

CHAPTER 6

6 CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

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6.1 Introduction

In this last chapter the work preceding it needs to be put into perspective and conclusions must be drawn. Certain objectives have been set in the first chapter and it is here where these objectives need to be reviewed so as to determine whether they have been met. Original research such as was attempted in this study, should have implications for various groupings and related subjects and these must be spelled out. Lastly, it is highly likely that research will open up new fields and pose new questions.

All these aspects will be covered in this chapter.

6.2 Research objectives and research questions revisited

It is proposed in the literature by experts and consultants that information should be managed analogous to the other resources, such as financial and human resources. The reasons for this proposition clearly stem from the importance information plays in the "information era" and in the "information society". Managing information in this way, so it is claimed, will lead to the true satisfaction of the need for information amidst a glut of data.

As the first objective to this study, it was necessary to evaluate the proposition that information can indeed be classified as a resource. Is information perhaps more than just a resource, or is it not a resource at all? Clarity had to be obtained regarding this issue.

Having clarified the issue of being a resource or not, the next proposition that had to be researched, was the question of manageability. Even if information is proved to be a resource, it might be such a unique resource that a resource with such characteristics must be managed in a very special way. The possibility that information is so unique that it is impossible to be managed, could not be ruled out completely.

Answers to these two objectives were necessary in order to determine whether the proposition that information must be managed can be substantiated.

6.2.1 Objective 1: Is information a resource?

6.2.1.1 What are the nature and characteristics of information?

Data are attributes with no apparent meaning. Data originate from anywhere: From documents, people, the environment and so on. It is perceived through the use of the sensory organs. Data have the potential to take on meaning, but in itself it has no meaning.

When data are put in context and perspective added so that the data become meaningful, it has been transformed into formation. This makes information something very personal and subjective and something only a human can do. De Bono (1992: 29) puts it beautifully: "...information comes wrapped in concepts and perceptions". Information itself is therefore intangible; it only exists in the mind and only a human being can transform data into information as only humans can add meaning. Technology and other means can assist in the process, but it can never create information all by itself.

This then explains why the same data can become information to one person while it remains data to another. Meaning is inseparably attached to a human being and only that human being and no-one else can make it meaningful to himself.

The primary source of information is data, that is, data become the resource for the creation of information. Data packaged in some form or another so as to ease and facilitate the process of converting data into information, can be called information resources. This packaging can come in a variety of forms: Books, conversation, speech and sound recording, video and film, shape, appearance and taste. It must be understood that these information resources are not information itself - they are only resources used to create information from.

Data and information resources are therefore one and the same thing, the only difference being that information resources are data that have undergone some or other organising process.

Hence, information is defined as data put into context and perspective.

Information created in the mind is added to other information previously created through similar processes. This addition takes place every living second of a human being - even while asleep. Collectively these "pieces" of information is called knowledge. It is a body of beliefs. Hence, knowledge is therefore defined as justified, true beliefs. Every human being has such knowledge; the justified truth in which he believes. Similarly, a common set of justified and true beliefs exists for groups of humans and even the entire human race. This becomes common knowledge; those pieces of information accepted and proven over the years and which we take to be true either through popular belief or through scientific proof.

Every human, as was shown, possesses knowledge in varying degrees. Through some mechanism, some humans have the ability to link different "pieces" of such knowledge with each other to show great insight in some or other matter or subject. This ability is called wisdom. Wisdom does not depend on the amount of knowledge the person has, it depends on the ability to connect whatever he possesses together to form new knowledge. Hence, even an uneducated person can be called "wise".

6.2.1.2 Where does information manifest itself in a narrow context?

Information (as a generic term) passes through various stages beginning with its creation (as a fact) and ending when it is being disposed of. The timeliness is an important characteristic of information and one to be taken cognisance of, especially with respect to information systems and information management. Information has other characteristics, some of them unique. These include

simultaneity of ownership and the fact that it is both compressible and expandable.

The purpose of information is to share it with others and, in the process, to gain more knowledge and insight into a given situation. Information needs to be productive and not only informative. The uses of information are varied and many. It is used by individuals, business, governments and societies. Its use in decision-making is obvious as it reduces uncertainty.

Information has a very definite cost, but also a value. Cost usually rises with the rise in quality. Valuing information presents many difficulties due to its timeliness and the subjective nature. It is, however, possible to determine the value, albeit subjectively. To measure information is difficult as there is no handy, universal unit of measurement.

