CHAPTER 3

DEFINITION OF INFORMATION

3.1 General introduction and purpose of chapter

In Chapter 2 I pointed out that poverty is a multidimensional concept which manifests itself in various fields and in different levels of intensity. In the introductory chapter I have also shown that information poverty is one of the manifestations of poverty. To fully understand this type of poverty and its moral implications, it is important to understand both the concept of poverty as described in Chapter 2 and the concept of information as well as the relationship between these two concepts. The purpose of Chapter 3 is to analyse the nature of information.

The chapter is structured as follows: firstly I have sketched the etymological development of the term information from a diachronic perspective. From this I developed a working definition. With the definition as point of departure, I will then discuss various scientific approaches to information. Based on the knowledge approach, which I prefer, I present my own approach to the concept of information. This approach forms the framework for consistent use of the concept of information and the way in which it is applied to information poverty in this thesis. Within the context of my own approach, a discussion of the various characteristics of information follows. Finally, I highlight the implications of these characteristics in respect of poverty; and these will then form the basis of the discussion of information poverty in Chapter 4.

3.2 A diachronic approach to the definition of information

Various experts in the fields of among others linguistics, information science, computer science and communication have attempted to arrive at a standard definition of information. Despite their efforts, information remains vague, and confusion continues to reign. Collier (1993:37-41) correctly calls it a "fuzzy field". Geldenhuys (1993:11) adds that in the legal field, information has been called an amorphous concept which defies definition.

One approach to examining information is from a diachronic perspective. The linguist de Saussure (1960:80-81) describes such an approach as "…the study of language from the point of view of its roots over a period of time".

The focus is in other words on the etymological development of the concept as well as the way in which it is used today. I base my discussion of information on this approach.

In the Afrikaans language, two terms are used which reflect approximately the same content. These terms are *inligting* and *informasie*. A brief analysis of both follows. Current usage, as reflected in dictionaries (see *Oxford English Dictionary*, 1999, *The Reader's Digest Oxford Wordfinder*, 1993 and the *Verklarende Handwoordeboek van die Afrikaanse Taal (HAT),* 1987) regards the concept of information as a process in which something is communicated and/or someone is informed. The concept is therefore implicitly linked to a particular action and also refers to the content which is communicated. The latter meaning (content) is defined as that which informs someone.

Etymologically the word information comes from the Latin root *forma* which means form, appearance or figure. The noun is *informatio* which indicates an idea or concept. The infinitive verb is *informare,* which means "to form an idea of [something]" (*Oxford Latin Dictionary*, 1968). In other words, a literal as well as figurative meaning can be distinguished. The literal meaning is to give form to something, and the figurative to form an idea and to conceptualise something.

Most European languages derive their words for information from the Latin. The most common examples are *information* in English and French, and the German and Dutch words *information* and *informatie*. The Afrikaans word *informasie* can be traced via the Dutch to its Latin origins.

On the other hand the word *inligting*, as used in the Afrikaans language, is derived from the Dutch word *inlichting* which has the following variations in meaning: information, explanation, illustration and elucidation. In the *Dutch Language Synonyms Dictionary* (1991) the words *inlichting* and *informatie* are given as synonyms, but in colloquial language the word *informatie* is preferred and in some cases the words are regarded as different concepts. *Informatie* is mostly seen as the content that is communicated and *inlichting* as the explanation or report of something. One would thus, for example, find an *inlichtingcentrum* where *informatie* can be obtained.

The word *inlichting*, with the meaning given above, dates from the nineteenth century and has its origins in the medieval word *inluchten*, which

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had a strong religious connotation as it referred to divine light irradiating or penetrating the human spirit. The origins of this word can be found in the Latin *lux,* related to *lumen,* which means light, lamp or torch. The infinitive is *illuminare* which means "to impart brightness or light" (Van Dale, 1992:321).

Based on this etymological description together with current usage of the word information, the concept of information will be regarded as both a process and a product. As process "to inform" it means the following:

* It is an action
* whereby content is transferred/communicated
* by means of a specific medium
* with the purpose of giving meaning.

The product of this informational action is information.

3.3 The concepts of information and data

When analysing the concept of information, it is also relevant to indicate what is understood under the concept of *data* (with singular *datum*) and how data is used in this thesis. In linguistic and technical dictionaries the concept of data is given the following meanings: as a given fact; that which is given; as synonym of information; as the computerised processing of information and as the basic element from which information is compiled[1]. In other words, data as a concept is generally used in the field of technology.

In the context of these definitions of data it becomes clear that the meanings of data and information are closely related insofar as both refer to the content of that which is communicated. To allow standardisation and avoid confusion I have chosen to give preference to the word information throughout the thesis. The only context in this study where I will use the concept of data will be in reference to the electronic communication (mostly in binary format) of signals between computers. This can be regarded as "data transmission" although it is basically still the transferring of information, but without direct human intervention. The term data is used in

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[1] The following dictionaries were consulted: *Woordeboek van die Afrikaanse taal* (1985); *New Websters Dictionary of English Language* (1985); *The Oxford English Dictionary* (2nd edition, 1989); *Dictionary of computers, data processing and telecommunications* (J.M. Rosenberg, 1984) and *Computer Dictionary and Handbook* (Sippl & Sippl, 1980).

this context because of its general usage in the computer and legal sectors. An example is a phrase such as "Data Protection Acts" where data actually refers to information in electronic formats.

I therefore do not share the view that data refers to unprocessed pieces of information. This is because "unprocessed pieces of information" is a very subjective idea. What one person regards as data (as unprocessed pieces of information) may be fully understandable information to the next person.

I also disagree with the distinction between data and information as explained by Geldenhuys (1993:63), according to whom data can in some cases not be regarded as information since it cannot be perceived physically. Information (and by implication data as well) which is not physically perceptible (even though it is data on a damaged computer disk – the example referred to by Geldenhuys) in my view remains potential information (Britz, 1996a).

3.4 Some scientific approaches

Particularly in the late fifties and sixties, when information science developed into a subject field in its own right, information as a scientifically demonstrable concept began to be debated. The search for an adequate definition went hand in hand with the debate about what scientific information science really was about. Could one really talk about information science as a science if there were no agreement on the object of study (information)? Authors who focused on these issues include Hayes (1969), Wellisch (1972), Wersig and Neveling (1975), and Belkin and Robertson (1976). More recent research has been done by Introna (1997), who concentrated on the hermeneutic interpretation of information, and Madden (2000), who reexamined the relationships between data, information and knowledge. Most of their arguments are linked to various information and communication theories. The communication theory of Shannon and Weaver (1949) was often used as basis. It is furthermore notable that little was published on the subject in the late eighties and nineties. With the development of knowledge management in the nineties, the meaning of information was once again debated – this time with the emphasis specifically on knowledge and intelligence.

The following two main reasons explain why a uniform and standard definition of information from the point of view of information science has

yet to be found, and why there is such terminological confusion which can hamper the development of information science as subject field (Britz, 1996a):

- The linguistic explanation of the term. This specifically relates to the various dictionary definitions of information, knowledge and data and the different ways in which they are applied.
- The interdisciplinary nature of information science. Wersig and Neveling (1975:128) ascribe the confusion in respect of the concept of information to the influence of other disciplines, such as computer science and mathematics. Each of these sciences holds its own views and applications of information as a concept.

Based on a literature study covering the field of information and in line with a previous study (Britz, 1996a), I propose a classification model regarding the way in which information as concept can be used and applied. This classification model is important because it indicates specific trains of thought about information in specifically the information science field.

3.4.1 Anti-definition approach

In the search for a scientific definition of information some experts are of the opinion that no specific definition of information as a concept is possible. This view is among others supported by Goffman (1970) who is of the opinion that a definition of information is not so crucial in studying information science, since related concepts are studied in information science. Fairthorne (in Wersig & Neveling, 1975:132) regards information as a linguistic term which is used for the sake of convenience without real meaning being given to it.

3.4.2 The ideological approach

In this approach certain ideologically loaded concepts are used to describe information. The most well known example is the Russian author Mikhailov (Wellisch 1972:172) who uses a specifically Marxist terminology in his description of information in which information is *inter alia* referred to as matter and approached from within the systems theory. Wersig and Neveling (1975:131) refer to this as the material approach. Daniël Bell's (1974) and Kingma's (2001) categorisation of information as a commodity can also be regarded as a specifically ideological (capitalist) approach to information.

3.4.3 The user approach

The user approach emphasises the application of information and its effects on users. According to this viewpoint, the real meaning of information is primarily to be found in its use or application. Although there are various versions of this approach, the main emphasis is on the usefulness and application of information in respect of decision-making. Supporters of this view are amongst others Lancaster (1987:6), who defined information as "... that which reduces uncertainty, ... that which assists in decision making", and Davis and Ohlson (1985:235-268), who define the role of information in terms of human decision-making processes. The Newell-Simon model, specifically developed for human problem-solving, often forms the basis for these processes. Whittemore and Yovits (1973:221-231) also support this view by linking information, defined as the reduction of insecurity, to decision-making. Wersig (1975) is another well-known supporter of the view that information from the perspective of information science can best be defined in terms of its effect on the consumer – in what he refers to as the reduction of insecurity.

3.4.4 The process approach

In the process approach information is not viewed as merely part of a process, but also as a process in itself. The reference to the process is thus twofold: firstly the process as it is enacted in the life cycle of information (*viz.* from the creation up to and including the use of information) and secondly the process which takes place when people process information for their use. Supporters of the first type of approach are notably Vickery (1987:9), who regards information from a social perspective as a social process which takes place between the generator and user of information, and Koblitz (1969:120-142), who refers to the information processes as the gathering and organising of information. Neill (1992) is an exponent of the second approach.

3.4.5 The content approach

The content approach supports the linguistic definition of information as being the content of that which is communicated. Supporters of this approach include Diemer (1971:105-113), who coined the concept *informene,* which denotes the content (information) of that which is communicated. One could add the description of Faibisoff and Ely (1976:3) of information as "...a symbol or set of symbols which has the potential of

meaning" in this context. Jedziny (1968) also attempts to link both elements of the linguistic definition of information by explaining it as that which consists of a semantic (content) and physical carrier and which is transferred through different processes. Webster (2002:23-28), describes information as content, but with emphasis on its social impact on society.

3.4.6 The knowledge approach

In what can be called the knowledge approach, information and knowledge are linked on the basis of various emphases. I value this approach as important and will therefore elaborate on it in more depth.

Brillouin (1962:x), Boon (1992:2) and Webster (2002), as representatives of this approach, regard information as the basis or raw material of knowledge. Kochen (1974:62) describes a hierarchical development from data to information to knowledge and finally wisdom. Although Horton (1979:51) does not support such a hierarchy, he does distinguish between data, information and knowledge. Martin (1988:10) supports this line of thought and regards the three ideas as "mutually sustaining elements".

Farradane (1979:13-17) can be regarded as one of the primary exponents of the knowledge approach. He describes information as a knowledge surrogate in spoken or written form. According to his definition, information is an external element or surrogate of knowledge which is communicated by various means. In this regard Farradane is supported by Costello (1961:191-97), who regarded information as knowledge which is communicated.

Farradane therefore argues that the original meaning of knowledge does not lie with the receiver, but with the creator – because the creator knows the intention of his/her original thought. According to Farradane, the receiver in turn processes the information which is received into new knowledge. The implication of this view of Farradane is that information cannot exist without knowledge. The receiver of the information, in transforming it into knowledge, imparts new interpreted knowledge (meaning) to the information.

In the knowledge management field, particular attention is given to knowledge as human cognition which can differ in degrees of intelligence and can be found explicitly as well as implicitly. The distinction between explicit and implicit (tacit) is derived from the work of the Hungarian

philosopher Polanyi, *The Tacit Dimension,* which was first published in 1967. Well-known exponents of this approach include Davenport and Pruzak (1998), Nonaka (1998), Day (2002) and Blair (2002).

This approach is therefore not focused on the user and the effect which information has on the receiver of the information as in the case of the user approach, but on the creator of knowledge, who communicates it to the user in the form of information (direct and indirect). It is important to bear in mind that the receiver of the information (as user of the information) becomes a new knowledge creator in the process of assigning meaning to the information that was received. I will explain this difference in more detail in the next few paragraphs. Emphasis is thus placed on meaning as well as on the hermeneutic process that takes place. This further implies that unused or unapplied information is essentially without meaning. Farradane (1979:14) refers in this context to information which is sterile.

3.5 A personal approach to information

In my view all the various approaches to information described above contain some elements which are relevant for describing information and information poverty. However, I propose an integrated approach, taking as my point of departure the knowledge approach as presented by Farradane. My own approach to information is further based on the philosopher Popper's threefold worldview. Popper sees the world as consisting of three parts, *viz.* reality (first world), reality as experienced by a person (subjective idea – second world) and the presentation (objectification) of reality by means of human symbols, including language and books – third world (Popper, 1972). In the following section I will discuss information within the context of these three worldviews, taking the knowledge approach as point of departure. Following from this I will identify and discuss the main characteristics of information.

