (Lewington & Farmer, 1995:8).

A study was subsequently undertaken to:

- Identify the sources of health information that was currently being used.
- Determine the extent to which users of this information was satisfied with these sources.
- Determine the attitudes of health information service professionals towards health information provision.
- Audit existing outlets of health information.
- Identify gaps in health information provision;.
- Make suggestions for the improvement of health information provision on Guernsey (Lewington & Farmer, 1995:8).

Phase 1: Questionnaires

A questionnaire was distributed to the three main groups involved in health information provision on Guernsey. These groups were identified as the public, health care professionals and recent public hospital in-patients. The aims of the questionnaire were to:

- determine the current levels of satisfaction with health information provision;
- obtain recommendations for the improvement of health information provision (Lewington & Farmer, 1995:9).

Lewington & Farmer (1995:9-11) discuss the nature of Guernsey and the views of the three focus groups on health information provision.

Phase 2: Analysis of the questionnaires

From the analysis of the questionnaires it became clear that health care professionals were in favour of the development of a health information policy for Guernsey. There was however, no organised infrastructure in place for the provision of health information, nor was there any formal plan for health information provision (Lewington & Farmer, 1995:12).

The health information sources that were available include:

- health information professionals;
- libraries;
- self-help and support groups (Lewington & Farmer, 1995:12-13).

These health information sources (see list above) are briefly and informally evaluated in terms of their advantages/disadvantages (Lewington & Farmer, 1995:13).

The study enabled the researchers to identify gaps in health information provision, specifically in terms of the types of health information that was needed. The audit results indicated that though health information was available it was insufficient in the sense that the sources were either minor sources or extremely specialized. No recommendations were made as to the improvement/development of health information provision on Guernsey (Lewington & Farmer, 1995:13-14).

Comments by the researcher

The auditing process itself is not described in any detail in the article by Lewington & Farmer. The researcher therefore concludes that the audit as it was performed cannot be regarded as a "proper" information audit. The authors described the compilation of an inventory of existing health information sources. No mention is made of the monetary value of these information sources. The value of the information sources is determined in a non-monetary sense by identifying users' attitudes towards and opinion of the information sources. Another feature that is missing from the study of Lewington & Farmer, is the lack of concrete recommendations for the improvement of weak points that were identified.

4.4 Evan-Wong: Practical case study

The author describes the various components that were included in the study to determine the viability of developing existing information networks into commercial information services (Evan-Wong, 1997:1).

A business strategy was developed. It was made up of the following components:

- An analysis of both the internal and external environments of the system
- Information needs assessment
- Information audit
- Market/product opportunity analysis
- Marketing plan
- Evaluation (Evan-Wong, 1997:2).

The information audit was used as a tool to assess the resources that were available and that could be used to develop information products and services. For this purpose the SWOT technique was used to determine the Strengths and Weaknesses of the internal resources, as well as the Threats and Opportunities that may impact on these resources (Evan-Wong, 1997:2).

After the development of the business strategy selected existing regional information networks were evaluated against the business strategy; possible areas for commercialisation were identified; as well as the constraints to commercialisation (Evan-Wong, 1997:2-4).

Some of the organisations that were investigated did not form part of the public sector. In order to accommodate these organisations it was necessary to make some adjustments to the policy that was developed (Evan-Wong, 1997:4).

Another opportunity for commercialisation was identified, i.e. the establishment of a regional information company that would serve as a broker for the information products and services offered by the regional information networks (Evan-Wong, 1997:4-5).

One of the results of the research project was the development of a map of information resources in the Commonwealth Caribbean. This map is currently produced commercially and a percentage of the proceeds of sales are used for the regular updating and expansion of the map (Evan-Wong, 1997:5). The author of the article (Evan-Wong) does not link the information auditing process to the production of the information map, but the researcher reckons that the results of the information audit, might have been used to develop the "infomap".

5. Comparison of different information audit methodologies

In the next section of this discussion, the researcher will attempt to compare the different information audit methodologies that have been discussed in this chapter. Since the terminology that is used by different authors to describe similar concepts, the researcher will have to generalise the terminology in order to make it possible to compare different phases.

5.1 Operational advisory audits

	Barker	Du-bois	Eddison	Gib-son	LaRosa	Robert-son	St Clair	Swash	Webb
Define organisational environment	✓				Identify potential markets	✓			
Planning		✓			Select specific markets; Identify contact persons	Deter-mine purpose of audit; Identify who will perform audit		✓	
Identify users' information needs	✓			Iden-tify users of infor-mation					
Design questionnaire							✓		

	Barker	Du-bois	Eddison	Gib-son	LaRosa	Robert-son	St Clair	Swash	Webb
Send memo to interviewees; Make appoint-ments with interviewees						✓			
Investigate technology				✓				Infor-mation tech-nology audit	
Analysis	Identify strong & weak points; Evaluate weak points	Blue-print	✓	✓	✓	✓	✓	✓	✓
Costing and valuing								✓	
Test key control points	✓								
Generate alternative solutions; Evaluate alternatives	✓								

	Barker	Du-bois	Eddison	Gib-son	LaRosa	Robert-son	St Clair	Swash	Webb
Monitor adherence to standards & regulations	✓								
Write report	Make recom-men-dations	✓					✓	✓	
Implement monitoring mechanisms		✓					Imple-ment recom-men-dations		

Although very few authors include the defining of the organisational environment as a phase in their information audit methodologies, the researcher regards this as a very important phase that should be included. Less than half of the authors include a specific phase for planning. Once again the researcher regards this as a phase essential to the success of an information audit. The same applies to the information needs assessment. It is of the utmost importance to know what the information needs within the organisation are as this enables one to determine whether the information resources are relevant and of any value. The majority of the authors include a phase during which an information inventory is compiled. The researcher agrees with this as one of the aims of an information audit is to collect information on organisational information resources. Only three of the authors indicate that monitoring mechanisms should be implemented upon completion of the information audit. The researcher also feels strongly that the results of the audit should be implemented and used so as to make the exercise worthwhile.

5.2 Geographical audits

	De Vaal & Du Toit	Haynes
Analyse users' information needs		
Compile information inventory		✓
Match information needs to information sources		Information resources mapping; Map information flows
Identify strong and weak points		✓
Design a solution	✓	
Design implementation plan		✓

Very few authors follow the geographical approach when performing an information audit. The researcher likes this approach because of the emphasis on the visual presentation of information. This has various advantages as has been discussed earlier in this chapter, as well as chapter 3 (Infomapping). Many of the same elements that have been highlighted as important to the operational advisory audit are also present in geographical audits, e.g. the information needs assessment, the information inventory, the analysis of the information by comparing the information needs to the identified information sources and the follow-up procedures in the form of solutions and/or implementation plans. Unfortunately the methodology of De Vaal & Du Toit, an example of one of the few practical case studies, include very few of these elements.