6.2.1.3 Where does information manifest itself in a broader context?

Human beings and information are interlinked and cannot be separated without life becoming meaningless. During the learning process, the teacher or instructor has to transform his knowledge into information or even into data, which can then be communicated to the learner. The learner has to transform this data into information and, eventually, into knowledge. For any individual to be completely cut off from information is to be reduced to little more than animal status. Individuals therefore need information.

It follows that society also became dependent on information. Societies are information intensive. Culture is shaped through the sharing of information over centuries.

The change in the economy from an industrially driven economy to a services driven one, made information indispensable as knowledge became central. Economies and societies lacking information, run the risk of being reduced to third-world status.

Businesses, from the early days, depend on information in order to survive. It is used extensively in decision-making, but the notion that more information produce better decisions, is not always valid. The solution is to have the right information at the right time.

Individuals, societies, nations and governments need information. Information therefore has wide application.

6.2.1.4 Is information a resource?

Having then defined the terms data, information knowledge and wisdom, we return to the question: Is information a resource? It is clear that information is necessary to form knowledge so it is correct to argue that information is a resource, at least in this respect. Information, however, is dependent for its creation on the existence of data (external stimuli), other information or knowledge already present in the mind of the person (internal to the person). In most cases all three would be necessary. In this respect data are resources which can be tangible (e.g. a book) or intangible (e.g. a sound) while information and knowledge can only be intangible resources.

Common (popular) understanding of the term information usually does not distinguish between the terms data, information, knowledge and wisdom. The terms information is mostly used interchangeably for these concepts. If that is taken as a point of departure, it is correct to argue that information (as the umbrella term) is a resource.

This, however, does not mean that information has only one dimension. In the process of transforming data into information, then transforming information into knowledge and, ultimately, to show wisdom, a person is being "informed". This "informing" (or "informating" as Zuboff called it) process is referred to as the process dimension of information: The process of in-forming. It focuses strongly on the communication process; a view supported by the field of semiotics and, to a lesser extent, hermeneutics. It is an important dimension

and one mostly ignored - hence the proposition by some to manage information "as a resource" and information "resources" management.

The fact that information has two dimensions, a resource and a process dimension, does not distract from the resource concept and the two are certainly not mutually exclusive. Far more, they complement one another and, importantly, belong together.

In conclusion then: Information can be seen as a resource even though it is not *only* a resource.

6.2.2 Objective 2: Can information be managed?

The second objective was *"to research the proposition that information is something which can, in fact, be managed"*. This led to the following research questions:

6.2.2.1 What is information management?

Accepting that information is an important and scarce resource and an important process in the lives of individuals, organisations, nationally and internationally, it follows logically that such resource and process must be managed. This introduces two concepts. Firstly there is the term "information management" (also sometimes called information resources management) and, secondly, the term "the management of information". Although they may appear to be identical on the surface, they differ substantially on the application side.

Information management takes information in its broadest context and avoids fragmentation and compartmentalisation. It takes the process of informing as the point of departure and covers the entire process: From data through to knowledge, including and focusing on the application of knowledge. Once knowledge has been created in the mind, it has the potential to trigger some or

other action. This is called productive knowledge. While it is locked up in the mind and not being applied to satisfy some objective, it is called informing knowledge.

Informing knowledge is a pre-requisite for productive knowledge and is clearly important to exist, but unless it is being applied so that some or other action is triggered, it has little practical value.

Information management focuses on productive knowledge. It looks at the processes involved in transforming data into information resources and information resources into informing and, eventually, productive knowledge. It also acknowledges that these processes are facilitated by an information infrastructure consisting of information technology and systems but also of education, training, libraries and other technologies. Information management treats all of these in a holistic way and maintains that the entire system must be managed rather than fragmenting it and managing the components discretely.

Information management in organisational terms, is the responsibility of some centralised function but, importantly, not to manage information, but to facilitate the management of information. The management of information is something that each person has as a responsibility, whether as an individual, or in organisational terms.

To expand on the management of information: Every human needs to manage the information at his disposal. In normal life, one is being bombarded with information in the form of newspapers, magazines, radio and television and through conversation. The senses are constantly transmitting data to the cerebral cortex and, somehow, all these signals must be managed so that sense is made at the end of the day. Even though we seldom think of how we manage information in our personal lives on a daily basis, it does not mean that we are not doing it. At least subconsciously, we are managing it continuously.