Before I discuss the relationship of information to reality (Popper's world one), people (Popper's world two) and other information carriers (Popper's world three), it is important to briefly consider the four basic sources of information for human beings. This will clarify the three identified relationships, which will prove to be very important for the understanding of information poverty (Chapter 4). The sources are:

- Objects in reality – a person may obtain information through sense perception of objects in reality. These can be both concrete and abstract. I can, for example, see a tree or feel the cold weather. Abstract objects include religion and feelings of love. This represents Popper's first world.
- A person's own knowledge base – this denotes the knowledge already in someone's possession which can be recalled when required. I can, for example, recall where to find the food store if I need to buy groceries, without having to look up the address or drive around to find it. This represents Popper's world two.
- Other people – information can be obtained by consulting other people. This represents Popper's world three.
- Indirect information sources – information can be obtained by consulting sources such as the Internet. This also represents Popper's world three.

Figure 2 illustrates these sources of information. In the following discussion I focus on reality as our source of information.
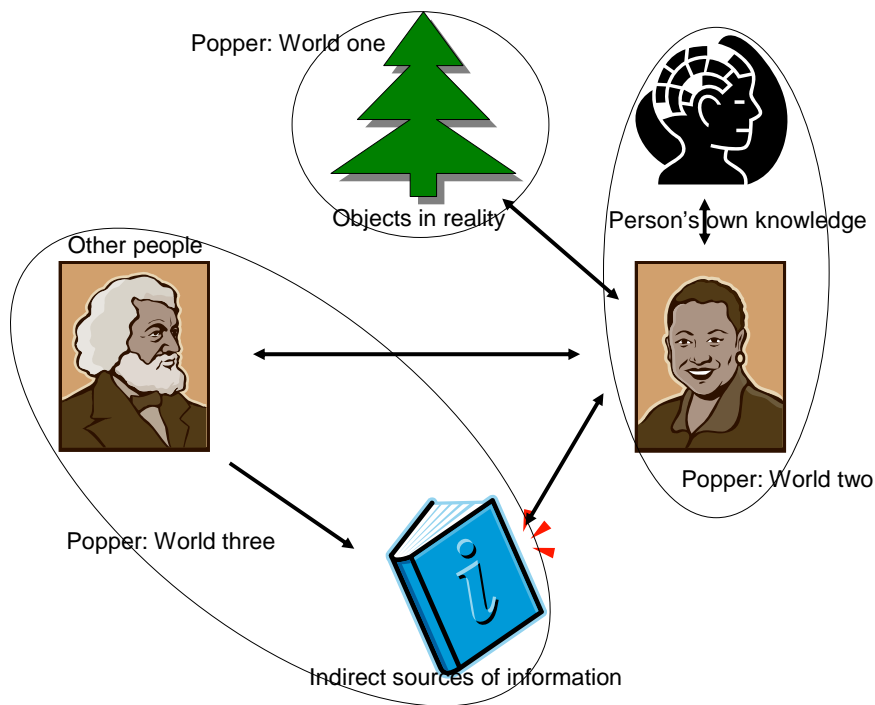

Figure 2: Sources of information

3.5.1 Reality as primary source and carrier of information

Using the definition of information as content that is communicated, the relationship between information (in the meaning of "content") and reality, which I define as the sum total of everything that "is" (objects such as trees, clouds, etc.) and as created by people (such as cars, shoes and intellectual creations), can be explained as follows: Reality in its totality is virtually "surrounded" or encompassed by information. In other words, the totality of reality carries information about itself in itself. This represents Popper's first world. For this reason reality, so to speak, functions as the primary carrier or source of information about itself. In this context information relates to the content from which reality consists for a person and which people can obtain and use in communicative form by means of sense perception. A person will for instance observe (abstracting information) that a particular tree (object in reality) provides shade in summer but loses its leaves in winter.

Taking the argument further, I would also reason that reality "out there" for us as people is restricted to an "information-based reality" which is only accessible through sense perception of the information which is available about objects in reality. In other words, I can only gain access to objects in reality (by which I mean the world that surrounds us, for example, trees, rivers and cars) if I have access to the information pertaining to those objects. If I cannot sense the information (hear, see, feel etc.) about a given object, then I would argue that that specific object does not exist for me. Let me explain this by means of an example: If there is a R5 coin on the moon, and I don't have access to the moon to actually see or feel the coin and nobody told me about it or I could not read about the coin on the moon then I can conclude that this specific coin, due to a lack of access to information pertaining to the coin, does not exist for me.

Corresponding to my "information-based" worldview the Dutch philosopher De Mul (2003:132) remarks: "... dat we informatie moeten beschouwen als (en mischien is zij dat zelfs) een basiseigenschap van het universum, naast materie en energie". Rucker (1988:31) also sees the origen of this change in worldview in what he calls the "computer revolution" according to which "...everything is information".

3.5.2 People as assigners and imparters of meaning to information-based reality

Following from the above discourse one can indeed say that we as humans are therefore in a "communication relationship" with objects in reality – in other words with the world that surrounds us. Through sensory perception observed information is transferred, among others by means of light and sound waves, to the brain where it is transformed into meaning. This meaning as it is assigned by us to the observed information is what I refer to as "knowledge". Epistemologically there is therefore a link with the rationalistic tradition which states that the source of knowledge (to know) is our human brain (Tarnas, 1991). Human knowledge therefore represents Popper's world two. However, the original source of our knowledge is information which can either be observed in reality (Popper's world one) or which has been recorded in some way or other by human representation symbols such as language and pictures (Popper's world three).

Knowledge as explained in the previous paragraph, in other words, is a human activity and is linked to the hermeneutical processes of assigning meaning, understanding and interpretation (Introna, 1997:55). In line with Debons (1988:6) as well as Kochen (1974:5) different levels of understanding of human knowledge can also be distinguished. The first of these levels consists of merely observing and being aware of a certain object without understanding or seeking to understand its intended meaning – as when someone watches a sports game without for instance trying to understand its rules. On the second level someone can to a lesser or greater extent ascribe significant meaning to what is observed. Taking the same example again, this would mean that the onlooker understands the rules of the game and is therefore able to follow the game intelligently. At the third and highest level someone would not only be able to ascribe correct meaning, but would be able to apply it correctly. In my example, the person not only understands the rules but can play the game. This indicates correct application of the knowledge the person has. I prefer to call this level of knowledge intelligence or wisdom. To know (knowledge) can therefore not be equated to "knowing the original intended meaning" or the ability of correct application of gained knowledge.

The human process of assigning meaning and of gaining and using knowledge is also co-determined by a number of important variables, including:

- our level of education;
- our socio-cultural framework;
- the context in which the information is presented to us;
- our different personalities and value system and also
- our human prejudices.

In summary, these refer to the shared *Weltanschauung* of communities (Habermas, 1987).

3.5.3 Information as objectified representation of reality: information and knowledge artifacts

As I have mentioned, indirect sources such as books and compact disks are also sources of information for people. This is Popper's world number three. I refer to these sources of information as the "objectified representations of reality".

Indirect sources have three characteristics. Firstly, as in the case of the primary source of information (*viz.* the object itself), these sources of information can only contain information by virtue of also being physically observable in order to become carriers of meaningful information for people (and by implication knowledge). I will explain this by means of an example. The information contained in a book remains potential information only until it is read by someone. After being read it becomes knowledge for this specific individual.

Secondly, such information differs from the original source of the information from which it has been "abstracted" or "unbundled" from objects in reality (the world in which we live) in that it has already been handled by a person or some form of technology. By this is meant that the information was obtained through human interventions which can include the use of technology such as cameras, and that it has been packaged in human communication symbols in specific carriers or information sources such as language or pictures. As humans we have the ability to process and represent obtained information in various ways. Information that is observed can be recorded on film without additional information about the object being made available. Meaning can also be imparted to the observed object by not only recording it on film but also by providing a description of the object that was photographed.

Lastly, these information sources which I have discussed in the previous paragraph, just like any other object in reality, can in themselves be a primary source of information for us. For example, a book containing information about birds (as a specific object in reality) can thus be an original source of information for us when someone uses sensory observation to obtain, for instance, information about the size or colour of the book.

Based on the above explanations of these sources of information I argue that these information sources, which are a result of our human representations (language, writing, pictures) can be regarded as "objectified knowledge" but not as knowledge itself. Neill (1992:34) correctly observes: "Knowledge representation [by that he means, for example, books and TV programs-JJB] are not knowledge but rather representations of knowledge." Likewise, the so-called practice of "making knowledge tangible" is according to this view questionable. Knowledge is limited to what people know. Once it is made tangible by means of human representation symbols, it again becomes information and representations of our knowledge. Representations of our knowledge can also be referred to as explicit knowledge (Nonaka, 1998).

In the knowledge management literature information artifacts and knowledge artifacts are increasingly being seen as discrete elements (Davenport & Pruzak, 1998; Nonaka, 1998; McInerney, 2002). This is a viable distinction provided both continue to be understood as objectified representations of knowledge – as I have explained in the previous paragraph. The difference is mainly to be found in the degree to which the receiver is able to ascribe the correct meaning (as intended by the sender) to the transferred information. Normally, an information artifact is regarded as a "lesser value-added" representation of knowledge, which hampers its understanding and application. A knowledge artifact on the other hand is a value-added representation of knowledge in which the emphasis is on easily understandable and applicable transferred information. Understanding and use are of cause determined by the user of this particular knowledge artifact. The difference can be explained by using the car manuals distributed in South Africa as example. In most cases, where such a manual is packaged in text format and one language only, it can be regarded as an information artifact – in other words it has lesser value added. It would become a knowledge artifact if, for example, it was in multimedia format with audiovisual representations and the option of accessing the information in

any of the recognised languages in South Africa. This allows the receiver of the information more possibilities for understanding and applying the information correctly and therefore gaining usable knowledge that can be applied correctly.

One can therefore make the assumption, based of cause on the user, that for an information user a knowledge artifact is much more valuable because it focuses on levels 2 (understanding) and 3 (application) of knowledge as explained in 3.5.2. This is particularly important for information poverty because knowledge artifacts, if packaged correctly, can contribute significantly to alleviating this form of poverty.

It is, however, important to bear in mind that a knowledge artifact remains a representation of knowledge and that it does not guarantee understanding and correct utilisation. The receiver, and by implication the interpreter of the knowledge artifact, remains the criterion for imparting meaning. Within the context of the hermeneutic approach to information (see discussion above) one could argue that the creator(s) of knowledge artifacts have to bear in mind the prejudices and socio-cultural framework (*weltanschauung*) of the specific users (target market) of such artifacts. The creation of knowledge artifacts is particularly successful in cases where there is a possibility of participative sharing of knowledge between the creators and receivers of the information.

One of the methods based on the use of knowledge artifacts, to encourage communication, to offer opportunities to learn and to promote the sharing of knowledge, is Nonaka's knowledge management model which he tagged as the SECI, *ba*, and knowledge assets model (1998).

In their article "SECI, *ba* and Leadership: A Unified Model of Dynamic Knowledge Creation", Nonaka, Toyama and Konno (2002) introduce the SECI model of knowledge management. It consists of three elements, namely the process of knowledge creation (SECI), resource development and use (knowledge asset) and the actual context and place where knowledge is shared (knowledge *ba*).

The SECI model of knowledge creation is based on the assumption the knowledge can only be created when there is interaction between tacit and explicit knowledge – a notion that I have explained earlier on. The creation

and sharing of knowledge process comprises of four elements or SECI which are:

- Socialisation. This is the sharing of tacit to tacit knowledge, for example, observation.
- Externalisation which is the process of conversion from tacit knowledge to explicit knowledge. Video recordings of work serve as a good example.
- Combination. This process implies the conversion from explicit to explicit knowledge, for example, when workers share their explicit knowledge with one another at meetings.
- Internalisation embodies the process of internalising the explicit knowledge. This process is closely linked to "learning by doing" (Nonaka *et al.,* 2002: 44) and is the ability of individuals to apply what they have learned.

Knowledge assets in their terms (which I refer to as "representations of knowledge") can be seen as the basis of knowledge management and comprises the resources that are used to create knowledge. In the words of Nonaka *et al.,*: "We define assets as 'firm-specific resources that are indispensable to create values for the firm' " (2002:55). Four different qualities can be distinguished. These are: experimental knowledge assets (such as expert skills and market experience); conceptual knowledge assets (for example, designs, and brand equity); routine knowledge assets (for example, the know-how in daily operations and routines) and systematic knowledge assets (for example, databases, documents and patents).

The third element in Nonaka's model is knowledge *ba,* which is a Japanese word for place or space and is the shared context for knowledge creation. It embodies shared contexts to share experiences, and can be physical, virtual or a combination. The knowledge *ba* is closely related to the *weltanschauung*.

3.5.4 The life cycle of information

Various authors, including Flowerdew (1984:9), Vickery (1987:11-13), Burk and Horton (1987:19-20) have previously pointed out that information has a specific life cycle. The life cycle of information is also emphasised in the process approach, which refers to the creation, gathering, organising, storing, retrieval, destruction, distribution and use of information. As I will

explain in Chapter 4, understanding this life cycle of information is crucial for understanding information poverty.

It is also important to understand that the life cycle of information is a characteristic which is closely associated with the way we as humans process and use our knowledge. We create, collect, store, organise, retrieve, distribute and use information and knowledge and in doing so we use a variety of means and techniques in the process, including information technology.