5.3 Cost-benefit approach

	Alderson*	Riley
Patterns of use	✓	
Costing	Cost-savings Costs of online searches Return on investment	Cost factors - Time - Space - Equipment - Personnel costs - Redesign efforts - Currency - Completeness - Accuracy

*Alderson does not discuss the information audit methodology in detail, nor does Riley, therefore a proper comparison cannot be made – both authors discuss only components of the audit.

The researcher finds it difficult to comment on the cost-benefit audits as the ones that were studied are not discussed in great detail in the literature. The approaches that are used to cost information sources can however be looked at when designing an information audit methodology.

5.4 Hybrid approach

5.4.1 Operational advisory approach and geographical approach

	Booth & Haines	Buchanan & Gibb	Lubbe & Boon	Quinn	Stanat
Promote the information audit		✓			
Define organisational environment	Review corporate objectives	✓	✓	Profile current set-up - Purpose - Scope - Services - Role - Cost - Users	✓ (as part of pre-audit procedure)
Planning	Design questionnaire; Training & support				✓
Collect data	Conduct interviews	Identify information flows; Identify organisational information resources (finalise preliminary inventory)	Identify all internal & external information sources	Identify staff requirements	Determine organisational information needs; Identify information resources

	Booth & Haines	Buchanan & Gibb	Lubbe & Boon	Quinn	Stanat
Analysis	✓	✓	Evaluate & valuate information resources		✓
Costing		✓	Capital & operating costs		Evaluate corporate investment in internal & external information sources
Compile report		✓	✓		Develop strategic intelligence blueprint

The hybrid approaches that are compared in the table above combine many of the best elements of the methodologies that have been looked at thus far. For example: the promotion of the audit (i.e. obtaining top management support and "marketing" the audit); defining the organisational environment; the planning phase; the collection of data (including the information needs assessment); the analysis of the information; the costing of the information sources; and the conclusion, i.e. the compilation of the final report. The researcher reckons that these phases form a solid basis from where one can look at developing guidelines for an information audit methodology.

5.4.2 Operational advisory approach and cost-benefit approach

	Hamilton	Jurek	Orna
			Pre-audit: Initial investigation
Planning	Prepare proposal		✓
Preparation	Design questionnaire; Select interviewees		

	Hamilton	Jurek	Orna
Collect data	Conduct interviews	Articulate information needs;	Identify information available in the organisation; Identify resources for making information available.
Set up databases; Key in data	✓	Compile profiles of information sources	
Cost & value information resources	✓		✓ Determine how information is used to further the purposes of the organisation
			Identify those responsible for managing & processing information
			Identify & evaluate information technology used to manage information resources
Compile final report	✓	Develop information management plan	(Part of post-audit procedure)
Present final report	✓		

In contrast to the previous hybrid audits the ones in this table do not regard the initial investigation as very important – only one author includes it in the methodology. The researcher regards the absence of this phase as a limitation. The planning phase seems to be more important (i.e. two authors make mention of it). All the authors focus on the collection of data (including an information needs assessment). The capturing of the collected information receives attention. This is important in view of the information being available again at a later stage to be used as a knowledge base of the

state of information in the organisation. The costing and valuing of information sources are also regarded as important, as is the compilation of the final report that can even include the development of an information management plan.

The researcher therefore comes to the conclusion that the best examples of information audit methodologies are those that are highlighted in paragraph 5.4.1. In Chapter 6 the researcher will either formulate an information audit methodology or develop guidelines for such a methodology.

CHAPTER 6: CONCLUSION

Chapter 6: Overview

In this chapter the researcher will briefly summarise the findings about information auditing. Selective characteristics of financial auditing will be highlighted to show how these can be used in support of information auditing. The researcher will come to a conclusion in response to the Statement of the problem (cf. Chapter 1). Finally, a few comments will be made about the future of information auditing.

1. Introduction

The purpose of this study was to investigate the possibility (and/or desirability) of developing a standardised methodology for information auditing – such as is used for financial auditing. This is based on the questions raised by Robertson (1994:36). He maintains that if a standardised information audit methodology and procedure is developed according to the example set by financial audits, the future might be different from what any information scientist could have expected. For example: Imagine a scenario where an information auditor evaluates (according to a set of standardised criteria) the effectiveness with which an organisation has managed/manages its information resources. On determining that no major problems exist the auditor issues a certificate to state that the organisation "manages its information resources correctly and efficiently and in accordance with established Standards, complying with best practice at that time". In order for the above scenario to become reality, it is imperative that properly qualified information auditors should be trained, preferably by means of acknowledged training programmes and professional examinations.

2. The information audit

2.1 The need for an information audit

Firstly, the researcher has determined that it is essential for organisations to perform information audits. This is because "[i]nformation permeates all organizations" (McPherson, 1994:203) or as stated by Orna (1990:46): "... information pervades the whole organization and is not the sole domain of the library or information scientist".

2.2 The main aims of an information audit

The main aims of an information audit were identified as follows (cf. Chapter 4):

- Identifying organisational information resources

Underwood (1994:61) defines an information resource as including published material, semi-published material as well as unpublished material. When identifying organisational information resources, personal information management systems should not be ignored. Examples of these include files, address books, lists of contacts, documents kept in staff's offices and also the personal knowledge of staff.[1] Information resources can also be stored in various formats, e.g. conventional mediums such as print and paper, and increasingly in electronic form (Underwood, 1994:61).

- Determining organisational information needs

It is necessary to determine what information the staff in an organisation need in order to perform their daily tasks optimally. So-called "information gaps" can be identified, i.e. where information resources needed for a specific task are not available in or through the organisation (Underwood, 1994:61).

Both these aims focus on the potential (value) of information to an organisation (Underwood, 1994:61).

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[1] The latter touches upon aspects typically included in the knowledge audit.

The researcher wants to add a third aim of an information audit, i.e. to make recommendations for the effective management of organisational information resources.

The scope of an organisational information audit typically includes the following:

- Identifying all the organizational information resources
- Determining how information is used in the organisation
- Determining the costs and values of the information function (Orna, 1990:29).

2.3 Lack of standardisation

There seems to be agreement amongst authors who write about information auditing, that currently no standardised information audit methodology exists (cf. Swash, 1997:314; Robertson, 1994:35; Buchanan & Gibb, 1998:36). Haynes (1995:30) confirms this by stating that information auditing has been performed in various different ways in different environments over the years. This has also become clear through the research that was done for this dissertation. The differences in methodologies are clearly illustrated by the comparison of different methodologies at the end of Chapter 5. Robertson (1994: 34)states that "[a]t present, information audits are usually conducted as specific projects to address particular issues", e.g. mergers, introduction of new information technology into an organisation etc.