In organisational terms the management of information takes on meaning on a more conscious and serious level. In order to perform one's duties as an employee, regardless of the level or job, information is a vital resource. In fact, without any information at all, no job will ever get done. Obviously, the amount, diversity and complexity of the information needed, will differ widely from job to job and situation to situation.

The fact remains: Both the worker and the manager need information. In order not to be flooded by information which becomes impossible to digest and comprehend, the information must be managed. Applying filters so that only the relevant information for a particular situation is obtained and searching for information which may be needed but is not forthcoming, is what it is all about. Hence the term "the management of information".

The management of information is the responsibility of each individual while information management is the responsibility of a centralised function whose objective it is to facilitate the management of information by individuals.

The addition of the term "resources" to the terms, narrows them down. "Information *resources* management" and "the management of information *as a resource*" implies the resources dimension as the only one. This is an unnecessary limitation, one best to avoid.

6.2.2.2 Can a conceptual framework be developed for information management?

Once information and information management have been defined and put into context, a model can be built to show the relationships between the different concepts and processes. The model starts off with data as the primary input. This data are then transformed into information resources via the process of acquisition, enhancement, retention and delivery.

The information resources are then transformed into information through another process of interpretation and appropriation. This only a human can do.

Thus "informing" knowledge is created. Once this kind of knowledge is applied to reach some pre-determined goal, the knowledge becomes productive. The ultimate aim of information management is to cause action.

Knowledge can be transformed back into data or information resources.

All the processes involved in the transformation of data into knowledge take place in an environment consisting of technology and systems, libraries and many other enabling disciplines. Management is applied to the processes as well as to the resources.

It is therefore possible to construct a model for information management.

6.2.2.3 Can the management principles be applied to information?

Before applying the management principles to information, it is necessary to determine exactly what needs to be managed. Looking at the processes involved in the transformation of data into productive knowledge it is found that there are organising processes, analysing processes, judgemental processes and decision processes. These processes and the resources are the ones which must be managed. In addition, the infrastructure needed for the successful transformation processes to happen efficiently and effectively, needs to be managed.

The command-and-control model of management (planning, organising, leading and control) was shown to be applicable to all the processes, resources and to the infrastructure. Management of the first two processes - the organising and the analysing processes - are relatively straight forward. The judgemental and decision making ones are more difficult as one is dealing with an intangible entity (knowledge) existing in the mind of human beings and one is trying to manage the processes taking place in the mind.

6.2.2.4 Can information be managed?

Accepting that information can be classified as a resource and that it should be managed, the question still unanswered is: *Can* it be managed? Information is certainly a resource with very unique characteristics and, coupled with the fact that not only is it a resource, but also a process, it cannot be assumed that anything so unusual can be managed in the normal sense of the word.

The research questions could all be answered positively. It is possible to accurately define what is meant by information management and its associated term the management of information. A model can be built to show the processes, the resources and where management fits into the scheme. The principles of management can all be applied to information.

It can therefore be concluded that information can, in fact, be managed.

6.2.3 Conclusion

Returning to the research objectives, namely, to determine if information is a resource and whether it can be managed, the answer to both is a qualified "yes". It is qualified in the sense that it hinges on the definition of information and information management. As information and information management have been defined in this study, the answer is positive.

6.3 Implications

Having satisfied the research objectives, the implications of the research must be explored.

6.3.1 Implications for the individual

Even though it could be argued that statements that we are living in an information era and that we have become an information society are over

dramatisations, few, if any, individuals will contest the fact that they are increasingly being confronted with more and more information (data, to be more correct) every day of their lives. There is no indication that this will cease. For years we have become used to "junk" mail and, more recently, "junk" faxes. The telephone is increasingly being used for marketing purposes leading to "junk" calls. The envisioned "information highway" will provide a mechanism to distribute and receive information (data) on a global scale in seconds.

The individual will find it increasingly more difficult to deal with all the data being aimed at him. In a certain sense it is going to be "managed" on his behalf by businesses realising the dilemma in which the consumer finds himself. Already magazines specialise so that consumers don't have to scan through thick magazines to find what they are interested in. The next step will be personalised magazines with personalised advertisements aimed at the individual taste of the individual. (Localised versions of more popular magazines such as Time are good examples of this.) The technology to do this already exists.