In the context of my proposed approach, the life cycle of information can furthermore be explained by regarding information as both an input and output of our knowledge – an aspect which I have touched on in the previous part when explaining the difference between information and knowledge.

Information as input of our knowledge can be explained as follows: we collect information by means of our senses (observing, smelling, hearing etc.) from a variety of sources. I have identified four different sources (see 3.5.1). We then process the collected information and convert it into knowledge which we organise (structure), store in our memory, recall (retrieve) and use when needed. These activities represent the internal life cycle of information.

The picture changes when information is an output of our knowledge. Here the external cycle starts with people creating knowledge, retrieving it from where it is distributed and used. When this information is distributed, it can then be collected, organised, stored, retrieved, distributed and used by someone else. These activities can be between people who are communicating directly with one another, or it can take place indirectly via other information carriers including books, CDs and videos.

Just as information is tied to its carrier, it is also tied to this life cycle. The cycle is repeated every time someone works with information, and it can also be interrupted – as when the information carrier is destroyed or stored in such a way that it cannot be retrieved.

3.6 Characteristics of information

Based on the three variables namely reality, people and the representation of reality through human representation symbols, it is possible to identify the

following characteristics of information which have a specific bearing on information poverty.

3.6.1 Object-connectedness of information: The relationship between information and objects in reality

As I have stated in explaining my own approach to information, information always has a bearing on an object in reality. Information can never so to speak "stand on its own" and has no meaning in itself. Geldenhuys (1993:52) refers to this characteristic as the "subject-connectedness of information". The object-connectedness of information means that even when information about an object is unbundled from the object to which it refers, the unbundled information will always have a bearing on the object from which it was unbundled. This characteristic of information has some important implications which I will explain in the following paragraphs.

3.6.1.1 Inexhaustibility of information

The first of these implications is the fact that information, in terms of its ability to be unbundled from objects, is inexhaustible. By this I mean that it is at least in theory possible to unbundle unlimited amounts of information from a specific object without exhausting the object or the information that pertains to the object. For example, a thousand people can look ("look" will translate in this context to the unbundling of information by means of senses) at a tree (object in reality) without depleting either the tree or the information about the tree. This is a unique feature of information which has implications for specifically the new information-based economy which has not only introduced globalisation but has also led to information poverty. I will elaborate on these implications in the following chapters.

3.6.1.2 Indestructibility of information

Information is not only inexhaustible, but in a certain sense also indestructible, because when an object is physically destroyed, this does not necessarily mean that information about the object has also been destroyed. To use the example in the previous paragraph again: the tree (object in reality) can be destroyed, but the information unbundled from the tree by means of our senses ("seeing" the tree) will still be available for distribution and use. There are exceptions, of course. Information can be destroyed if the tree has died and no one is able to recall anything about the tree or if the people who saw the tree also died without being able to share their knowledge with anyone else. Destruction of information is, however, not so

simple because of the fact that it is relatively easy to duplicate, recreate and distribute information. This feature of information also has important implications for amongst others access to information about objects that do not exist any more but can still benefit human development. Again, I will elaborate on these implications later in the thesis.

3.6.1.3 Independent existence of information

The indestructibility of information which I have explained in the previous paragraph, points to another reality-related characteristic of information. I have argued that from a human being's perspective, an object cannot exist without information being "bundled" with the object itself. In other words, a tree does not exist for me if I cannot observe the tree by means of my senses. On the other hand, it is possible for the information about the tree to exist without being "bundled" with the tree. This feature of information again explains why destroying an object does not necessarily imply the destruction of the information about that object. This characteristic has important implications for access to and use of information, particularly in the current era of globalisation that is driven by an information-based economy. I highlight two implications. Firstly, this feature of information allows a person the ability to become knowledgeable about an object without having physical access to it. I can, for example, gain knowledge about a certain tree or animal by watching a film about the tree or animal. However, access to information about an object does not necessarily imply access to and use of the object itself. In this way I can have access to information about the fruits of an apple tree, but without access to the apples I will not be able to eat them.

Another important feature that can be derived from this characteristic of information and that has implications for intellectual property and the distribution of information is the fact that human ownership and control of information do not necessarily imply ownership and control of the object itself. It is possible, based on this characteristic of information, to distinguish four different ownership/control relationships that can exist between objects and information about these objects. These relationships are:

- No ownership of either the information or the object. The following example will illustrate this relationship. If I look (unbundling of information) at the moon (object) I do not possess either the information about the moon or the moon self.

- Ownership of the information but not ownership of the object. In elaborating on the previous example this would imply that I not only look at the moon but can also describe what I see in a unique way. This can imply that I can actually own the information (my description of the moon) and may even exclude others from my ideas about the moon. However, owning this information does not imply that I own the moon itself.
- Ownership and control of the object but ownership and /or limited control of the information about the object. The reverse of the above relationship is also possible. I can, for example, be the owner of a car, but at the same time will not be able to control or "own" all the information about my car. It would be very difficult to prevent others from seeing my car. I can, however, control the information about where I park my car at night by deciding with whom I will share this information.
- Ownership and control of an object as well as ownership and control of the information about the object. This relationship is possible when I develop my own idea (immaterial object) and decide not to share the information about it with anyone.

3.6.2 Carrier-connectedness of information: The relationship between information and its carriers

Geldenhuys (1993:55) in his thesis refers to this relationship as the "carrier-connectedness" (*draergebondenheid*) of information and it refers to the fact that information can never be isolated from a carrier. As discussed previously, a variety of carriers can be identified, including objects in reality itself as primary carriers (such as a tree that contains information about itself), together with secondary carriers such as the human mind, books, sound and light waves and different representation symbols, including language and writing. This "carrier-connectedness" of information has also certain unique and important features which I will discuss in the next few paragraphs.

3.6.2.1 Repackaging of information in different carriers

It is possible to repackage the same information, about the same object in a variety of carriers. For example, I can translate the information from one language to another or repackage a text-based document into a multimedia presentation containing text together with audio-visual forms of presentations. One of the main advantages of repackaging information is the

fact that it can allow illiterate people to access information. The ability to repackage information in all spoken languages also opens up the possibility to allow (in theory) all people to have access to the same information.

3.6.2.2. Access to and accessibility of information

Access to an information carrier does not necessarily imply or guarantee accessibility of the content. Access to a book (carrier) does not guarantee access to the content (text/information). If the book contains only language (in other words: text) then there are at least the following criteria that a person needs to meet before having access to the content:

- being literate;
- understanding of the language; and
- understanding of the content.

3.6.2.3 From pictures, art and writing to cameras and computers

To be able to understand the real economic and socio-cultural as well as political impact of information poverty, it is important to make a few introductory comments on the impact of modern ICT as carrier of information on society.

Before the development and introduction of modern ICT we as humans had, apart from language, three rather limited techniques, in terms of time and space, to describe and unbundle objects in reality. These tools were pictures, art and writing. Apart from being limited by time and space these were also subjective because we could only paint and describe our subjective perception of what we perceived though our senses.

The information technology that really introduced the new information-based world (some would refer to specific digital cameras as the cyber world) was the camera and the art of photography because this information technology (as a carrier of content) introduced the so-called "true" and objective unbundling of our reality. De Mul argues as follows: "De fotografie is een van de belangrijkste hulpmiddelen geweest waarmee de moderne mens zijn wereld tot beeld heeft getransformeerd. Meer dan enig ander instrument geeft het fototoestel het menselijke subject een beeld van de werkelijkheid, en meer dan enig ander beeld wordt het fotografische beeldt gekenmerkt door objectiviteit" (2003:156).

One can thererfore say that modern ICT, including the camera and other digtial technologies like the computer, has permanently established our information-based world. The ability of modern ICT (for example, the World Wide Web) to not only unbundle information "objectively and correctly" from its original carrier without direct human intervention (art, pictures or writing), but also to digitise the content, introduced revolutionary changes regarding access to and accessibility of objects in reality. It allows more people to gain simultaneous access to objects in reality, to manipulate and interact with the content according to need. This is being done without the same level of time and space constraints that are normally associated with other carriers such as books and videos and introduced the new weightless and dematerialised global information economy (Webster, 2002:17). I will elaborate on these characteristics and their bearing on information poverty later in the thesis.

3.6.2.4 Carriers of information allows control and ownership

It is difficult to control and claim ownership of one's own knowledge – knowledge in the sense in which I explained it in this chapter. The reason for this is that knowledge is a human phenomenon that is difficult to capture. The carrier-connectedness of information on the other hand allows for the capturing of information as input to and output of human knowledge. It is, for example, possible to control and own a book and exclude others from using it.

This ability to control and own information has some important legal and moral implications. Those who favour access to information might argue that control of access to information due to its connectedness to carriers will impact negatively on this fundamental right of access to information. On the other hand, creators of information products will use this "carrier feature" of information to claim their ownership of the content and to protect it from misuse.

3.6.2.5 Information as an immaterial legal object

The fact that it is possible to control and own information due to its carrier-connectedness allows for a short but important discussion on intellectual property rights.

To start with, a terminological clarification is needed. In the context of the above discussion, it appears that it is not technically correct to refer to the

ownership of information (as content) as intellectual property. The main reason is that it is not possible to alienate information (as content) or human knowledge. For a product to be regarded as property to which one can claim ownership, it is a precondition that it has to be possible to alienate that product (Van Zyl & Van der Vyver, 1982:405).

Although one can therefore, strictly speaking in legal terms, not be the owner of one's own intellectual product (because the alienation thereof is not possible), legal provision is nevertheless made for the protection of the economic interests that one should enjoy with respect of one's efforts to produce intellectual products. The "carrier-connectedness" of information allows for the legal protection of information products because it allows for some form of control. In legal terms certain information products are treated and protected as immaterial legal objects (Geldenhuys, 1993). The following information-related products are considered to be immaterial legal objects (Geldenhuys, 1993:100-109):

- right of authorship;
- trade secrets;
- patent rights;
- trademarks;
- model rights;
- cultivation rights and
- heraldic rights.

Based on its carrier-connectedness, legal experts have identified the following criteria for information products to be treated as immaterial legal objects:

- Information should be packaged in some tangible medium which must meet the criteria of controllability and exclusion of use by others.
- Intellectual property is considered as an immaterial legal object only if it has a value for its creator and can be used for need satisfaction. Such an interest or value must be mainly economic in nature. Teijl and Holzthauer (1991) pay attention to the economic aspect of authorship and its associated protection. According to these writers, the economic justification of legal protection of intellectual property does not lie in the fact that such information is scarce and can be depleted (as in the case of other products), but relates to the fact that the producer, in other words

the author and others that are involved in the value adding and distribution of the information product, must enjoy the necessary economic protection.

3.6.2.6. Communication failure

The carrier-connectedness of information presents other problems, such as obsolescence of the information, duplication and lack of systematisation (Boon 1984:87). This affects not only its retrieval, but also the effective utilisation of information for carrying out tasks. These problems are mainly linked to the so-called publications and information explosion. Consequently relevant, correct and useful information as packaged in some information source or other is becoming increasingly obscured in the masses of irrelevant information. The carrier-connectedness of information can therefore cause communication failures of information as manifested in its life cycle.

3.6.3 Human-connectedness of information: The relationship between information and humans

Earlier in this chapter I argued that knowledge is a human activity consisting of gathering information and cognitively processing it. Knowledge also has some unique features that are relevant to the understanding of information poverty. In the next few paragraphs I will elaborate on these features.

3.6.3.1 Humans as assigners of meaning

As humans we assign meaning to what we perceive through our senses. We furthermore have a fragmented view of objects in reality that we perceive through our senses. This is partly due to our limited knowledge about what we perceive as well as the fact that our human senses are fallible.

Because we have a rather limited as well as fragmented sensory perception of reality, the question arises about the relationship between what we know and the "truth" or the so-called "correct meaning out there". This relationship between truth and meaning has been debated by philosophers for centuries. Some participants in this debate include Locke, Hume, Descartes, Nietzsche and Leibnitz. Various theories about the truth have also been developed. Some of these are the correspondence, coherence and phenomenological theories about truth (Thiselton, 1978:874-901). The purpose and scope of this thesis does not permit a discussion of these theories.

Since this study focuses on information poverty, I will highlight three relationships that deal with the way we as humans assign meaning to what we perceive. This discussion is merely meant to explain the way in which we assign meaning and does not claim to be an in-depth epistemological discussion. These are:

- The meaning we assign to objects that we created ourselves. I refer to these as human artifacts.
- The meaning we assign to objects (human artifacts) created by others, recently or in the past.
- The meaning we assign to objects in nature which were not created by humans. This includes, for example, wildlife and plants.

An example of the first "meaning-relationship" is the meaning a particular society assigns to a chair that is designed, built and used by that society. This can be regarded as the closest to the "true or correct meaning". One can even use the word "original intended meaning" to express this relationship, because we, as creators, imbue our creations with a specific practical value and significance. However, two important remarks about assigning the "correct meaning" should be borne in mind. Firstly, these artifacts are mostly created and used within a society where the same sets of truths (in terms of assigned meaning) are shared. Individuals who are not members of such a group may find it difficult to ascribe the "correct intended meaning" to certain items of use. A stranger who visits a city and has never seen a car before might find it difficult to assign the correct (original and intended) meaning to it. Secondly, people who are part of the society in discussion must also learn and be educated about the intended meaning and correct use of such artifacts. Education is therefore a prerequisite for assigning the correct intended meaning to created artifacts. For instance, people have to be taught the intended meaning of a car as well as how to drive it.