Despite the lack of a standardised methodology the information audit remains an important tool for information management (Dubois, 1995:20). Riley (1975:25) notes that structured information audits are rarely performed, but that information should be evaluated in this way in more environments more frequently – hereby once again stressing the importance of performing information audits.

2.4 A standardised information audit methodology

The problem that the researcher found with the majority of information audit methodologies that are discussed in the literature are verbalised by Buchanan & Gibb (1998:36): "...very few of the methods proposed or discussed go beyond basic frameworks which require further development." Furthermore "...many are characterised by a very definite purpose and scope which makes their universal adoption difficult."

Furthermore the researcher found that none of the information audit methodologies that were studied and discussed in Chapter 5 are sufficient on to its own. Buchanan & Gibb (1998:40) came to the same conclusion: "It is apparent from this review that no single information audit methodology can provide a complete information audit solution and that none can fully fulfil the strategic role of the information audit."

The only attempt that has been made at a "universal" information audit methodology, is the model that was developed by Buchanan & Gibb (1998). There are however still limitations to this model which makes its universal adoption problematic.

The researcher therefore comes to the conclusion that currently it does not seem possible, nor desirable to develop a standardised information audit methodology. The reasons for this include:

- The unique characteristics of information as a resource – this complicates the management of information resources.
- It seems to be desirable to allow for different approaches to information auditing (cf. Ellis et al) in different (unique) information environments. This is confirmed by Hall (1996:iv) who states that each organisation is unique, "which means the audit must be designed for the particular organisation".
- The fact that an attempt at developing a "universal" information audit methodology has not been 100% successful.
- When one looks at the example of a standardised audit methodology (e.g. financial auditing), it becomes clear that there is a long history of national and international

developments behind these. If any attempt were ever to be made to standardise information auditing methodology, this would have to be driven by a strong, international information-oriented body that would be able to influence strong, national bodies to monitor and encourage the implementation of auditing standards, training standards, etc. It should also be taken into account that international accounting and auditing standards are not enforceable. The same will most probably happen if international standards for information audits were to be developed. The standards would only be useful as guidelines.

- Furthermore, the reason for developing standardised information audit methodologies were the requirements for adherence to legislation. The current situation in the USA is that the financial statements of organisations that reflect the value of corporate information resources must be prepared according to financial standards and legislative requirements.
- According to Robertson's (1994:36) statement, the standardised methodology envisioned by him is not supposed to limit organisations in the execution of information audits, but rather to guide them in terms of elements to investigate and tasks to include in the performance of such an audit, i.e. a checklist of things to do – in other words, a methodology such as the one proposed by Buchanan & Gibb would be acceptable. The researcher, however, does not foresee the possibility of developing a standardised information audit methodology that would adhere to legal implications and requirements, such as is the case with the financial audit.
- The researcher has identified components of information auditing methodology that can be standardised. These include the costing and valuing of information resources. This will be discussed in more detail later on in this chapter.

3. Financial auditing versus information auditing

Despite the fact that information auditing methodology is not standardised and that there does not seem to be a possibility of doing this, the researcher has identified certain similarities with the procedures and activities of financial auditing, as well as areas where information professionals can learn from the example of financial auditing. In the literature the researcher also found evidence of a correlation between financial and information auditing, e.g. Stanat points to a loose correlation with the financial audit, i.e. the (information) audit being a recognised management tool. According to Dubois (1995:20) "[the] parallel with standard financial auditing is ... a loose one".

TABLE 6-1: Financial versus information auditing

FINANCIAL AUDITING	INFORMATION AUDITING
In financial auditing "formal standards lay down audit guidelines, checklists, techniques and operating standards which will apply to all types of organization and have evolved over many years" (Robertson, 1994:35).	As has been explained, this is not the case with information audit methodologies.
Activities common to all types of audit assignments: - Planning, control and supervision - Fact finding, analysis & documentation - Recommending - Reporting (Flesher, 1996:253).	All these activities apply to information audits. The majority of information audit methodologies that were studied during the course of this research include the first two sets of activities. Not all of these go as far as preparing final reports and making recommendations. The researcher identifies the latter two stages as very important phases that should be included in all information audit methodologies.

FINANCIAL AUDITING	INFORMATION AUDITING
Different approaches to the auditing process include: - Balance sheet approach - Systems-based approach - Transaction flow or cycle approach - Risk-based approach (The principles and practice of auditing, 1992:59-66).	Even though no standardised information audit methodology exists, there are "recognised approaches to the audit process" (Gibson, 1996:12). Different authors identify different approaches to information auditing (cf. The discussion on this aspect in Chapter 5).
Robertson (1994:36) identifies three general types of financial audits commonly used in the commercial environment. These are financial audits used for: - "The physical verification of assets and liabilities; - Control and compliance issues; and - Investigative matters".	According to Robertson (1994:36) the majority of information audits currently performed in organisations, can be classified as similar to the first type of financial audit listed in the column to the left, i.e. these information audits are used to compile inventories of organisational information resources. The researcher has identified very few information audit methodologies where compliance issues are addressed. Although compliance is included in the operational advisory audit approach as described by Ellis et al (1993:138), very few of the audits that were identified as operational advisory audits, actually addressed this component. An element of compliance forms part of Barker's methodology – phase 9, where adherence to standards and regulations are determined. A few of the information audits performed in organisations can be classified as similar to the third type of financial audit listed in the column to the left, i.e. investigative for reasons that differ from those for which an investigative financial audit is performed (e.g. in situations where an information source is not used; or where a system is not functioning properly; or where an information centre is to be closed down because it is undervalued).
An audit is performed as a preventative (pro-active) measure, i.e. it is performed in order to identify problems before they become major problems and one has to react to these (Downs, 1988:1).	The same applies to information auditing.
One type of audit that was identified in Chapter 2, is the internal audit. No two internal audit assignments are performed exactly the same way, i.e. no "routine" internal audit assignment exists. Every assignment and its objectives are unique.	The same applies to information audits.