The individual can, therefore, rely on business to manage his information for him. However, business, generally speaking, is profit motivated and cannot cater for individual tastes and interests entirely. Its efforts may have to be augmented by the individual's own. One can buy vegetables at the green grocer, but it may be life-enriching to grow it yourself.

The implications for the individual are as follows:

- The individual will have to exercise his options more consciously with regards to what he is interested in and what not. It will be impossible to deal with the volume of data he is being confronted with and, more importantly, to obtain the information he is interested in, unless the available data are managed.

On the other hand, this abundance of data and information presents the information-hunger individual with immense challenges to explore this gold mine full of data. It is up to the individual to enrich his life by refining this data into productive knowledge.

- Individuals deprived of relevant information will find it impossible to compete with those having access to it. Without any access to it, life will become little else but subsistence existence (which is fine if one chooses to do so).
- The individual will find increasingly that more and more of his personal data will become the target of businesses. Attributes such as names and addresses will be expanded to include details such as income, spending and travelling patterns, personal preferences and tastes. This will lead to more and more invasion of his privacy and emphasises the question of who the real owner of such data is. It will also lead to more and more trading with personal data with or without the consent of the individual concerned.
- Even though it may be difficult to determine the size of the services sector in the economy and even more difficult to determine the size of the information sector itself, it is abundantly clear that shifts have taken place in the economy and are continuing to take place. There is no doubt that most developed countries are firmly in the post-industrial economy. The economic "good" in this economy is knowledge and information and the "machine" is a knowledge worker.

These changes taking place in the economy have implications for the individual. Whereas physical labour was used in the industrial economy, it shifted to intellectual work in the post-industrial economy. This allows for various minorities to be absorbed in the workforce.

To the individual this is the time to re-skill and re-tool.

- It is not only in the economy where changes are evident. Changes are taking place in society. The buildings we work and live in are getting "smart" in the way energy is being utilised; motor cars are "intelligent" enough to adapt to changing road conditions; there is talk about "smart" cities and "smart" roads; our telephones follow us wherever we go and put us in touch with our homes and offices; our electronic mail does the same. Already the "information highway" is being built so as to link everyone with access to a computer together on a global scale.

And we have made adjustments already: Banking, as an example, has become "faceless". The young, with enthusiasm, and the old, with reluctance and distrust at first, have both taken to automated teller machines instead of the friendly bank teller behind the counter.

All of the above changes will not leave the individual untouched. The changes call for a universal language and non-English speaking societies find themselves locked out. TV and radio broadcasts across international borders are seen as posing a threat to existing cultures and already countries are taking steps to limit such activities.

Individuals need to be aware of these changes and the effect it will have on them. It calls for a certain level of computer literacy just to keep up and needs a whole new set of skills if one really wants to take advantage of what becomes available. It also calls for a censorship mechanism that parents will have to exercise themselves if values and culture are to be protected in a technological world where "anything goes".

6.3.2 Implications for business

Whereas data have a cost, information has a value and people are willing to pay for it. The booming publishing industry is proof of this. This poses big challenges to business: To provide individuals with the information they find interesting and to provide businesses with information they desperately need

in order to survive the onslaught of competition on a global scale. Those who have identified this opportunity have grown rich and will grow richer in future years.

Business as a consumer of information originating internally and externally to the business will have to put in a conscious effort to manage this information. Flying by the seat of the pants is not good enough any more. Competition from other businesses all over the world means that management and workers must be able to respond with minimal time delay. Decisions cannot wait until the next morning and therefore need to be made in "real-time". Decisions use information (in generic sense) as the primary resource and with the use of technology such information can be made available instantaneously, provided information is managed properly.

Businesses therefore need to get the information resources and information processes under control. This means that staff and especially managers must accept their responsibilities in terms of the management of information. It further means that information management must be put in place so as to facilitate the management of information. Depending on the size of the business, it may call for the appointment of a "Chief Information Officer" to take on this challenge. The potential benefits are huge: The business which can harness information to its advantage, stands to gain competitive advantage on a global scale.