Assigning meaning and practical value by a society to artifacts which it did not create is more complicated and functions at two levels. The first level is relevant to those artifacts created by societies that have vanished. In addition to the various scientific methods used for instance to determine the age of these artifacts, transferred information (oral or written) also plays a major role in determining their utility value. Knowledge about extinct cultures that did not possess a written tradition is generally lost – a good example is the history and ways of living of the early American natives. Assigning meaning

to artifacts and other objects from such cultures is in other words mostly limited to some hypotheses about their use.

Furthermore, societies have a particular meaning-relationship with artifacts which are created by other societies and become their own articles of use through a process of acculturation. This phenomenon has been further encouraged and stimulated by European expansionism over the past three to four centuries together with the process of globalisation (Stiglitz, 2003). The meaning imparted by specific cultural groups to the creations of other cultures has certain characteristics. In some cases the same meaning is given to them, in other cases it is adapted and contextualised – and it also happens that a culture, for a variety of reasons, fails to impart any useful meaning to artifacts alien to that culture (Mander, 1991).

Humans also assign meaning to objects in nature, such as the moon, trees, plants and animals. This is mainly done through observation, experience and scientific research. However, our knowledge and understanding of nature is very relative and also limited – firstly because scientific knowledge constantly changes, secondly because different cultures give different meanings to nature and thirdly because we constantly discover new knowledge without reaching a point of knowing everything about nature. For these reason claims of absolute truth can never be made about nature.

3.6.3.2 Knowledge is value-added information

Numerous studies have been launched to investigate the relationship between information and value. Most of these studies have been carried out from a consumer and economic perspective. Taylor, in his *Value-added processes in information systems,* which was published as early as 1986, made a significant contribution to this theme by developing a value-addition model for information systems. Other authors who have done work in this field include Boon (1984); Tellis (1993); Brinberg (1989), Byrd (1989) and Kingma (2001).

In concurrence with the views of Taylor (1986:4) and Boon (1984:4) that the value of information lies in its usefulness for people, it is clear that adding value to information is closely linked to people's ability to take information which is perceived with the senses and transform it into meaning. Thus, to reiterate my previous arguments about knowledge, every person who collects information and processes it into knowledge is essentially engaged

in adding value to information. However, the human process of adding value (assigning of meaning) to information that is being processed by the human brain, is a relative concept due to the subjectivity of human understanding and interpretation of reality. As I have indicated, the value imparted to information can vary from person to person, and the same person may within different contexts derive different meanings and application possibilities from the same information. For example, a person might not recognize the same person in a different context.

The value of information for people furthermore does not intrinsically reside in the information itself (Taylor 1986:4), but in people's ability to transform that information into meaning and application. Adding value to information is therefore related to making information accessible, understandable and applicable for people in respect of certain objects in reality. From this angle adding value can thus be relevant to the content itself, the representation medium through which it is communicated and the various information sources.

In regard to content, value can be added in two ways. The first way (which one can also refer to as the internal process) is where the object is personally perceived and where such information, based on the person's own existing knowledge base, is converted to meaning. In the second way a person can also obtain additional and in some cases already interpreted information about such an object by consulting other information sources about the object (the so-called external process). In the latter case value can be added without direct observation of the object itself through the senses. I can, for example, read about a tree in Alaska that I have never seen. Reading about the tree allows me to add value to my knowledge about this specific tree and trees in general.

Adding value in respect of the human representation symbols through which the communication of information takes place relates in particular to making it accessible, as when it is packaged in secondary information sources. This way of adding value can for instance be done by translating the written text or spoken language or by using graphic representation. Graphic representation is particularly useful when information has to be made accessible to illiterate people.

3.6.3.3 Knowledge as instrument of power

Several writers, among others Foucault (1980), Toffler (1990), Gonzalez-Manet (1987), Line (1990), Giddens (1991) and Introna (1997) have remarked on the relationship between information/knowledge and power as well as the various areas in which power is exercised.

To explain this relationship, the point of departure is once again the fact that human beings give meaning to reality in perceiving it with the senses, and that people can make a representation of reality due to their ability to communicate this information about reality.

The relationship between people, knowledge and power can be explained from two perspectives. In the first place power lies in human beings' ability to "control" reality, so to speak. This is done by means of the meaning that we assign to nature – not only in the sense of name-giving, but also in terms of the use-value that we assign to it. In this way nature is to a certain extent made dependent on people's ability to impart meaning to *inter alia* the content of the information about the reality that is observed. It is, for example, within our power to decide what purpose a tree will have for us. We can either use its wood to make a fire or furniture or use the tree for shade.

Secondly, people also possess power where information is an output of human knowledge – in other words, knowledge that is communicated by people through representation symbols and media and which counts as the representation of reality by people. The power relationship between people and such information resides in the fact that human beings are able to represent reality and that they have the power by means of a variety of technologies to manipulate representations of reality. Information from this perspective can in particular be applied as instrument of power where societies are dependent on this information (*viz.* the representation thereof by others) for decision making, to form their worldviews and for the ability to do their jobs. Television serves as a good example to illustrate this power relationship. Most of us form our opinions and shape our worldviews by what we hear and see on television. Television images (as representations of reality) are, however, mediated and manipulated by people and technology. This explains why Baudrillard (1993) argued that the Gulf war in 1991 never happened – it was according to him created by CNN.

Neill (1992:50) correctly points out that every person who wishes to use information as an instrument of power not only needs knowledge but access to information, the ability to apply it, access to distribution channels and finally the will to use it. This last point made by Neill emphasises people's own value systems in the way in which such power is handled and exercised.

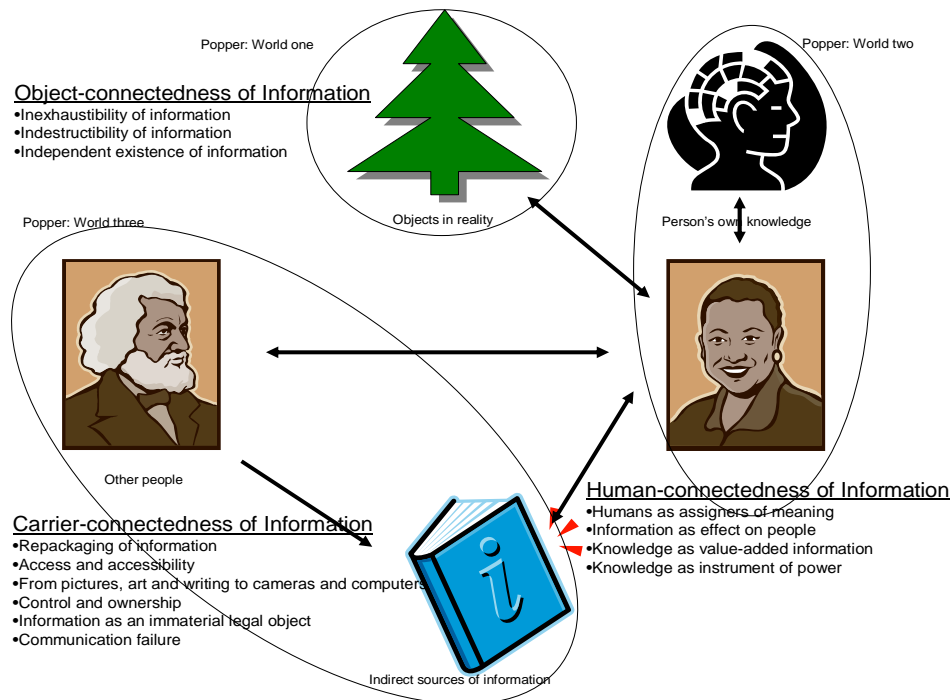In figure 3 I summarise the three interrelated characteristics of information.

Figure 3: The three interrelated characteristics of information

3.7 Understanding information and its implications for the study of information poverty

What are the implications of all the many characteristics of information in respect of information poverty? To understand this, the concept of poverty as defined in Chapter 2 must be revisited, namely that poverty is that condition of life where people lack sufficient resources to supply their basic needs for survival. Various levels, forms and degrees of poverty can be distinguished and it can be measured quantitatively as well as qualitatively.

3.7.1 Information as instrumental resource for satisfying all needs

The fact that all objects in reality are only accessible by means of the information that pertains to such objects has important implications for

poverty. The most important implication is that access to information about the basic necessities of life is an essential prerequisite for addressing and finding possible solutions for poverty. Without access to this crucial information poor people (and by implication all people) cannot meet and satisfy their basic needs. Water (object in reality), for example, has no meaning for people if they do not know where to obtain it. This instrumental role of information for satisfying human needs further serves as basis for the view that access to the information needed to satisfy basic needs can be regarded as a basic human right. I will say more about this concept in Chapter 4.

3.7.2 Access to information and its usefulness

In the preceding paragraph I showed that without access to information in respect of essential resources, people find it impossible to satisfy their basic survival needs. The fact that information can exist independently of the resources (objects in reality) to which it is linked, as well as the fact that certain information carriers can minimise the spatiotemporal restriction of access to these resources, has further implications for understanding information poverty.

The first one is that it is possible for people to obtain knowledge of objects in reality without the objects themselves having to be perceptible to the senses. As I pointed out earlier, this carrier-connected characteristic of information, together with the development of modern ICT, has made possible the phenomenon of globalisation. There are many advantages in the fact that people can have access to objects in reality without having to experience them personally through their senses. It enables people to become better informed, able to take better decisions, communicate more effectively and access extensive resources of which they were formerly unaware. Modern ICT has made it possible to distribute the expertise of experts to others all over the world without these experts having to be present everywhere. This characteristic of information has important implications for among others education and making available knowledge artifacts which can assist people in understanding and using resources better. The distribution of medical knowledge artifacts is a good case in point.

However, there are specific disadvantages as well. Access to information without access to the object can mean that such an object cannot in most cases be used. This can have a significant impact on poor people since

access to information about water means little if the water itself is not accessible. The problem is made worse if incorrect information about the object is available. There are two possible outcomes depending on the nature of the incorrect information that is available.

- If it is inaccurate "access information" about an object (for example, an incorrect telephone number) it may mean that such an object is inaccessible.
- If access to an object can be obtained but the information about the object is incorrect, the object may be used incorrectly. Incorrect information about water purification can, for example, have serious health consequences for people who gain access to infected water and drink it without purifying it correctly.

People are not always able to impart the correct meaning to the information observed without direct observation of the object itself. This view is supported by the remarks of Baudrillard (1993), who said that in the era of information technology we have access to more information but by implication to less knowledge as well. This is because the original point of verification for people – the object itself – has shifted to a second, third or even further abstractions. The implication is clear: if an object in reality is represented as a second abstraction by means of information, it can be manipulated and even changed.

Modern ICT also makes it possible to recreate reality. In the process reality and virtual reality become concepts which are difficult to distinguish. For instance, a virtual concert of Frank Sinatra was held in New York between 10 and 19 October 2003. Although Sinatra died in 1998, modern technology has made it possible to create three-dimensional images of the deceased singer and even to cause him to sing new songs (USA Today, Wednesday June 11, 2003: section D:1). The recreation of objects by means of information can also help people understand such objects better. In medical training, for instance, students can take a virtual tour of "information-recreated" organs. This characteristic of information has major implications for development and education.

Certain objects are characterised by the fact that they can be manipulated and changed by information that relates to them. This mainly applies to information products and services as well as money. The reason is that these objects already represent other objects. Money (paper or coins), for example,

represents a value. It follows that money can be replaced by information (figures) as representation of the value. This characteristic of information makes it possible among other things to pay out unemployment grants to poor people without their having to travel long distances. Educational information (as information products) can also be made available in this way without people having direct access to the original book or article. Distance education serves as a very good example.

3.7.3 Information as a category word

Based on the fact that reality consists of various objects and artifacts, different categories of information can be distinguished, such as political, economic, recreational and private information.

In attempting to understand information poverty, two categories of information should be singled out. The first is the difference between essential and non-essential information. This distinction can be explained as follows: certain essential information is indispensable for poor people and is required daily to provide their basic needs for survival and for soicio-economic development. Information about where to obtain food or medical services is an example of essential information. Non-essential information, on the other hand, is information which does not relate directly to providing in (poor) people's daily basic subsistence needs. It may even be important information in some cases, but is not necessarily essential for survival. Information about taxi routes is a case in point. I will elaborate in more depth on essential information in the next chapter.

The second category is an economic distinction which specifically relates to the demand for distribution of information products and services in the market. On the one hand, some information products and services are distributed as commodities in the market. This is normally done at a price determined by supply and demand and can imply the exclusion of poor people (Wessels, 2001:493). Collective information, in contrast, consists of information products and services from which people cannot or should not be excluded, and where it is incumbent upon government and government bodies to ensure that it is fairly distributed to all people (Kingma, 2001:67). The market mechanism (demand and supply based on price) in other words fails to fairly distribute such information products and services in the market. The question of which categories of information products and services should be regarded as collective and which as commodities is

discussed in the following chapter. The answer to this question has significant policy implications in respect of the way in which essential information should be distributed to poor people.