FINANCIAL AUDITING	INFORMATION AUDITING
The typical responsibilities of an internal auditor, include: - To aid the organisation in the effective discharge of its objectives; - Information is collected for management; - The direction of the audit is looking forward.	Many of the information audits that were discussed in Chapter 5, had similar objectives, i.e.: - To determine whether the information resources contribute to organisational objectives; - Information is collected for management; - The direction of the audit is looking forward (by evaluating the current situation).
Another type of audit, the operational audit, is aimed at "... an organized search for efficiency- and effectiveness-related problems ... [within] an entity or one of its subdivisions" (Flesher, 1996:242).	In Chapter 5 it became clear that some of the information audits were performed in order to evaluate the efficiency and effectiveness of a specific information system (e.g. Barker), a specific entity such as the corporate library/information centre (e.g. Gibson), or with the purpose of establishing effective information management procedures (e.g. Boon & Lubbe).
The overall approach to operational auditing entails the following: 1. Seek out and identify the organisation's objectives. 2. Determine the pertinent facts and conditions by: conducting a physical tour; obtaining internal forms and documents; interviewing departmental employees; preparing financial analyses. 3. Define problem areas or opportunities for improvement. 4. Present findings to management.	The main activities common to the majority of information audits that were discussed in Chapter 5, included the following: 1. Defining the organisational environment. 2. Data collection (by conducting a physical tour and/or obtaining relevant documentation and/or interviews and analysis of the collected information). 3. The identification of strong and weak points. 4. The compilation of the final report and the presentation of the findings to management.
In terms of the classification of audits, the restricted (or partial) audit is not required by law, but is requested by a client (The principles and practice of auditing, 1992:53).	The majority of information audits could be classified as restricted or partial audits, in the sense that these are not required by law, but are usually requested by management.

FINANCIAL AUDITING	INFORMATION AUDITING
Three aspects that auditors have to consider, are: - the size of the company; - the statutory requirements (if any) that govern the audit; - the wishes of the client (The principles and practice of auditing, 1992:53-54).	The first and the last aspects (listed in the column to the left) must also be considered during the planning phase by the person who must perform an information audit. The second aspect might apply to information audits in specific situations.
The characteristics of advisory audits include the following: - it is diagnostic; - it is used to evaluate the appropriateness of existing information systems and services; - it informs users in the organisation of its findings (Ellis et al, 1993:134).	The majority of information audits are of an advisory nature and have the same characteristics as (financial) advisory audits.
Planning is the second activity of a typical audit: It is stated that an absence of planning or ineffective planning results in an ineffective audit (Human, 1996b:1). - During the Planning phase of an audit the auditor must obtain knowledge of the entity's business. - Formulate an audit approach. - The preparation of a written audit programme	The importance of proper planning is emphasized by a number of authors who discuss information auditing. The researcher has determined that proper planning is the key to success of any project. - This part of the planning phase is similar to the part of the information audit where the organisational environment is defined. - The audit approach also forms part of the information audit, i.e. where the auditor has to decide which approach to follow, e.g. a hybrid approach, a cost-benefit approach, a compliance-based approach, etc. - The written audit programme also forms part of the majority of information audit methodologies.

From the table above it becomes clear that information audit methodologies have many elements in common with standardized financial audits. The only difference is that information audit methodologies do not adhere to legal requirements.

TABLE 6-2: What information professionals can learn from financial audits

FINANCIAL AUDITING	INFORMATION AUDITING
The instructions that an auditor receives from the client, determines the scope of a specific audit. The instructions must be confirmed in writing.	This is an aspect that can be applied by those who perform information audits, i.e. that the audit assignment should be specified clearly, in writing.
Compliance audits are performed to determine whether an organisation is meeting certain specified requirements, e.g. internally or externally imposed laws, regulations, standards, policies, plans and procedures. A compliance audit can be requested by management or it can be performed to satisfy a legal requirement. Over the past few years, compliance audits have become increasingly important, as organisations are being held accountable at a higher level for their performance. Accountability is requested by boards of directors, top management, stock holders, taxpayers and governments (Flesher, 1996:251).	The researcher has determined that very few of the information audits that were discussed in Chapter 5, contained elements of compliance. In view of the increasing importance of compliance audits in terms of accountability, information professionals should look at setting organisational standards and implementing organisational policies for information management and the evaluation of these through the inclusion of compliance components in information audits.
The auditing process is made up of four main procedures and activities, i.e.: - pre-engagement activities; - planning; - compliance and substantive procedures; - evaluating, concluding and reporting. The Pre-engagement activities include amongst other things: - Determining the skills and competence requirements; - Establishing terms of agreement (The principles and practice of auditing, 1992:56).	Information professionals can learn from these two aspects of the Pre-engagement activities, i.e.: - determining that the auditing team is made up of people with the necessary skills and competencies; - establishing a formal agreement with management as to the scope and purpose of the information audit and to get a copy of the agreement, in writing.
Evaluating, concluding and reporting make up the final procedure of the auditing process.	Evaluating, concluding and reporting are not included in all the information audits that were discussed in Chapter 5. The researcher feels strongly that it should. Swash (1997:314) stresses the fact that the recommendations resulting from the information audit are of vital importance.

FINANCIAL AUDITING	INFORMATION AUDITING
The auditor's responsibilities include: - Reporting his/her opinion - Conducting the audit with due professional care and competence - Maintaining an independent mental attitude - Reporting on material irregularities; and detecting and reporting illegal acts, other irregularities and errors.	The information profession can learn from this and it should be expected of the information auditor: - To report his/her opinion (i.e. Feedback); - Conduct the audit with professional care and competence (i.e. a qualified information professional should perform the information audit); - Maintain an independent mental attitude, especially if the auditor is a staff member; - Report any problems that he/she came across.

Information professionals can also learn from the example of financial auditing by looking at the so-called working papers compiled by auditors. As have been mentioned already, the working papers contain important audit evidence and for this purpose all audit activities must be thoroughly documented. The documentation gathered and included as audit evidence in the working papers, can range from charts, schedules and interview notes to internal reports and memoranda (Flesher, 1996:255). An overview of the typical contents of the active working papers of an auditor, is included in Table 3-4 (below):

TABLE 6-3: An overview of the typical contents of the active working papers of an auditor

1. The audit work program.
2. Documents obtained during the acquisition of data stage.
3. Physical tour questionnaire.
4. Questionnaires from the interviews with management stage.
5. Memoranda prepared by the auditor during the financial analysis (analytical review) stage of the audit.
6. The survey memorandum.
7. Documentation (such as flowcharts, questionnaires and checklists) of internal control systems.
8. Questionnaires from the in-depth interview of departmental employees.
9. Memoranda prepared during the financial analysis stage of the in-depth audit.
10. Papers related to results of audit testing, such as compliance and substantive tests.
11. Memoranda related to audit comments made during the exit interview.

(Flesher, 1996:255-256)

The working papers must be indexed, preferably chronologically, i.e. first the documentation gathered during the preliminary survey, followed by documentation generated and collected during the in-depth audit. Standardised formatting of documentation included in the working papers is very important, e.g. a uniform style for headings, only writing on one side of a page and a standard page size for all documents (Flesher, 1996:256).

As have been mentioned before, the documentation contained in the working papers must support conclusions made in the audit report. This means that another auditor must be able to come to the same conclusions (as those contained in the audit report) when using the audit evidence in the working papers (Flesher, 1996:257).