This calls for management to involve themselves in information management principles and to make it happen. Paying lip-service or writing it in strategy documents will not by itself make it happen. It calls for management with vision regarding information as a major resource. This study provides a conceptual framework for information management and businesses can apply the principles to their advantage.

6.3.3 Implications on a national level

As with business, information as a power base for government is too important to ignore. This does not mean that governments must use information to rule ruthlessly over its citizens, on the contrary, governments must use information prudently to the benefit of the people they govern. Information can be used to protect citizens in times of conflict (warfare supremacy), but, more importantly, it must be used to empower its citizens.

Modern information technology has the potential for allowing citizens to share in decisions affecting them. Apart from the ordinary daily newspaper reporting on government activities, electronic bulletin boards enable citizens to share in information. Technology enables participation and it is up to governments to utilise it to the benefit of their citizens.

Because of the significant effect information can have on societies and even on culture, it is the duty of government to take an active stance on this issue. Transborder radio and TV broadcasts are already receiving attention in many countries. With the deployment of international data communications networks and, eventually, the information highway, this will become more difficult to control. Censorship will become impossible and the only hope to have some control is to have an information policy to guide developments.

Apart from the potential to influence and change cultures and for empowerment in general, the need for a national information policy is also driven from other issues. The "gap" between the information rich and the information poor (usually between developed and developing countries) is a cause for concern and unless governments take an active interest to manage this gap, it is likely to worsen rather than improve. The introduction of trading and investment in information technology must also be managed by way of a policy. Information, warn Du Plooy and Roode (1993: 2), is never neutral. Protection of local industries and exploration of what is available on the international

markets must be balanced. The potential of information technology to replace people needs special attention and must be guided by a policy framework.

Furthermore, government must involve itself in data ownership, privacy, access and accuracy issues. One way to deal with this is to have it embedded in legislation. Another is to have it entrenched in an "Information Bill of Rights".

It is important that the aim of the development and implementation of a national information policy is not only to protect and disallow. It must also be positive and promote what is in the national best interest.

6.3.4 Implications on an international level

The imbalance between the use of information and information technology by developed and developing countries and the effect large transnational businesses may have on developing and under-developed countries is firstly the responsibility of each national government. It can, however, be governed and facilitated by the international organisations of which there are a variety.

UNESCO has already played an important role in this regard. Conflicting interests arose between what is desired by groupings of countries and individual countries. In this regard a good example is the NWICO proposals of UNESCO causing a flood of negative responses by the USA, UK and others. This should not stop the good intentions and the efforts of these international organisations. It is necessary to obtain the ever important balance between what is good for the people and what could be gained in the short term by some nations.

6.3.5 Implications for the management of information

The management of information is the responsibility of each individual and every worker and manager in organisational terms. This responsibility cannot be delegated to anyone else: It is something every person must do. This means

that the individual must do the necessary to obtain the right information in the right form, at the right time and at the right cost.

Even though we tend to do this in our normal non-organisational lives with relative ease and by using mainly intuition, we may be forced in future to take this more seriously as we become swamped with data and have to extract the relevant information from that. In organisational sense the management of information cannot be left to intuition. The stakes are too high to revert to intuition.

What is necessary is for organisations to embark on a programme to make staff on all levels aware of what it means to manage information and then to implement it with the active facilitation by the information management function. Training in the use of information and information technology, but also in other related disciplines, is essential. It calls for a paradigm shift to treat information as a scarce commodity as opposed to the more popular belief that information is a free resource.

The management of information is often confused with information management. This study emphasised the differences. These are two different functions and performed in organisational terms by different people.

6.3.6 Implications for information management

Information management is a widely used term and one with many meanings to many people. This study provides a conceptual framework for information management. It investigated information and its related terminology, it looked at it in context and where it fits into a broader scheme and then proposed what information management *should* be.

For too long too many disciplines have been using this term to suit their own disciplinary purposes. And no doubt each one of those was dealing with a

valid view, albeit a limited view, one restricted to the single discipline. It is time that a holistic approach is followed as suggested in this study.

The information management model proposed in this study does not negate the importance of each one of these disciplines. The library and information sciences still has its rightful place and so does computer science, communication science and all the others. They are, however, components of a bigger system. The challenge is to get all these components to contribute individually but collectively to achieve the overall purpose of information management: To create productive knowledge. This unambiguously implies that *action* is the ultimate aim.