3.7.4 Access to and accessibility of information

I have agued earlier in the chapter that the carrier-connected and human related (knowledge) characteristics of information have important implications for access to and the accessibility of information and by implication for information poverty. The first is that access to the information carry does not necessarily lead to access to the content. There are numerous reasons for this. People may not have the instruments/technology and/or knowledge to retrieve the information. Information (content) on computer disks (information carriers) will only be accessible if someone has the technology (computer) and skills (computer literacy) to make it accessible. To be able to access information packaged in modern ICT in most cases presupposes an accessible and costly information infrastructure such as hardware, software and efficient internet access. Most people in the developing world lack the resources not only to implement but also to maintain such an information infrastructure.

Language as carrier of information (content) further complicates the relationship between access to and the accessibility of information. The problem is that access to language does not guarantee that someone will be able to impart meaning to content. Thus, even if I am able to open and read a computer disk, this does not necessarily mean access to its content (see also the example in the previous paragraph). There are two reasons for this. The first and most obvious is that the reader may not be able to understand the language. And even if the reader can understand the language, it does not follow that the meaning will be understood or correctly applied. The spoken sentence "The badgers got really killed in Illinois" means something totally different to a supporter of the Badgers basketball team in Wisconsin than for an English-speaking person in South Africa. This is because language is not an objective, independent carrier of meaning; it gains meaning within a usage context which is co-determined by the socio-cultural framework of its users (Wittgenstein, 1956; Luhmann, 1995; Introna 1997; Britz & Snyman, 2002).

As I have pointed out the repackaging potential of information carriers can facilitate accessibility to content. Information can be translated and

information in text format can be repackaged in other human representational symbols, including audiovisual presentations. This would make it possible for illiterate persons to access content.

3.7.5 Measuring information poverty

It is also possible to measure the information poverty phenomenon both qualitatively and quantitatively by using the reality-, human- and carrier-connected characteristics of information.

In theory, the following variables in regard to information in its relation to poverty can be measured:

- The number of literate and information-literate people.
- Determining what is essential and non-essential information in a specific community.
- Determining the size of the information infrastructure of a country or community (the number of people employed in the information sector, the number of libraries and publishers, internet access).
- The extent to which information which relates to relevant resources is available and accessible.

It is also possible to determine, based on the above criteria the individual, group, regional and community levels of information poverty. In addition the causes and results of and solutions for information poverty can be discussed using these characteristics.

3.8 Conclusion

In Chapter 3 the concept of information was discussed. Its etymological roots as well as contemporary usage were indicated. By using Popper's three worlds and based on the reality-connected, human-connected and carrier-connected characteristics of information I developed an own information model that can be used to understand and address the moral issues relating to information poverty. In the last part of this chapter I illustrated the relationship between poverty (Chapter 2) and information (Chapter 3). The discussion in Chapter 3 forms the framework for a detailed analysis of information poverty in Chapter 4.

CHAPTER 4

DESCRIPTION OF INFORMATION POVERTY

4.1 General introduction

Where Chapters 2 and 3 dealt with poverty and information, Chapter 4 deals with information poverty. It can thus be seen as a logical outflow of the previous two chapters.

In the first part of Chapter 4 I provide an overview of the current literature on information poverty. Following from this I present an own description of information poverty based on a hypothetical ideal information-rich society. Based on the definition of information poverty the different levels, qualitative and quantitative indicators and the causes of information poverty are discussed. A summary of the research findings of Chapter 4 has been published in the Journal of Information. The full details of the article appear in the bibliography.

4.2 Literature overview of information poverty

4.2.1 Background

As indicated earlier in Chapter 2, poverty is described as that condition in which a person does not have adequate means for living meaningfully. Furthermore, poverty is not only related to the presence or absence of necessities; it is also manifested in the inability to produce such necessities. Lötter (2000:101) refers to this condition as "absolute poverty". The United Nations report on poverty (*1998 Report on Overcoming Human Poverty*) refers to absolute poverty as well as poverty owing to a lack of income, relative poverty and overall poverty.

The experience of being information poor is not new (Lievrouw & Farb, 2003). Throughout history, individuals and societies have in some or another way lacked not only raw materials and other resources, but also the information needed to address their basic needs, together with the skills and abilities to satisfy their specific information needs.

However, a new dimension was added to the notion of information poverty with the transition to the information era. The transition, supported by the

development of ICTs, brought about a globalised information-driven economy, also referred to as the knowledge economy, based on intellectual, intangible assets (Freeman, 2001). I will discuss the impact of advanced capitalism and globalisation on information poverty in more detail under the section dealing with the main causes of information poverty. It is important to note that the current debate on information poverty has been overshadowed in the last decade by the notion of globalisation and the accompanying growth of the importance of ICT (Lievrouw & Farb, 2003:500, Britz, 2004)). ICT is a technology that has grown relentlessly in its own right and has caused a phenomenal growth in the information and knowledge industries of most of the developed countries. It has further exacerbated the gap between the rich and poor countries, leading to the coining of the terms information-rich and information-poor countries and the "digital divide" (Rifkin, 1995; Haywood, 1995; Castells, 1998; Norris, 2001; Bolt & Crawford, 2000; Nath, 2001; Floridi, 2001; Lievrouw & Farb, 2003; Hamelink, 2003; Britz, 2004).

4.2.2 Three interrelated approaches

Apart from the statistical indicators regarding the so-called digital divide in the world, a variety of approaches and definitions of the concept information poverty is found in the literature. A literature review shows that although few would deny the existence of information richness and poverty, little agreement exists on exactly what these terms refer to. In academic as well as popular literature the terms information rich and information poor are used without being explicitly defined (Britz, 2004). The extant confusion is evident in the extensive yet divergent debate concerning the issue.

I will discuss some of these definitions under three categories. These categories are based on the main characteristics of information that were identified in Chapter 3, and are related to one another. These categories could even be regarded as different approaches. It is important to note that the authors quoted in this context should nevertheless not be categorised as if they only present one specific point of view. Such an interpretation would not do justice to their points of view. The categorisation is based on what I interpreted as the main focus and accents of each author. In this way it is possible to identify and categorise the different perspectives on information poverty. The following three categories or approaches are identified: an information connectivity approach (linked to the carrier-connectedness of information), an information content approach (linked to the reality

connectedness of information), and what one could call a 'human approach' – emphasising the knowledge aspect of information poverty and linked to the human-connectedness of information (Britz, 2004). I will discuss a last category, called "related views on information poverty" at the end.

4.2.2.1 Information connectivity approach to information poverty

The information connectivity approach to information poverty is based on the conduit characteristics of information and focuses mainly on the lack of access to modern ICT. This approach is also linked with the so-called digital divide and information gap between the rich and poor which is seen as the disparities in access to modern ICT. It is furthermore based on the assumption that there is a causal relationship between the material status and economic wealth of people and access to information via ICT. The relationship hinges on two premises. The first is that ICT has the capacity to both increase and restrict access to information needed to satisfy needs, and the second is that socio-economic and political disadvantages will in most cases also produce informational disadvantages.

The information connectivity argument goes more or less as follows: certain categories of valuable information, such as economic information, are mainly available in an electronic format. In most cases this implies that poor people, due to the financial costs and in many cases also a lack of know-how knowledge of modern ICT, are unable to access and fully exploit these technologies and thereby benefit from these categories of information. Poor people are therefore in most cases marginalised and even excluded from the digitised world economy which is based on access to and use of information. Thus, the argument goes, ICT has accelerated the production and distribution of information, but at the same time has exacerbated the gap between those who have access to and use of information and those who do not.

There are a number of institutions and researchers that emphasise this divide based on the connectivity gap. The Administrative Committee on Coordination (ACC) of the United Nations (1997) views, for example, the lack of access to modern ICT in the developing countries as one of the main causes contributing to the situation of information poverty. The Organisation for Economic Co-operation and Development (OECD) also defines the digital divide as a gap between those who have the financial and other material means to access modern ICT and those who do not (2001). The

influential Gartner Group (2001), in a report entitled *The Digital Divide and the American Society*, argues that there is a causal relationship between the socio-economic status of people and their inability to participate in the digital economy. The International Federation of Library Associations and Institutions (IFLA), by means of its Social Responsibilities Discussion Group, also emphasised that the "economically disadvantaged populations of the developed countries are the information poor because, amongst others, they do not have the material means to afford modern ICTs" (Kagan, 1999). Researchers such as Buckley (1987), Doctor (1991), O'Neill (1999) and Heeks (1999) are of the same opinion. I quote a few of their most important comments. Buckley (1987:47) is of opinion that the lack of access to information technology, and in particular computers, is one of the major contributing factors to information poverty and he argues that "…people without computers and access to communication lines will be the information poor in the future unless other avenues for access are provided by libraries". According to Heeks (1999:5): "…new communication technologies are revolutionising access to information – but the revolution is likely to reach everyone but the poor". O'Neill (1999:3) argues that access to modern ICTs is limited to the so-called information elites which translates according to him to the wealthy.

4.2.2.2 Content/access approach to information poverty

The content/access approach reflects the reality characteristics of information. According to this view the unavailability or scarcity of usable information and high quality information, as well as deficient access of this information needed for development, underlie the genesis and roots of information poverty (Haywood, 1995; Aguolu, 1997 and Norris, 2001). In the same line of argument scholars such as Schement (1995) and Lievrouw (2000) make a strong case that approaches to finding solutions for information inequalities must largely be based on information content issues.

According to Aguolu (1997) access to relevant and usable information is a prerequisite for becoming part of the information society. He argues that becoming part of the information society will remain a myth for most of the developing countries until these societies overcome the following prevailing obstacles: a high rate of illiteracy, unawareness of the relevance of quality information, overall poverty as well as a lack of infrastructural facilities.

Burgelman *et al.,* (1998) is of opinion that the divide between information-rich and information-poor communities is "more than just digital" – it is according to these authors also related to the affordability, availability and suitability of the information itself (content). This approach reflects also the relationship between poverty and ability to access usable content. Lipinski (1999), in his discussion on information poverty, argues for example that the un-affordability of legal information to poor people is a form of information poverty.

Schiller (1983, 1984, 1991) adds another dimension to this content/access approach to information poverty. According to him there exists, what he refers to as an "information gap" between those who are educated and politically and socio-economically privileged, and those at the bottom of the class system – the uneducated, the marginalised and the poor. In, what he refers to as the "pay-per society" the socio-economically and educationally privileged have access to sophisticated information systems, and have the means and skills to access and benefit from valuable information. However, the underprivileged are exposed to less valuable information from which little socio-economic and political benefit can be derived.

Habermas (1989), the German philosopher, can also be seen as an exponent of this content/access approach. He expresses his doubt and scepticism regarding the quality of information that is currently made available in the public sphere. According to him the information that is made available to the citizenry is inadequate, not always reliable and even irrelevant. According to Harbermas the available information in the public sphere is managed and presented in such a manner that it only favours certain role players such as politicians. He argues that this undermines the democratic process in society.

Both the World Summits on the Information Society (WSIS) (2004, 2005) focused on the ability of all to participate in the information society and to benefit from information and knowledge sharing and reflect therefore this approach. The first principle proposed by the WSIS reads as follows: "A people-centred, inclusive Information Society where everyone can create, access, utilise and share information and knowledge, enabling individuals, communities and people[s] to achieve their full potential and improve their quality of life in a sustainable manner" (United Nations Libraries and the Information Society, 2003:1). In the WSIS Draft Declaration of Principles it is also recognised that "technology alone cannot solve any political and

social problems. ICTs should therefore be regarded as a tool and not an end in themselves" (World Summit on the Information Society, 2003).

The right of access to relevant and usable content is also strongly propagated by IFLA. According to IFLA, libraries are key players in fostering the information society and in bridging the so-called digital divide. The main role of libraries is according to IFLA to guarantee access to information. "…libraries and information services are key actors in providing unhindered access to essential information for economic and cultural advance. In doing so, they contribute effectively to the development and maintenance of intellectual freedom, safeguarding democratic values and universal civil rights. They encourage social inclusion, by striving to serve all those in their user communities regardless of age, gender, economic or employment status, literacy or technical skills, cultural or ethnic origin, religious or political beliefs, sexual orientation and physical or mental ability. The communities they serve may be geographically based or, increasingly, linked only by technology and shared interests" (World Summit on the Information Society, 2003).

4.2.2.3 Human approach to information poverty

Arguing from the human-related characteristics of information, the human approach to information poverty is not based on a wealth/poverty metaphor, but is based on and represents rather a hermeneutical view of information (Britz, 2004). According to this view information is seen as a subjective phenomenon and is viewed as a social construct that enables human understanding, interpretation, decision-making and problem solving. As such it is grounded in a phenomenological and constructivist view of information (Lievrouw & Farb, 2003:516).

The core argument is that access to information alone is not enough. People must also have the ability to benefit from the use of the information that has been accessed. Doctor (1991:217) articulates this very well when he argues that, we need a "right of access" in a broader sense, as a "right to benefit from access". This ability to benefit from access to information is co-determined by the level of education, skills, experience and other contextual factors. Sawhney (2000:162) captures the essence of this point of view when he remarks: "Information is not like food or energy of which everybody needs a bare minimum (an information ration of sorts) in order to survive.

Information only has value when a recipient has some need for it and the capacity to process it. Otherwise information is a resource that is of no use".