4. Guidelines for information auditing

According to Gibson (1996:12) "there are some assumptions that can be made as to what [an information audit] should cover". One of the purposes of this study is to identify such general/basic elements of an information audit, if the findings of the study indicate that it is not feasible to develop a standardised information audit methodology. Since the researcher does not foresee the standardisation of information auditing methodology and based on the discussion above, the researcher concludes that an information audit should contain the following components – taking into account the time available to conduct the audit and the available resources. These main phases are based on what the researcher identified as common to the majority of information audits (and the different approaches):

- Planning
- Information needs assessment
- Information inventory
- Costing and valuing information resources
- Analysis
- Report (with recommendations)

For practical suggestions of what should/could be included under each phase, the reader can refer to the methodologies discussed in Chapter 5. "As is the case with the "universal model" that was developed by Buchanan & Gibb (1998:47) the phases that are listed here by the researcher are "intended to be wide-ranging and of general applicability but it is recognised that organisations may need to make compromises, or may wish to use a sub-set of steps, or may need to enhance or tailor it to their specific requirements".

Keep in mind that when designing an information audit methodology, the auditor should take into account the organisational environment (i.e. company politics and culture), the structure of the organisation, as well as its mission, goals and functions (Stanat, 1990:7). A prerequisite for the development of an information audit methodology is a clearly defined scope and purpose (Buchanan & Gibb, 1998:40).

Despite the fact that the results of information audits performed in different organisations will be unique, LaRosa (1991:8) identifies the following types of information that will typically be collected:

- The strategic objectives, goals and strategies of the different organisational units, as well as their respective roles and functions.
- Challenges that face the various units and the obstacles they have to overcome in order to reach their goals.
- The information needed in order to help the units overcome their obstacles.
- The way(s) in which the various units plan and the information they need, as well as information on where they find this information and how relevant it is to them.
- The products and services produced by the different units, as well as the resources they manage.
- Evaluative information on the usefulness of information for various purposes.

The prerequisites for conducting a successful information audit are:

- Support from top management
- Skilled staff to conduct the investigation and the audit
- Sufficient time to complete the research
- Free access to relevant information and the right people
- Standardized methods for managing the investigation and reporting the results thereof (Orna, 1990:31).

Looking at the main phases listed at the beginning of paragraph 4, a question can be raised as to whether it is necessary to include a step where the value of information is determined – should this be "compulsory" or not? The researcher feels strongly that such a phase should be included. There are however arguments to the contrary. In view of the difficulty in determining the value of information one could easily argue that such a phase should not be included in an information audit. Swash (1997:317) warns that "[t]he problems of quantifying the exact contribution of a specific term of information may ... prove insurmountable." Furthermore, some information audits do not include the determination of the cost and value of identified information sources. According to Swash (1997:315) this is unusual and undesirable as this makes up an essential component of the information auditing process. The exclusion of such a crucial component of the information audit, does however, support the presumption that information audit methodology can be adapted according to individual circumstances. As has been indicated by the researcher in Chapter 4, more research is needed about methods (standardised if possible) to determine the economic value of information entities. This is confirmed in an article by McPherson (1994:203-215). This author goes as far as pleading for the development of a form of "information accounting": "... a complete accounting framework is require that incorporates a treatment of intangible value that is so rigorous that it has to be accepted as an equal partner to monetary value" (McPherson, 1994:203).

The researcher therefore comes to the conclusion that even though the principles of the financial audit cannot be used to develop a standardised methodology for information auditing, information professionals can look towards the accounting profession to support them in developing a standardised, universally accepted method for accurately determining the value of information entities. This method will have to make provision for measuring the intangible values of such entities.

As far as the auditing of information technology is concerned (as part of an information audit), the following applies: The auditing of information technology is an accepted, standardised procedure performed by accountants. This type of audit "seeks to manage and control costs and information flows, as well as to improve enterprise wide efficient access to information" (Jurek, 1997:42). The researcher has come to the conclusion that one cannot really audit information resources properly without taking into account the enabling information technology.

5. The future of information auditing

It is a well-known fact that information is increasingly being recognised as a strategic corporate resource. Following on this organisations invest valuable resources, "often considerable resources", in information services departments. The information services manager has the responsibility of justifying this investment to management (St Clair, 1996:9). The traditional way in which this is done is by means of reports to management. The information services manager usually compiles these reports on a monthly, quarterly and/or annual basis. Typical information included in these reports are feedback from the users of the information services department, interpretations of statistical information, e.g. frequency of usage of specific information services and/or products, etc. These tools contain sufficient information on the functioning of the information services department. At times however, more information might be needed. In order to obtain an overview, a so-called "big picture", of the state of the information services department, an information audit can be conducted.

Examples of times when an information audit could ideally be conducted, include the following:

- when the purpose, services and/or products of the information services department must be evaluated,
- when a need for new information services and/or products are identified, or
- when management questions the existence and/or value of the information services department (St Clair, 1996:9).

According to Alderson (1993:4) performing information audits will become increasingly important. Performing information audits will most definitely form part of the job description of the so-called "new" information professional. Information professionals can contribute to increased information awareness in organisations by requesting/suggesting a corporate information management review. Furthermore they can contribute by compiling literature reviews of information auditing techniques (Booth & Haines, 1993:231).

Information scientists agree that the results of an information audit can be valuable to an organisation in the development of an organisational information management plan. The above discussion of the methodology for performing such an audit, raises a number of questions. It is probable that information scientists will first have to find answers to these questions if information auditing is to be recognised as an invaluable (information) management technique. Robertson (1994:35) asks whether the experience of financial auditors should be incorporated in order to develop a standardised information auditing methodology. Other problems identified by him, include the following:

1. Information audits represent the state of information in an organisation at one particular point in time. A way/method will have to be found to follow up such an investigation in order to keep information on organisational information resources up to date. Robertson (1994:35) suggests once again that information scientists look to financial auditors for advice on this issue, as financial audits are performed frequently in organisations for a variety of reasons.
2. A second problem that has already been discussed extensively in this dissertation is the difficulty of calculating the costs and determining the value of information resources.

Companies are beginning to realise that information is a very important organisational asset and they are investing large amounts of money in this asset. The irony of this is that these companies do not realise the full value of their investment. As a result, information scientists are faced with the challenge of determining the effectiveness of information flow within a company, as well as the effectiveness of existing information products and services (Stanat, 1990:1). Once again, an information audit can be used to provide the needed answers.

Information audits have been performed in companies for many years, but focused mainly on systems development. Now the strategic information audit can help companies to link information services and products with the strategic objectives and goals of that specific company (Stanat, 1990:1).

According to Booth & Haines (1993:231) many opportunities exist for information professionals to involve themselves in the information auditing process when performed in organizations.