6.4 Further research work

The following is suggested as possible themes for further research:

- This study covered a very broad range of subjects. It started with definitions of information, it put information in context, defined information management and then tested the concept against the management principles. Each one of these aspects could conceivably be the subject of a study on its own. However, for the purposes of this study, only the most essential elements of each aspect had to be extracted so as to arrive at a conceptual framework, but based on all these aspects.
- A major question still largely left unanswered by this study is: *How* information management must take place in practice. This study defined the *what* and even though a conceptual framework is now available, a model for information management has been developed and it was proven that information *can* be managed, the *how* is not entirely clear yet.

It would be beneficial to place information management on par with the other resources management disciplines, that is, financial and human resources management. When the management model (planning,

organising, leading and controlling) is applied in practice to human resources management, it leads to specific actions such as recruitment, selection, induction, remuneration, organisation development and others. The same goes for financial management: Capital structure, accounting, auditing, budgeting, reserves and dividends and so on. Similarly, the management model needs to be applied in an equal amount of detail to information. This study showed that it can be done, but more detail work needs to be done.

The "how" part was specifically excluded from this study as the scope would become too wide. It would, however, complement this study if further work could be done on this very important part.

- This study does not include any empirical evidence to support what is mostly theory. Taking the framework and the model for information management as a theoretical basis, it could be investigated whether it supports what is happening in reality by doing a few case studies at organisations who seem to be managing their information well. This is, however, more difficult than it sounds as explained in the next point.
- A further question is: How do we know when information management is done by an organisation? Where does good information management show up? It would have been nice to have a measuring device which could be used to measure the effectiveness of information management in an organisation. That would enable the Chief Information Officer to go in, measure the effectiveness and based on that, devise a plan to improve it, if necessary.

Again, to use financial management and human resources management as analogies, poor financial management shows up clearly in financial statements. Using a variety of ratios show up disequilibrium and causes for concern. Poor human resources management results, *inter alia*, in absenteeism, high turnover rates and so on. Good human resources

management has good staff morale as a result. Where does good or poor information management manifest itself?

The fact that an organisation has appointed a Chief Information Officer and that it says that information management is practised, still does not guarantee that it is managed well. It does not even warrant that it is being managed at all, at least, not as it was defined in this study.

One argument is that a financially successful business is in all probability practising information management fairly successfully. It is obvious that the cheaper and more efficiently an organisation can obtain its information, the more profitable it must be. One could therefore arguably take such a company and investigate whether it is managing its information. A positive finding could then be used as proof that information is in fact being managed. This would, however, not necessarily be the case as success can be attributed to many causes and not only to information being managed well.

It remains an open question as to how good or poor information management will be measured. Research to provide such a measuring tool would provide a major missing part of the jigsaw puzzle.

6.5 Contribution

Never in the history of man has information received so much attention as now. The shift from an agrarian to industrial economy and, lately, from an industrially based to a services based economy (with a consequential changes in society) must be seen as a major factor contributing to the importance being attached to information. Also contributing to this phenomenon are the changes presently shaping the business community: competing globally requires the availability of and access to vast information resources. Governments, under pressure from unions and other groups, but also from ordinary citizens through

the democratic processes, need information in order to ensure prosperity to its citizens and to stay in power.

One expects to find that information is well understood and equally well managed because of its importance to individuals, businesses and governments. Yet, when one attempts to implement information management in practice, it is not at all clear what one needs to do. Worse, when turning to the fundamentals, it becomes clear that much confusion reigns with regards to the components of information management. This may indeed precisely be why information management is not practised properly.

The contribution of this study is that it defines information and its related terms, data, knowledge and wisdom by taking into consideration definitions and viewpoints from all the relevant disciplines. It puts information into narrow and broad context to make it even more clear. Using this strong base, a conceptual framework for information management is developed. In this framework the transformation processes, from data to information to informative knowledge, finally to productive knowledge and back again, as well as the resources and supporting infrastructure are shown.

Such a model or framework provides the basis to determine whether information, taking its unique attributes into consideration, can be managed along the lines of management principles. It is shown that information can indeed be managed and that it should be managed.

This study did not attempt to explore the "how". It concentrated on the research question preceding the "how", namely, the "what". It is clear that the "how" cannot be addressed before the "what" is understood. Now that the "what" is addressed, the "how" becomes a logical suggestion for further research.