Other related views include those of Akhtar and Melessee (1994:314), who see the problem of information poverty as an extremely complex one that encompasses factors such as attitudes, managerial skills and finances: "The general lack of appreciation of the role of information, the almost non-existent national information policies and the recurrent, inadequate financial resources allocated to information systems and networks development and maintenance have severely deterred the use of information to solve Africa's socio-economic problems". Chatman (1996), who did a study on the information worlds of poor people and elderly women, found that their social and cultural norms influenced the way in which they access and use information and that this contributed to their situation of information poverty.

Fahey (2003), and Nath (2001) reflect also this approach to information poverty and relate it to the inability of people to benefit from the use of information. Nath (2001) refers to this as a problem of the mind, and he argues that due to a lack of proper education, many developing countries have an inability to "recognise the knowledge they possess, put a value to it and use the power of knowledge to their growth". In the same line of argument Odasz (in Cronin, 1992:32) defines information poverty as "[n]ot knowing what options exist, being an 'information have-not', [who] threatens to create a class of electronically colonised infopoor techno-peasants".

Tapscott (1995), Ponelis (1998), Mosco (2000) and Warschauer (2003) link information poverty directly to a lack of education. Warschauer argues that we must rethink and re-evaluate the so-called digital divide. He argues that modern ICT is imbedded in a "complex array of factors encompassing physical, digital, human and social resources and content". He therefore prefers to call the current information based divide a literacy divide where literacy is understood as a "set of social practices rather than a narrow cognitive skill" (2003). Tapscott (1995:294) emphasises the importance of education, which according to him must be seen as central to addressing the problem of information poverty. Ponelis (1998) defines the information poor as those who lack information (literacy) skills such as the ability to locate data leading to information, choose from a variety of sources, analyse and interpret what has been gathered for relevancy and accuracy, as well as the

ability to discriminate between sources of information. Mosco (2000:1) comments that access to information should be much more that just hardware and software. "In a deeper sense, access requires a set of capabilities, intellectual, social and cultural, from basic literacy to higher education, that are necessary to make effective use of the Information Highway".

The United Nations' Educational, Scientific and Cultural Organization (UNESCO) also strongly supports the idea that education can solve the problem of the digital divide and the information poverty. In a recent document, *Education in and for the Information Society* (2003), UNESCO prefers to use and promote the notion of "knowledge societies" rather than information societies, thereby emphasising the importance of education in the information era.

4.2.2.4 Related views on and references to information poverty

Related views on and references to information poverty can be summarised as follows:

- Lievrouw & Farb, (2003) define the gap between the information rich and information poor as one of "information inequities". These authors distinguish between a vertical or hierarchical perspective and a horizontal or heterarchical perspective. The vertical perspective represents an approach where access and use of information is seen as functions of individual and group demographics. According to this approach information inequality is determined by the socio-economic status of people; and greater equality of information access and use can be achieved by a more even and fair distribution of information in the marketplace. The horizontal perspective on the other hand is based on the point of view that individuals and groups with similar economic and social traits may have different experiences regarding access, use and needs of information. According to this approach the focus in the fair distribution of information should rather be on the real needs of individuals and the value of the information.
- Information poverty is sometimes replaced by the notion of a widening gap between societies and nations. Steele-Vivas (1996:160) describes this gap as follows: "... we [Americans] face a world in which we are allowing technology and limited policy understanding to create very significant masses of dispossessed and alienated

populations – including sizeable elements within our own borders" . In the same vein, Broadbent (1992:194) argues that "[t]here is, therefore, significant evidence of the widening gap between richer and poorer countries and a growing dependent relationship of the poorer on the richer for new knowledge". In a previous article (1990:206) he refers to "... a growing gap between the North and the South, that is, those with access to information versus those who lack it. This is commonly referred to as the information gap, which is growing at an exponential rate". Broadbent argues that this is the start of a dependency relationship which is particularly introduction of new ICTs and the related problem of accessing and sharing of information.

- The concept "media gap" is also used to identify and describe the digital divide and the gap between the information rich and information poor. Agrawal, director of the Taleem Research Foundation, argues for example that the development of modern ICT has divided the world in the media-rich and the media- poor societies (Durham, 1996:33).

- Chatman (1996) points out that information poverty differs from economic poverty. She (1996:194) emphasises the fact that information is a rather "complex social and cultural phenomenon" and that it cannot *per se* be equated to an economic form of poverty. She further states, in the same article (1996:195), that she was "...influenced by a debate in which information poverty and economic poverty were interchangeable conditions of need. After systematically examining this relationship, however, I cannot support this argument".

- Some authors are of the opinion that information poverty is a geographic occurrence on an international, national as well as regional scale (Haywood, 1995; Chatman, 1996, Braman, 1998). Castells (1989, 1994) would even refer to informational cities, which are marked by social disparities. The disparity lies between those who have access to information and have the skills and abilities to process information versus those who do not have access to information or the necessary skills to process and benefit from it.

- There is also the view that uneven distribution of and access to information result in certain power relations. Giddens (1985, 1991) and Foucault (1977) are two important exponents of this view. Giddens is of the opinion that the "information society" is nothing else than a controlled society whereby the nation state uses modern ICT to ensure power and control. This is among others achieved by surveillance. Foucault (1977) refers to the surveillance of people as

the asymmetric relationship between those who have access to information about individuals versus those who do not know that they are being observed. He uses the notion *panopticon* to describe this relationship – a metaphor that he borrowed from the British philosopher Jeremy Bentham, who used it to refer to the architectural design whereby wardens could observe prisoners who inhabited a separate, mostly illuminated cell. According to Foucault people are today observed in the same manner with modern panopticon technologies; and those being observed do not communicate with others who are being observed and cannot see who is doing the observation. This is the so-called "disciplinary society".

4.3 Conclusion

The variety of definitions above clearly indicates that the concept of information poverty is used pragmatically and formulated from different perspectives. Important aspects that deserve emphasis are the fact that information poverty is related to the inaccessibility of information; it is co-determined by the absence of a well-developed information infrastructure; it is closely related to literacy levels, particularly information literacy; and is further determined by attitude/approach to information and the value linked to it. Information poverty is a global phenomenon that can vary from context to context. Finally, it is clear that information poverty is not purely an economic phenomenon but can be linked to the cultural and social spheres of society.

Information poverty is chronic and long-lived. It is furthermore an instrumental form of poverty because it can affect all aspects of people's lives. In addition, it is difficult to quantify and measure statistically – for instance, how should one measure the human ability to transform observed information into meaningful knowledge?

4.4 Own description of information poverty

I structured my own description of information poverty in the following manner: Firstly a short summary is given of the main elements of information poverty as described in the literature overview. Secondly, the main characteristics of information that have a bearing on information poverty are highlighted. In the following part the ideal information-rich society is described and following from this a definition of information

poverty is presented. Based on this definition, I will analyse the following aspects of information poverty:

- different forms of information poverty;
- different contexts of information poverty;
- measuring information poverty and
- the main reasons for information poverty.

The reasons for information poverty are dealt with in more detail, because the thesis deals with social justice and information poverty. The different reasons that contribute to information poverty emphasise the fact that information poverty is a serious moral concern.

4.4.1 Main variables of information poverty

From the above descriptions it is clear that the concept of information poverty is used pragmatically and is formulated from different, but interrelated perspectives. I re-emphasise again the most important elements of information poverty is. Information poverty is:

- related to the inaccessibility of quality, relevant and suitable information;
- co-determined by the absence of a well-developed, well maintained and user-friendly information infrastructure;
- closely linked to the level of education and literacy, particularly information literacy;
- determined by the attitude/approach towards information and the use thereof as well as the understanding of the value that can be attributed to it;
- a global phenomenon, but can also occur within the same community and context;
- related to a lack of material and other means to access information; and
- not only an economic occurrence, but has an important bearing on the cultural, political and social spheres of society (Britz, 2004:197).

4.4.2 Main characteristics of information and their relationship to information poverty

In an attempt to define information poverty the following information-related characteristics, which I have addressed in Chapter 3, should also be borne in mind that (see 3.6):

- information is the most important and essential resource needed to facilitate the possibility to satisfy all human needs;
- without access to information pertaining to resources needed it is impossible to access and utilise other resources and;
- without access to relevant and usable information, decision-making is impossible and most human needs cannot be effectively addressed.

Information is instrumental and fundamental to all human activities. It can therefore be stated that without access to and use of relevant and essential information, individuals, societies and nations will be marginalized and exposed to different levels of poverty.

The second important variable relates to the fact that the availability of, and access to information, is not enough in itself. Availability and access also imply accessibility and usability. People need to be able to put information to use and to benefit from it. I elaborated extensively on this relationship under 3.6.3 – the relationship between humans and information.

4.4.3 The ideal information-rich society

I also based my deliberation on information poverty on a hypothetical ideal information-rich society. I have presented the main findings of this ideal information society at an international conference in Germany that was organized by the International Center for Information Ethics (see bibliography). This presentation will be published as a chapter in a book. This approach has certain advantages. As a methodological framework it makes it possible to:

- identify all the important variables that contribute to information wealth and information poverty;
- determine the various levels, degrees and manifestations of information poverty;
- identify criteria that can be used to measure information poverty;
- identify variables that contribute to information poverty;
- formulate policies based on the different variables that contribute to information poverty, to use for alleviating information poverty.

4.4.3.1 Description of the ideal information-rich society

This hypothetical information-rich society closely correlates with my own approach to information as described in the previous chapter. It is based on the three core variables of the information model, *viz.*: objects in reality, human-related characteristics of information, and the carrier-related characteristics. A schematic representation of the ideal information-rich society is given in Fig. 4.
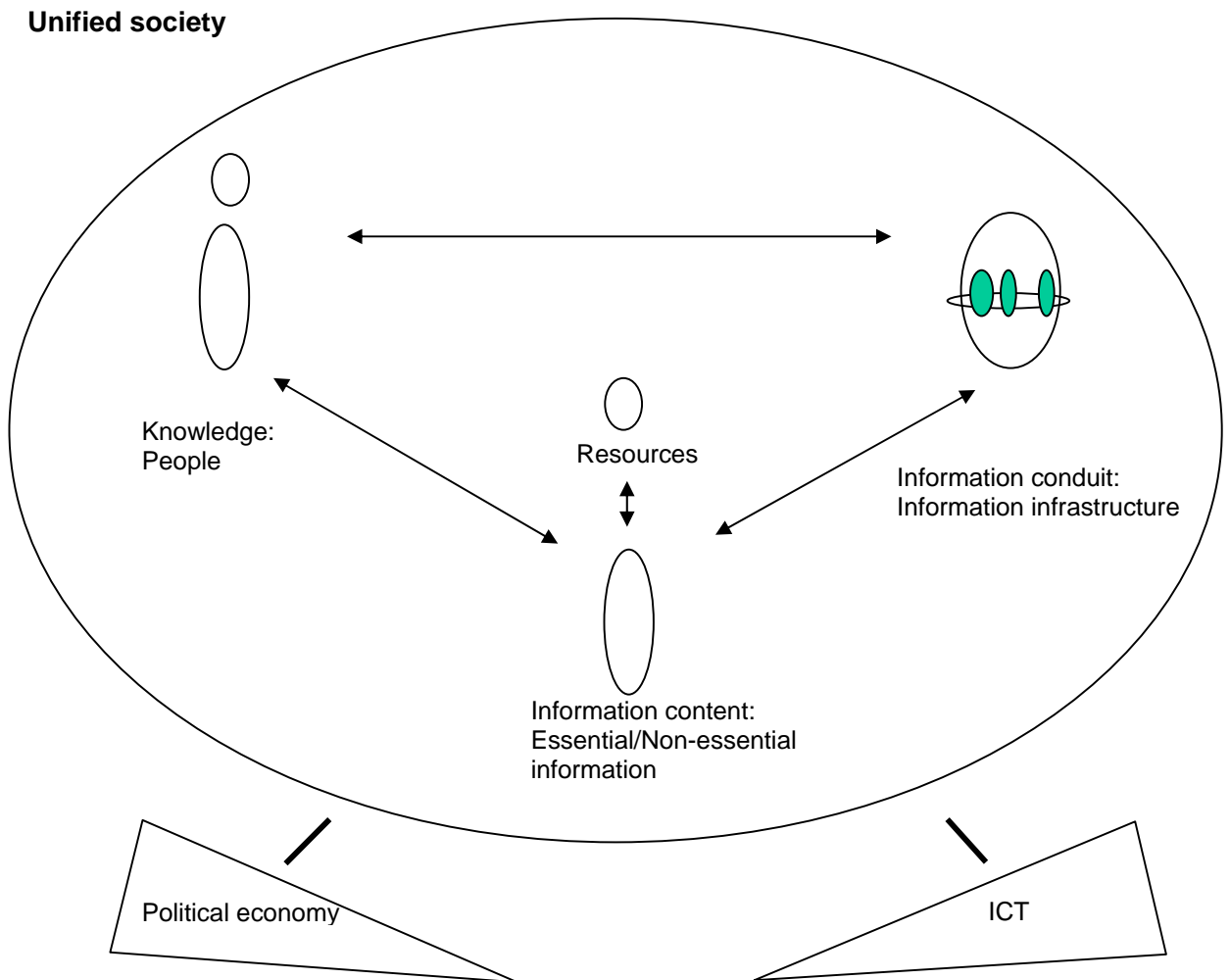
Unified society

Knowledge: People

Resources

Information conduit: Information infrastructure

Information content: Essential/Non-essential information

Political economy

ICT

Figure 4: The ideal information-rich society

The model can be described as follows:

4.4.3.1.1 Unified society, political economy and ICT

These three variables are related to the macro environment of the hypothetical information-rich society. It can be explained as follows: an information-rich society is unified and people live in a closed and shared socio-cultural framework. In an ideal information-rich society, cultural values are shared and everyone speaks the same language, which facilitates communication and interpretation. The political economy is fair and supported by a broad moral consensus by society. Resources and products (including information) are distributed fairly based on merit, acquired rights and basic needs. In other words, there is no alien political economy enforced on society from outside. The ICT used for communication is historically and technologically rooted in society. People grow up with it and just like the political economy, it is not alien in respect of history or usage.