Currently, in many information centres/corporate libraries there is a constant threat of cost-cutting. The ideal scenario is that the value of information be recognised and that information be used for decision making at all levels in an organisation. Few companies have the ability to identify and evaluate whether information is available internally and at what cost. Dubois (1995:20-21) regards information auditing as a potential solution to these and other information problems that occur in organisations. Jurek (1997:43) is another author who stresses the importance of building a phase into the information audit during which the cost of information sources/resources will be determined. The cost of information must be connected with the value of information in the organisation. Worlock (1987:52) discusses the information audit as a tool to help determine the value of information and to examine whether the use of information

technology could increase the value of information. Following the same line of discussion, Underwood (1994:60) points out that even though organisations view information as "important" to them, the value and existence of information remain largely unrecognised. According to him the main value of an information audit lies in the fact that it can help an organisation to survive various periods of crises, as far as information management is concerned.

From the discussion above it becomes clear that more research is needed on the topic of information auditing.

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Addendum A: The South African Institute of Chartered Accountants statements on auditing standards

AU	Title	Date issued
000	Foreword to the auditing section of the members' handbook	Oct 1989
Introductory statements		
001	Responsibilities and function of the independent auditor	Feb 1976
005	Fraud and error	Jul 1983
010	Generally accepted auditing standards	Jul 1986
011	The relationship between statements issued in South Africa and guideline statements issued by the International Federation of Accountants	Jul 1982
015	The audit process	Apr 1987
020	Quality control	Jul 1982
General statements		
110	Training and proficiency	Feb 1976
115	Supplementary practical training	Oct 1977
118	On the job training	Feb 1981
120	Independence	Dec 1989
130	Due professional care	Feb 1976
Statements on fieldwork		
202	Audit risk	Dec 1986
204	Audit evidence	Jun 1986
205	Working papers	Aug 1978
210	Audit planning	Jul 1986
211	Engagement letters	Apr 1977
220	Supervision and review	Aug 1978
221	Change in professional appointment	Dec 1982
225	Reliance on other auditors	Jun 1990
226	Using the work of a specialist	Feb 1981
230	Accounting systems and internal controls	Jun 1986
231	Compliance procedures	Jun 1986
232	Reporting material weaknesses in internal controls	Jul 1988
240	Substantive procedures	Jun 1986
252	Bank confirmations	Jun 1979
257	Enquiries of attorneys	Apr 1980

259	Management representations	May 1982
265	Analytical review	Oct 1983
270	Timing of auditing procedures	Aug 1978
283	Audit sampling	Oct 1989
290	Evaluating and concluding	Apr 1987
291	Audit differences	Apr 1987
292	Overall review of financial information	Apr 1987
293	Events after the balance sheet date	Jul 1985
294	Going concern	Sep 1986

Statements on reporting

310	Reporting	Aug 1978
321	The auditor's report on annual financial statements	Dec 1990
322	Other information in documents containing audited financial statements	Nov 1984
331	Special reports	Apr 1988
332	Special reports expressing opinions	Apr 1988
333	Special reports expressing limited assurance	Apr 1988
334	Special reports on factual findings	Apr 1988

(The principles and practice of auditing, 1992:508-509)

IFAC

Final Pronouncements Issued by IFAC

As of March 1996

| Auditing | Education | Ethics | Financial & Management Accounting | Public Sector | Other |

Auditing

International Standards on Auditing-Codified

- Introductory Matters
- Responsibilities
- Planning
- Internal Control
- Audit Evidence
- Using Work of Others
- Audit Conclusions and Reporting
- Specialized Area
- Related Services (RSs)

International Auditing Practice Statements

- Inter-Bank Confirmation Procedures
- EDP Environment -- Stand-Alone Microcomputers
- EDP Environment -- On-Line Computer Support
- EDP Environment -- Database Systems
- The Relationship between Bank Supervisors and External Auditors
- Particular Considerations in the Audit of Small Business
- The Audit of International Commercial Banks
- Communications with Management
- EDP Characteristics and Considerations
- Computer-Assisted Audit Techniques

Discussion Paper

- The Audit Profession and the Environment

Statement of Policy

- Assuring the Quality of Audit and Related Services

Education

International Education Guidelines

(Note: IEGs 1,3,4,5,6 and 8 have been consolidated into IEG 9)

- IEG 2 · Continuing Professional Education
- IEG 7 Education and Training Requirements for Accounting Technicians
- IEG 9 Prequalification Education, Tests of Professional Competence and Practical Exprerience of Professional Accountants
- IEG 10 Professional Ethics for Accountants: The Educational Challenge and Practical Application
- IEG 11 Information Technology in the Accounting Curriculum

Discussion Papers

- Specialization in the Accounting Profession
- Minimum Skill Levels in Information Technology for Professional Accountants
- 2000 and Beyond: A Strategic Framework for Prequalification Education for the Accountancy Profession in the Year 2000 and Beyond
- Integrating Information Technology Across the Accounting Curriculum

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Ethics

- Code of Ethics for Professional Accountants

Statements of Policy

- Preface to Ethical Requirements
- Implementation and Enforcement of Ethical Requirements

Financial and Management Accounting

Statements on International Management Accounting-Practices

- No.1 Management Accounting Concepts
- No.2 The Capital Expenditure Decision
- No.3 Foreign Currency Exposure and Risk Management
- No.4 Management Control of Projects
- No.5 Managing Quality Improvements
- No.6 Post Completion Review
- No.7 Strategic Planning for Information Resource Management

Statements on International Management Accounting-Studies

No.1 Control of Computer Applications
No.2 (superseded by Practice 3)
No.3 Introduction to Strategic Financial Management
No.4 Reporting Treasury Performance - A Framework for the Treasury Practitioner
No.5 Role of Management Accounting in Emerging Team Approach to Work

A View of Tomorrow - Management Accounting in the Year 2004

A View of Tomorrow - the Chief Financial Officer in the Year 2005

Performance Management in the Small Business

Articles of Merit - 1994 Competition

Articles of Merit - 1995 Competition

Public Sector

International Public Sector Guidelines

No.1 Financial Reporting by Government Business Enterprises
No.2 Applicability of International Standards on Auditing to the Audit of Financial Statements of Government Business Enterprises

Studies

No.1 Financial Reporting by National Government
No.2 Elements of the Financial Statements of National Governments
No.3 Auditing for Compliance with Authorities - A Public Sector Perspective
No.4 Using the Works of Other Auditors - A Public Sector Perspective
No.5 Definition and Recognition Assets
No.6 Accounting for and Reporting Liabilities
No.7 Performance Reporting by Government Business Enterprises
Selected Bibliography of Public Sector Accounting and Auditing Material

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Other

Statement of Policy

Recognition of Professional Accountancy Qualifications
Auditors Legal Liability in the Global Marketplace: A Case for Limitation

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Addendum C: Example of a user matrix