Introna (1992: 5:30) proposes a number of criteria to be used in evaluating a theory. Although this study does not make a contribution in terms of the

development of a theory, it does propose, *inter alia*, a conceptual framework. Using Introna's criteria, the contribution of this study can be analysed as follows:

- *Does the study raise problems previously not perceived, e.g. problems of an increasing depth, and does it display an ever-increasing fertility in suggesting new problems?*

Information Management, as was shown, is not a simple matter. It deals with complex entities, the major one being the nature of information itself. Information spans across a wide spectrum of disciplines, each one of which contributes towards a complete picture. Although it was shown that information can be treated as a resource, one must never lose track of the fact that it is a resource with very unique characteristics and attributes.

As was pointed out in the suggestions for further research, many aspects remain unanswered. In this respect the most pressing question is: How do we know when information is managed properly? Where does good information management manifest itself and how can it be measured?

- *Does the study anticipate novel facts and auxiliary studies?*

The study showed that many misconceptions of what information management really is, exist. The computer industry (information technology and information systems) makes information management out to be how to manage technology and/or information systems. This study suggests that managing information systems and technology is but part of the information infrastructure which is but one of the components of information management. Likewise, the view librarians and information scientists generally hold of information management, is a subset of what this study suggests information management is.

The framework for information management suggested in this study is, as far as could be established, the first attempt in this direction.

This study is also the first which used generally accepted management principles to test the manageability of information. In doing so, it was possible to give a positive answer to a much debated issue in the literature pertaining to, mainly, information science.

- *Is the study more precise in its assertions and in the facts it explains than previous studies?*

Assertions are made with regards to a definition of information and its related terms, data, knowledge and wisdom as well as to what information management is. Assertions are made with respect to the processes, resources and infrastructure that are involved in information management.

The study, in general, goes deeper and wider with respect to information, its nature and putting information into context than most other referenced studies of this nature, but it does not leave it there. It then narrows it down into a single framework for information management.

- *Has the study unified or connected various hitherto unrelated problems, or concepts?*

This study went to great lengths to obtain understanding of information and its related concepts. It took into consideration epistemological viewpoints; it visited the arenas of semiotics and pedagogics; it explored the changes sweeping through the fields of economics and through societies; it touched upon ethical issues such as privacy, secrecy and ownership and, eventually, a possible information Bill of Rights. In evaluating the manageability of information, the principles of management were - for the first time as far as could be determined - applied to information.

In all of this lies, probably, the biggest contribution of this study as all these seemingly unrelated issues were combined into single framework for information management.

- *Does the study have positive and negative heuristic power?*

On the positive heuristic power side the following can be identified:

- Hermeneutics and semiotics hold special significance for information management. These must be further explored in order to make it more practical to the information manager.
- The effects and potential effects information has on society need to be explored further.
- Now that it has been determined *what* information management is, effort must be put into determining *how* it must be managed.
- Much thought has to be put into the manifestation of information management. It is often said that something has to be measured in order to be managed. How can it be determined whether a business or government is effective and efficient in its management of information? It is not impossible that such a debate may lead back to a redefinition of some of the terms used in order to define the "what" of information management.

On the negative heuristic power side, the following could be identified:

- It is felt that the definition of information, data, knowledge and wisdom have been exhausted and further attempts will add little value.

- Information management is not a mere concatenation of information and management.
- Information management is not only about information systems or information technology, neither is it pure semiotics or information science.
- *Has the study produced a new perspective on existing problems and thus created a new understanding of these existing problems?*

A new perspective was placed on information management. It is not merely managing information systems and information technology, neither is it the management of a library. It shows why attempts in information management have failed when taking such narrow views and explain why decision-makers still claim that they do not have the information they require despite the glut of data available to them.

The study also makes it clear that knowledge only becomes valuable to society once it is put to use. Knowledge must trigger action. The framework suggests the processes involved in getting from data to productive knowledge.

- *Has the study produced unconventional ideas, ideas that radically challenge current conceptions?*

The study challenges popular viewpoints such as the ones that:

- Information can be created by a non-human such as a computer;
- Information management is synonymous to information systems and information technology management;
- Information management is synonymous to library management.



In conclusion: The study made a significant contribution in terms of our understanding of what information management is. With this it added to the body of knowledge of this field.