4.4.3.1.2 Knowledge/People

The knowledge/people variable of an information-rich society is closely linked to the human-connected characteristics of information, and is related to people's intelligence and the ability to assign the original intended meaning to information, apply it and obtain benefits from it. In this non-existent ideal information-rich society people as carriers of knowledge, possess the following characteristics:

- High levels of intelligence. In the ideal society all people have the intelligent ability to transform information into useful knowledge and to apply it, as well as to benefit from it.
- Literacy, and specifically information literacy. Those in the ideal situation are not merely intelligent. They are also literate, and specifically information-literate. In an information-rich environment people are aware of the value of information and they know where to obtain the information they need, how to retrieve it and use it effectively. They have, as Boon (1992: 32) says: "…an awareness of the importance of information in everyday life, and a facility in obtaining, evaluating and using it for a wide range of work purposes". Information-literate people are in other words able "…to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information. Ultimately, information-

literate people are those who have learned how to learn. They know how to learn because they know how knowledge is organized, how to find information and how to use information in a way that others can learn from them" (Foster, 1993:344-345). The ideal situation is therefore one where individuals are able to formulate their own information needs, have the ability to obtain the needed information and to evaluate it, cognitively process it so that it can be interpreted meaningfully and applied. The information obtained thus is then effectively communicated.

- ICT literacy. Although ICT literacy is normally regarded as part of information literacy, it is discussed separately in this section. The distinction can be explained as follows: the technology used to gain access to information has developed to such an extent that it may be regarded as a separate skill which individuals need for becoming really information-literate. Although ICT literacy cannot be separated from information literacy, it can be analysed separately. In an ideal information-rich society individuals have the ability of mastering and effectively using the technology which offers access to information. Individuals thus possess the knowledge to use technology to gain access to information and knowledge.

4.4.3.1.3 Information content/essential and non-essential information

Another characteristic of the ideal information-rich society is the fact that there is no shortage of essential and non-essential information. This information is created locally by means of experience, observation and interaction with the environment. It is, in other words, knowledge that is unique and understandable.

The value of this indigenous knowledge can be found in the fact that it is used to satisfy all information-related needs, such as decision-making, problem solving and management, and the use of resources.

Although essential information as a concept has been discussed in the previous chapter it is important, for the logical flow of the argument, to reiterate what is meant by essential information. By essential information is meant that information that is required to survive and develop. This includes information related to the basic minimum needs of humanity, as well as information tools for trade and economic development – information essential to the development of capital generation and the necessary

infrastructure to support it, which includes among others backbone industries, basic science, and survival services in health, education, welfare, agriculture and labour. As such, essential information is regarded as common goods from which all in this ideal society have to benefit.

4.4.3.1.4 Information content and resources

The ideal society is not only characterised by the availability of sufficient resources for fulfilling human needs; there also exists a special relationship between these resources and the information that relates to them. This relationship is connected to the reality-connected characteristics of information, which can be explained as follows: the availability and use of these resources depend on the availability, accessibility and usefulness of the information about them. Without this availability, accessibility and usefulness of information, resources cannot be exploited and used. In an information-rich society, the information that relates to resources is unbundled and accessible to people. Correct unbundling of information, also in terms of the ability of the user to access and use the information, therefore means that resources are more accessible and useful. In practice this means that people know where to obtain water and, if required, have the knowledge of how to purify it so that it is suitable for human use.

4.4.3.1.5 Information carrier/Information infrastructure

This characteristic of an information society is based on the carrier-connected characteristics of information and relates to the way in which information products and services in the market are processed, packaged and distributed. In an ideal information-rich society the information infrastructure is well developed and all important information is made available in an affordable manner through information producers and distributors. Individuals also have the required information skills to obtain access to the information as it has been retrieved. The effective and efficient flow of information is regulated by a well-designed information policy in which the social, economic and moral rights of the users, creators and distributors of information are protected fairly.

Description	Characteristic
A homogenous society populated by intelligent people who are aware of the value of information. As generators of knowledge, information needs are analysed correctly. People know where to find information and how to retrieve, use and correctly apply it.	Human-related characteristic of information
The production, distribution and use of information are made possible by a well-developed information infrastructure.	Carrier-connected characteristic of information
Enough essential and non-essential information is available to supply all information-related needs.	Content-related characteristic of information
Other resources that are needed to satisfy human needs are accessible because the information which relates to them has been unbundled.	Reality-related characteristic of information

Table 1: The ideal information rich society

4.4.4 Definition of information poverty

Using this ideal information-rich society as point of departure, the extremely information-poor society can be described as follows:

> The situation in which individuals and communities, within a given context, do not have the requisite skills, abilities or material means to obtain efficient access to information, interpret it and apply it appropriately. It is further characterised by a lack of essential information and a poorly developed information infrastructure. Resources needed to satisfy human needs are in most cases inaccessible because the information about these resources are not unbundled and therefore not available to humans to use to gain access to these resources (Britz, 2004: 199).

The information capital in an information-poor society therefore has the following characteristics:

- a lack of access to essential information, including access to information which has a bearing on those resources needed to satisfy needs;
- a lack of a well-developed, familiar and well-maintained information infrastructure;
- a lack of financial capital to pay for information;
- a lack of the technical and other abilities to access information and
- a lack of an intellectual capacity to filter, evaluate and benefit from information (Britz, 2004:199).

As such information poverty has an overall impact on the development of people in nearly all spheres of life.

4.4.5 The relationship between information poverty and economic poverty

Based on this description of information poverty it is clear that there is a close relationship between information poverty and economic poverty. This relationship can be explained as follows: Information is instrumental in all human activities (see Chapter 3). People cannot satisfy their human needs without access to information that pertains to resources, for example, food, water and housing needed. However, access to information and the resources which have a bearing on the information alone is not enough. People also need to know how to apply their knowledge and use the resources to satisfy their needs.

Based on this discussion I propose that economic poverty should be redefined as: "The state of a person with insufficient resources, including information, as well as the inability to know how to use and add value to the resources to satisfy needs".

4.4.6 Degrees of information poverty

Not all of the factors that create a situation of information poverty need to be present to create a situation of information poverty. Information poverty is relative in nature and different degrees of information poverty can be distinguished. For example, a society can be highly educated, and have access to the Internet, but if its members cannot speak or understand English, such a society might be regarded in a specific context as information-poor due to the fact that it does not have access to the bulk of information that is available on the Internet.

Also, a society might have a wonderful information infrastructure including computers, free access to the Internet as well as trained people to update and maintain the technology. As an information society it might be regarded as information-rich in so far as its members have access to the best information infrastructure. However, if individuals are un-educated and by implication illiterate and/or information illiterate, access to such a well-developed information infrastructure is of no or little use. The same society can therefore, from a knowledge perspective, be judged as information-poor.

4.4.7 Contexts of information poverty

4.4.7.1 Individual information context as a determined of information poverty

Information poverty is co-determined by the context within which individuals find themselves. Information contexts can include the messages and symbols which a person encounters through conversations and interaction with others through a variety of media. The implication might be that two different people, sharing the same physical space and context, might have different interpretations understanding of the same information. This is possible because each individual has a unique experience and knowledge base to engage in the hermeneutical process of understanding and applying knowledge. The implications are clear: The one person, sharing the same information context than another person can be information-rich and will be able to assign appropriate meaning to information. Another person in the same context might be information-poor due to the inability to assign appropriate meaning to the information within the given context. This difference in information context can be explained with the following practical example: A well-educated person from New York City would, for example, have difficulty assigning substantive meaning to information if this person finds him-/herself in a remote area in Asia. This might be due to a lack of access to and understanding of the local language and/or meanings that are assigned to symbols used by the local people. Chatman (1996) refers to this inability to understand and apply this local information of inhabitants as the difference between "insiders" and "outsiders". The insiders share a communal culture, information and knowledge base, as well as similar set of symbols. These social networks as well as the social capital that these local people confer on one another are powerful information resources within such a society. The outsiders are mostly excluded from these social networks

and are therefore, in terms of understanding and applying of local information, considered to be information-poor in this particular context.

It is therefore possible that outsiders can, based on this form of information poverty, experience some form of self-alienation since the outsider is prevented from using his/her own style and method to understand and apply the correct meaning to perceived information in this new and strange environment. Effective social interaction, based on the contextual social networks, is therefore arguably not possible within an unfamiliar information context.

4.4.7.2 Information context of communities/societies as a determinator of information poverty

This form of information poverty and alienation is unfortunately not limited to individuals only, but it also affects nations and communities within nations. It can therefore be argued that globalisation, which is underpinned by modern ICT, is one of the biggest causes of this form of contextual information poverty in particularly the developing nations and poor communities. This is specifically true of those nations that are not fully part of the mainstream of globalisation in which the *lingua franca* is English and where the technotalk related to ICT is not used.

The best way to explain this claim is as follows: The use of modern ICT, with it own "language", plus English as the dominant language of economic interaction, creates a new international standard for economic activities. This new international "English – based information context", driven by a sophisticated, but mostly foreign information infrastructure, is forced, in a manner of speaking, on many of the developing nations in the world. Consequently these countries are alienated from their own economic processes, familiar forms of communication, as well as the local and indigenous information contexts. Thus, not only is self-alienation strengthened but new asymmetric information power relationships are also created since these nations are increasingly dependent on the information-rich nations and multi-national corporations for access to and interpretation of relevant and essential information that is needed for development. According to Rose (2005) this situation creates "soft power" and an asymmetric relationship of understanding.

A primary underlying cause of this dependence and self-alienation lies in many cases in an inability by these nations to self-appropriate modern ICT (Heeks, 1999:18). It is important to stress that fact that this lack of self-appropriation lies deeper than just "pressing the right buttons". It is in essence, as I have argued earlier, a lack of a hermeneutic process within which the "language" of modern ICT must be understood in order to obtain contextual functionality and application. This lack of understanding often leads to a form of social exclusion and marginalisation. Thus Robins and Webster (1999:74) correctly remark that "…new technology is a mystery, and it remains a mystery even when its technical functions are explained in simplified terms, because its genesis – its social history – is ignored. It comes to native people without history as an unstoppable force. These people only understand that they have to change their whole way of life".

4.4.8 Qualitative and quantitative indicators of information poverty

To understand the true complexity of information poverty, it is important to address the indicators, qualitative as well as quantitative, that are used to measure information poverty. At the same time, however, one should bear in mind that the quantitative and qualitative indicators of information poverty have significant limitations. Statistical measures can be misleading and their interpretations can be one-sided. It is also very difficult to describe the true perceptions of information-poor people.

Within the context of these limitations, it is nevertheless important to discuss the quantitative and qualitative indicators of information poverty. They offer useful insights into the real complexity of information poverty, the various reasons for information poverty and the moral implications thereof. Alcock's (1997) method is preferred, being a combination of quantitative measurement and qualitative description of information poverty. As Lötter (2000:107) describes it: "Qualitative indicators make dry statistics vivid and insightful."

4.4.8.1 Quantitative indicators of information poverty

It has become fairly popular to measure information poverty, expressed as the digital divide, statistically. The World Bank (World Bank Reports) and the United Nations (Human Development Reports), for example, regularly publish comparative statistics regarding the digital divide. Indicators used include the number of telephone lines per 1000 people, access to the Internet, literacy rate, access to cable TV, number of personal computers in

homes and number of cellular phones *(The Global Information Technology Report*, 2003/2004). These statistics, as a valid quantitative measurement, are also used in policy formulation by countries and world bodies such as the World Bank and the UN. However, as I have argued, statistical measurements have certain important limitations. Statistics cannot measure quantitative factors that contribute to a situation of information poverty, such as attitudes towards information and levels of intelligence. Mansell and Wehn (1998:34-39) tried to bridge the qualitative and quantitative gap by using the so-called INEXSK approach. It measures Infrastructure, Experience, SKills and KNowledge. INEXSK is a footprint analysis, as it measures knowledge societies against a so-called "ideal knowledge indicator" .

Based on Mansell and Wehn's approach it is possible to identify two important indicators that can be quantified. They are access to the Internet and level of literacy. These two factors will be briefly dealt with and used as quantitative indicators to illustrate the serious problem of the divide between those who have access to information and those who do not.