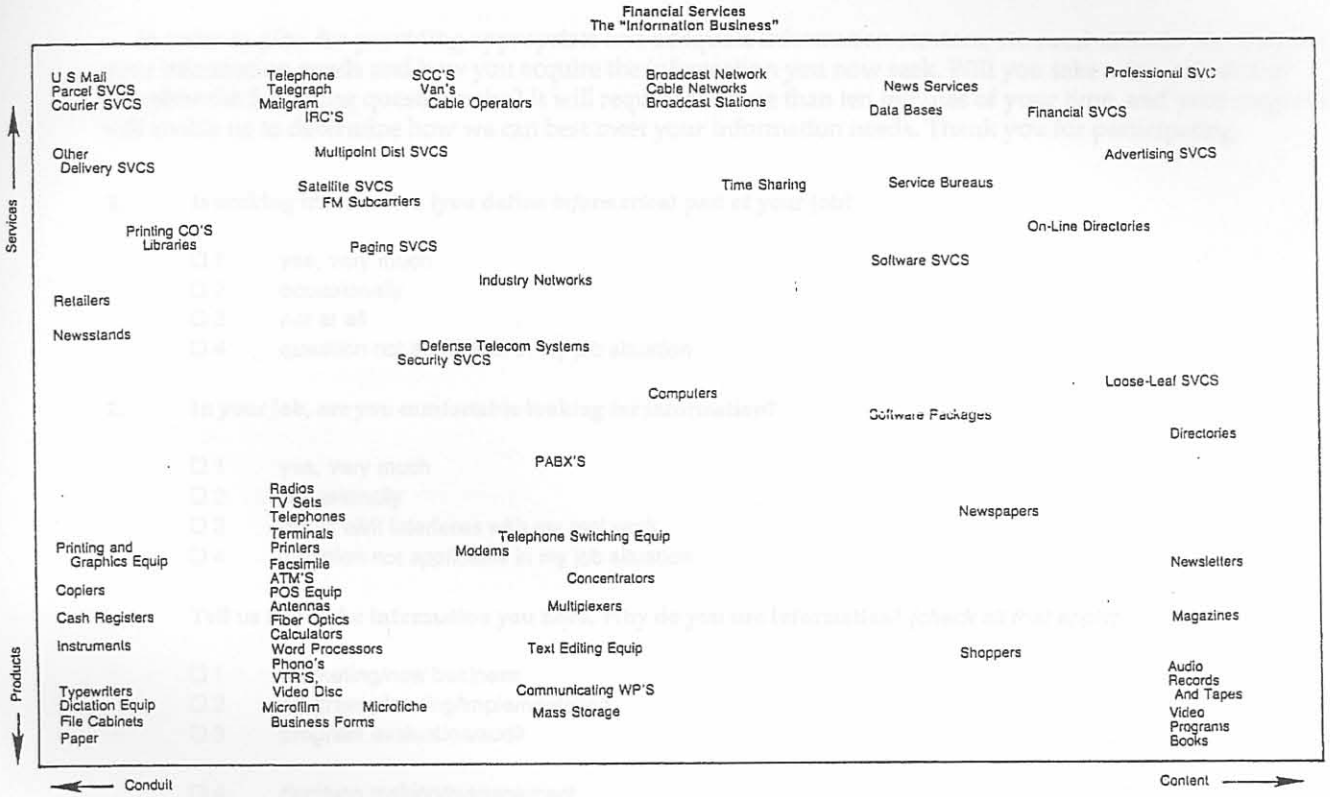
INFORMATION RESOURCE WORKSHEET

USER MATRIX

INFORMATION RESOURCE CATEGORIES AND TYPES	Resource Characteristics: Internal	External	Manual/ analog	Technology-based	ORGANIZATIONAL UNITS: General Manager	Admin & Tech Serv	Basin Study	Overseas	Research Group	Geo-physics	Diamonds	Northern WA	Southern WA	South Australia	Victoria	New South Wales	East Queensland	TOTALS
1. SOURCES																		
CRAE Information																		
1.1 Bibliographic data	I		M	T		X		X	X	X	X	X	X	X	X	X	X	11
1.2 Drill-log and assay data	I		M			X	X	X	X			X	X	X	X	X	X	10
1.3 Exploration reports	I		M		X	X	X	X	X	X	X	X	X	X	X	X	X	13
1.4 Geochemical data	I		M	T				X	X			X	X	X	X	X	X	8
1.5 Geological samples data	I		M	T							X	X		X	X	X	X	8
1.6 Geophysical data	I		M	T			X	X	X	X	X	X	X	X	X	X	X	11
1.7 Management information	I		M	T	X	X	X	X	X	X	X	X	X	X	X	X	X	13
1.8 Maps and charts	I		M	T		X	X	X	X	X	X	X	X	X	X	X	X	12
1.9 Mineral lease data	I		M			X		X			X	X	X	X	X	X	X	9
1.10 Mining information	I		M		X	X												2
1.11 Petroleum information	I		M		X		X											2
1.12 Prospects data	I		M			X	X	X	X	X	X	X	X	X	X	X	X	12
1.13 Remote sensing data	I			T					X									1
1.14 Other	I																	0
External Organizations																		
1.15 Commercial		E	M	T					X	X		X	X	X	X	X	X	8
1.16 Federal agencies		E	M	T			X		X	X		X	X				X	6
1.17 Other CRA Group		E	M		X	X								X				3
1.18 State agencies		E	M	T		X	X			X	X	X	X	X	X	X	X	10
1.19 Other		E		T					X	X		X	X	X	X	X		7
2. SERVICES																		
2.1 Aerial photography		E	M									X	X			X		3
2.2 Core/samples curation	I	E	M	T					X					X	X	X		4
2.3 Drafting	I	E	M	T	X	X	X	X	X	X	X	X	X	X	X	X	X	13
2.4 Geophysical surveying		E		T				X		X								2
2.5 Information locating	I	E	M	T		X	X	X	X	X	X	X	X	X	X	X	X	12
2.6 Library	I	E	M	T		X			X			X	X	X	X			6
2.7 Mineral lease information	I	E	M			X		X			X	X	X	X	X	X	X	9
2.8 Records management																		0
2.9 Reporting	I		M		X	X	X	X	X	X	X	X	X	X	X	X	X	13
2.10 Reprographics	I		M		X	X	X	X	X	X	X	X	X	X	X	X	X	13
2.11 Resource evaluation	I		M	T	X	X												2
2.12 Systems/programming	I	E	M	T		X			X	X	X	X	X	X	X	X	X	10
2.13 Other																		0
3. SYSTEMS																		
3.1 Bibliographic control	I	E		T		X			X									2
3.2 Computing	I	E		T		X			X	X	X	X	X	X	X	X	X	10
3.3 Communication		E	M		X	X	X	X	X	X	X	X	X	X	X	X	X	13
3.4 Drafting/graphics	I	E		T					X	X	X	X	X	X	X	X	X	9
3.5 Geoscience data analysis	I			T					X	X	X	X	X	X	X	X	X	9
3.6 Geoscience data management	I			T								X					X	2
3.7 Image analysis	I			T					X									1
3.8 Mineral lease data	I	E	M	T		X		X		X	X	X	X	X	X	X	X	10
3.9 Prospect information	I		M	T													X	1
3.10 Word processing		E		T	X	X	X	X						X				5
3.11 Other																		0
TOTALS	30	19	29	27	11	23	15	18	25	21	20	28	26	27	27	28	26	293

(Burk & Horton, 1988:124-125)

Addendum D: Example of an infomap



(Horton, 1988:250)

Addendum E: Questionnaire

INFORMATION AUDIT

In order to plan for providing appropriate and adequate information services, we need to know more about your information needs and how you acquire the information you now seek. Will you take a few minutes to complete the following questionnaire? It will require no more than ten minutes of your time, and your response will enable us to determine how we can best meet your information needs. Thank you for participating.

1. **Is seeking information (you define *information*) part of your job?**

   ❑ 1 yes, very much
   ❑ 2 occasionally
   ❑ 3 not at all
   ❑ 4 question not applicable in my job situation

2. **In your job, are you comfortable looking for information?**

   ❑ 1 yes, very much
   ❑ 2 occasionally
   ❑ 3 not at all/it interferes with my real work
   ❑ 4 question not applicable in my job situation

3. **Tell us about the information you need. Why do you use information?** *(check all that apply)*

   ❑ 1 marketing/new business
   ❑ 2 program planning/implementation
   ❑ 3 program evaluation/audit

   ❑ 4 decision making/management
   ❑ 5 crisis management
   ❑ 6 idea formation

   ❑ 7 research
   ❑ 8 class assignments/educational
   ❑ 9 other (please specify)_____

4. **How much time do you spend gathering information?** *(check one)*

   ❑ 1 5 hours or less per week
   ❑ 2 6 to 10 hours per week
   ❑ 3 11 to 20 hours per week
   ❑ 4 21 hours or more hours per week

5. **When you need to obtain information, are you *more likely* to look first to people and resources *within* your department/immediate environment *or* to information services providers (librarians, database searchers, etc.)?**

   ❑ 1 within the department
   ❑ 2 information services providers

6. **If your preferred method for obtaining information is people and resources within your own department or environment, your *primary* reason is** *(check one)*:

   ❑ 1 because they are accessible
   ❑ 2 because the information they have is relevant
   ❑ 3 because the information they have is of high quality

7. **You probably use some of the following types of information or sources to acquire the information you need. Do you have difficulty obtaining information from these types or sources?**
(circle numbers to indicate how often you have difficulty obtaining information from these types or sources)

		Often Have Difficulty	Occasionally Have Difficulty	Never Have Difficulty	Not Relevant
01	internal databases	1	2	3	4
02	electronic sources (e.g. online external databases, Internet, CD-ROM, etc.)	1	2	3	4
03	personal contacts	1	2	3	4
04	information intermediaries such as librarians, database searchers, etc.	1	2	3	4
05	general interest magazines, newspapers	1	2	3	4
06	journals, special interest publications	1	2	3	4
07	books/textbooks	1	2	3	4
08	handbooks/directories	1	2	3	4
09	continuing education programs	1	2	3	4
10	conference proceedings	1	2	3	4
11	paid consultants	1	2	3	4
12	internal reports	1	2	3	4
13	legal information/gov't documents	1	2	3	4
14	theses/dissertations	1	2	3	4
15	preprints (prepublication copies of articles, reports, etc.)	1	2	3	4
16	standards	1	2	3	4
17	technical reports	1	2	3	4
18	numeric data	1	2	3	4
19	other_____	1	2	3	4

8. **Finally, how important are the following reasons for selecting information sources?**
(circle one number per row to indicate the level of importance.)

		Level of Importance		
		High	Moderate	Low/None
01	accessibility/availability/convenience	1	2	3
02	adequacy of data/documentation	1	2	3
03	comprehensiveness	1	2	3
04	currency/timeliness	1	2	3
05	delivery method (electronic vs. hard copy)	1	2	3
06	expense	1	2	3
07	familiarity/experience	1	2	3
08	organization/format	1	2	3
09	relevancy	1	2	3
10	technical accuracy of data/precision	1	2	3
11	other (please specify)_____	1	2	3

Thank you for taking part in this survey. Please return it to: _____

(St Clair, 1995a:5-6)

Addendum F: Interview Questions

Remember that these questions were developed to provide you with impressionistic feedback about the information-seeking behavior of the people you're interviewing. Not all questions will be asked of all interviewees, and other questions will sometimes be developed as the interviews progress (especially if you are conducting group interviews or focus groups). The objective of the interview is to encourage the information customer to "open up" about his or her information use, and to offer suggestions or comments about how the information your department is providing is (or could be) useful to him or her.

Briefly describe your job. What department do you work in, and what products and services are provided by your department?

How does your department relate to the organizational/corporate mission?

With regard to your specific role, what do you do and how do you use information in your work?

Do you know how to use IT (information technology)? Do you use IT in any form (e.g., telecommunications, word processing, spreadsheet, records management, information retrieval, etc.) in your work?

Describe briefly what you seek most in information products and services (things like quality, value, convenience, solutions to problems, cost, reliability, convenience, etc.) How do the products and services you obtain through our department match these criteria to meet your needs?

How satisfied are your with the services of our department? What do you like best about coming to us for your information?

Are there problems associated with your gathering information through our department? What are they? Be as specific as you can be.

Where do you get information when you don't come to us? In your opinion, does the company/organization/community *need* information products/services from our department?

Do you have any "ideal" scenario regarding information services and products from our department? What "ideal" information products or services do you wish existed?

(St Clair, 1995b:7)

Addendum G: Basic elements of a sample questionnaire

General information

1. Name, title, department
   Job description
   Factors required to perform job

Information sources

2. Current information sources used
   Internal sources and externally published sources
   Listing of sources (by type)
   Rating of usefulness
   Frequency of use
3. List of documents they generate themselves
   Where are these documents located?
4. Where do they go to find information?

Information Needs

5. Internal document information needs (internally generated memos, reports, and so on)
6. External document information needs (published materials such as newspapers, journals, magazines)

Communication Needs

7. Other departments or staff needed to perform job
8. Current method of communication internally
   (electronic mail, memo, phone)

Software/Computer Needs

9. Do they use a personal computer, terminal, modem, hard copy?
10. Current software packages used

Wish List

11. What information sources or system would enable them to perform their job at optimum?
12. Describe the system

(Stanat, 1991:377)