According to a World Bank report (1998/99), one third of the world's population is illiterate. UNESCO confirmed these figures in 2000. The largest percentage of illiterates live in South Asia (45%), Sub-Saharan Africa (40%), the Arab states and North Africa (40%). UNESCO furthermore found that women comprise the majority of these populations.

Access to ICT (more specifically the Internet) also differs dramatically between developed and developing countries. Recent statistics regarding access to the Internet are listed in table 2.

Continent	Country	Percentage of population with Internet access
Africa	South Africa	7
	Namibia	2.5
	Kenya	1.6
Asia-Pacific	China	3.6
	India	0.67
	Australia	54
	South Korea	54
Latin America	Chile	20
	Argentina	10
	Brazil	8
North America and Europe	Sweden	68
	Denmark	63
	United States of America	59
	Canada	49

Table 2: Percentage of population with access to the Internet by country (2004)[2]

Africa, which represents an eighth of the world's population, can surely be considered from a statistical perspective, as the poorest continent when it comes to connectivity and the ability to participate in the global digital economy. In 1998, Africa accounted for 2% of the world's telephone lines and even less than 2% when access to and use of the Internet is considered (Forging, 1998:1-8). This statistic has not changed dramatically over the past eight years. According to the Human Development Report of the UN (2001) only 4.2 % of the population in the sub-Saharan Africa region have access to a telephone, 1.1% use personal computers and 0.8% access the Internet.

From these statistics it is clear that the largest part of the world's population does not have access to ICT and more specifically the Internet, and is therefore excluded from primary economic activities. Although primarily a form of economic poverty, this division between the connected and unconnected has an impact on the cultural, social and political life of countries and communities (Fahey 2003:1). It frustrates development,

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[2] These statistics are based on the CIA's World Factbook and the Neilson//NetRatings

marginalises countries and communities, breeds a new form of dependence and contributes to the cycle of poverty.

The UN, the World Bank and various other international organisations such as, for example, the Information Poverty Research Institute based in the US, in developed and developing countries alike are concerned about this growing digital divide. Various initiatives, including attempts by the World Bank to connect Africa to the Internet, were launched to address and solve the digital divide. The UN, in co-operation with the International Telecommunication Union (ITU) hosted the World Summit on the Information Society (WSIS) in December 2003 in Geneva, with a follow-up conference which took place in 2005 in Tunisia. On the agenda, amongst others, is how to find solutions to the problem of connectivity in the world. In Chapter 6 I will elaborate on some initiatives in Africa to connect the continent to modern ICT.

As has been indicated, information poverty is not only about statistics; although ICT has played a dominant role in dividing the world between the information haves and have-nots, and should therefore not be underestimated, information poverty is not restricted or limited to a technology/digital divide only. The information divide is not limited to the "technology insiders" and "technology outsiders" of cyberspace (Floridi, 2001). As I have argued in the introduction, it is a much more complex phenomenon including issues such as socio-cultural and language diversity, different levels of education as well as the ability/inability to access, use and benefit from information.

4.4.8.2 Qualitative indicators of information poverty

To measure information poverty qualitatively is not easy. One has to interpret and construct the live experiences of information users taking into consideration their ontology, in other words the information user's perceptions regarding reality as well as epistemology by which I mean the information user's perception of her/his own position in relation to reality (Schrink, 1998:240).

These life experiences, which form the basis of the qualitative measurement of information poverty, have a bearing on the following information-related behaviours:

- how people value information;
- how they react to information;
- the ability to understand their information needs;
- to know where and from whom to obtain needed information;
- the ability to evaluate information and to put it into use effectively; and
- the ability to communicate and share information.

Based on these information-related behaviours it is possible to identify the following indicators that can be used as criteria to qualitatively measure information poverty.

4.4.8.2.1 Knowledge undiscovered: Not to know what is not known

The first and probably the most difficult qualitative measurement of information poverty relates to the question of the extent to which people know what they do not know. Not to know what you do not know could probably be regarded as one of the worst forms of ignorance and by implication also as the worst degree of information poverty. The reasons for this are fairly obvious. When someone does not know what he/she does not know, this means that such a person is not only restricted to "that which is known", but also does not have the ability to discover what can potentially be known.

There are a number of reasons for this knowledge stagnation. The main reasons follow:

- A lack of intelligence. This can be regarded as the most basic form of knowledge stagnation. However, inherent ignorance owing to a lack of intellect is difficult to measure and also hard to alleviate.
- A lack of education. Intelligent people can also lack the ability of not knowing what they do not know. This can be ascribed to a total lack of education or a lack of knowledge about a specific subject. For instance, when someone who has a doctorate in theology but lacks medical knowledge pays a visit to her medical practitioner, she may not in all cases know what she does not know.
- Ignorance in a specific context. This form of knowledge ignorance is closely related to the previous type and occurs when knowledgeable people find themselves in a strange and unfamiliar environment and are not only ignorant of the meaning ascribed to certain icons, but also

do not know which "questions to ask". Someone who lives in the US and visits a tribe of indigenous people in Namibia, will probably be ignorant of the fact that she has to report to the chief first. In all probability she will not even know that she is ignorant.

This form of information poverty can cause people to make the wrong decisions because they do not necessarily have access to the correct information. Ignorance also causes dependence, which can lead to skewed power relationships and exploitation. This can affect the dignity and self-respect of information-poor people. Ignorant people, who for a variety of reasons, do not always know what they do not know, may be typified as stupid or inferior by society. In this way, a negative self-image and self-respect is exacerbated by society. This can have a humiliating effect on ignorant people.

4.4.8.2.2 Asymmetric information relations

Asymmetric information relationships also give rise to information poverty. This concept is basically used in the economic sense (Kingma, 2001:92). It means that one group of people possesses more information in the market than another group and may use or misuse it to their advantage. Akerhof (1970) was one of the first to refer to this asymmetrical relationship. He applied it to the used-car market, saying that the seller knew much more about the condition of the vehicle than the buyer. Such situations create an asymmetrical relationship in the market, which can lead to mistrust, and an ineffective trade relationship. Levitt & Harper (2005) refer to these asymmetric information relationships as the sins of information. According to them (2005:69) "…most of them involved an expert, or a gang of experts promoting false information or hiding true information: in each case the experts were trying to keep the information as asymmetric as possible".

Although markets with such imperfect information can result in inefficiencies, people can take certain initiatives to correct these inefficiencies. In my example, this can be done by collecting more information on the second-hand car by reading consumer reports or contacting the previous owner of the car or by buying an additional warranty. Levitt & Harper (2005) argue that the Internet has succeeded to eliminate these asymmetric power relationships, because it allows people to be much more informed and to compare the different sets of information. What they however neglected to mention is the fact that many people do not

know how to use the Internet effectively for this purpose. The quality of information available on the Internet is also doubtful.

Asymmetrical information relationships do not only apply to economic trade relations. They are equally relevant and applicable to the political, social and cultural spheres of life. The choice of a life partner is in most cases based on an asymmetrical information relationship.

Apart from the ineffective trade relationships caused by asymmetrical information relationships, they can also have a negative impact on people who come off second best in such relationships. Not only is mistrust created, but they can also lead to dependency, fear and insecurity. Dependence together with mistrust and insecurity forms a combination which can affect the respect and dignity of people.

4.4.8.2.3 Information and unmet expectations

Information informs people. It keeps them abreast of a variety of objects (concrete and abstract) which relate to reality. Without information about an object in reality, a human being cannot access or use it. This can be illustrated as follows. If I do not have access to information about water which flows beneath the sand in the dry riverbed, the water will remain inaccessible to me and I will not be able to drink or use it. To reiterate my previous arguments (see Chapter 3) one could go so far as to state that water does not exist for me.

Just as the objects in reality are only accessible to people via information about such objects, access to information about an object does not necessarily guarantee access to and use of such objects. One premise is that people need to know how to apply the information correctly – for instance, I have to know how to find the water beneath the sand and how to purify it. The "use tension" between access to information and the object to which it relates has been exacerbated by the modern development of ICT. The minimisation of time and space constraints has exposed people to a far greater reality. At the same time, however, it has led to a maximisation of the inability to use the objects to which access has been gained. On the one hand, ICT may create a wonderful opportunity for poor people somewhere in Africa to gain access to the knowledge of a doctor in the Netherlands via a telecentre. Such access to medical knowledge creates certain expectations

that in many cases cannot be met because the concrete objects such as medicine and hypodermic needles are not available.

These unmet expectations lead to frustration and can cause "information wealth" (overload) to contribute to an intensification of the experience of poverty.

4.4.8.2.4 The effect of information on people

Eaton (1987:80) correctly states that information has a specific effect on people. This effect is co-determined by a person's W*eltanschauung*, his/her value system, prejudices and perceptions. Based on the work done by Farradane (1979:15) four main cognitive effects of information on people can be distinguished:

- The first one is when information has little or no effect on a person. This occurs when someone simply cannot understand the content of the information and therefore is unable to process it cognitively to broaden his/her knowledge base. Such a person is restricted to merely perceiving the information without even knowing what he does not know. Information then has no or very little value to such a person. The effect might be the frustration of "not knowing".
- Secondly, information can have a slight effect and little value adding on someone when a few additional "knowledge elements" are added to existing knowledge that a person has acquired. For example, explaining to an experienced bus driver how to operate a new radio that was installed in the bus. This example is of course based on the assumption that the bus driver had some previous experience with radios but does not fully understand how to operate this new peace of technology in his bus.
- Thirdly, information can have a confirming effect on someone's existing knowledge base. The previous example is also applicable to explain this "confirming effect on what we already know". In explaining to the bus driver how to operate the new radio, he might experience a confirmation of what he already knew about how to operate this particular radio.
- Fourthly, information can effect a total change by adding new knowledge to existing knowledge or by leading to a totally new level of knowledge which did not exist previously. The explanation of how to operate a newly installed radio in a bus to a bus driver who has no previous knowledge of a radio, nor how to operate it, serves as a good example to explain this level of knowledge adding.

Apart from these cognitive effects which information has on the knowledge levels of people, it also impacts on the affective side of people. This also relates to the four different types of effect. In this case, however, the focus is not on people's knowledge base, but on their value systems and personality. The emphasis shifts from the content of the information and its influence on what someone already knows to the affective nature of that effect. Certain religious information can for instance be ignored because it clashes with someone's views. One of the basic principles of information literacy is specifically that new information should be compared with existing knowledge and its effects on, among others, the value system of an individual determined (ALA, 1989).

Because people are involved, this means that the same information can have different effects on different people, and also that the same information may in some cases elicit different reactions from the same person under different circumstances. This obviously makes it very difficult to measure this effect.

The effect which information has on people has important implications that again underline the complexity of information poverty. For example, people may ignore important information for a variety of reasons. Neill (1995) shows how smokers tend to ignore the information that indicates the medical risks of smoking. This attitude can lead to serious medical conditions or death. Information is not only ignored, but also selected. People are inclined to use only the information that suits them (Neill, 1995:121, Montana & Charnov, 2000:333). Owing to people's assumptions and perceptions, information may be quoted and used out of context. The results can be negative and even lethal. Toffler, in his book *Power Shift* (1990), gives a whole list of examples of how information is selectively quoted and used for own gain, particularly in the political arena. The complexity of the human makeup can also cause people to believe rumours and apply them as truths in their own circumstances. One such example relates to the many rumours circulating in South Africa about cures for AIDS. One such rumour, to all accounts widely believed, is that sexual intercourse with a virgin will cure AIDS (Du Plessis, *et al*., 2006).

4.4.9 Main causes of information poverty

What causes information poverty? As has been demonstrated, information poverty is a multi-dimensional concept and as such, there is a variety of

reasons that contribute to the condition of information poverty. I will only highlight the most important causes.

4.4.9.1 Fundamental causes

One of the fundamental causes of information poverty is certainly lack of access to essential information needed for development and if available, an inability to assign appropriate meaning to it. The World Bank (1998/99:2), in particular, regards the lack of this ability to access and use essential information as one of the main causes that contributes to the situation of information poverty. In their Report on Knowledge for Development the World Bank argues that there is not only a lack of knowledge and understanding regarding economic processes themselves, for example, how to catch a fish (referred to as know-how knowledge), but also the inability to assess the value and usability of products and services. For example, information-poor people lack the ability to assess the quality of a potato. This can lead to incorrect decisions affecting the lives of people. The World Bank describes this inability as a lack of knowledge about attributes (1998/99:2). Apart from these two categories of knowledge, I argue that a third essential category, namely knowledge about knowledge must be added. Knowledge about knowledge refers to the expertise or skill (or lack thereof) required to master the information technology that enables access to the much needed information. Based on evidence provided in this thesis is it clear that most of the poor and developing communities do not have the expertise and skills to use and benefit from modern ICT. Heeks (1999:17) correctly pointed out, in his evaluation of information poverty, that poor communities do not necessarily need new information, but rather the expertise and information skills required to make existing information accessible.

Closely related to the inability to benefit from information is choice – when people choose not to learn, not to discover new knowledge. According to Jaeger and Thompson (2004:100), "…all individuals, information rich and information poor, inhabit their own small worlds. It is when one relies only on the small world for information that information poverty ensues".

IFLA (2003) is also very critical of the quality of information that is available on the Internet. According to IFLA the content of information available on the Internet and other networks "…needs to be appropriate, authentic, timely and in languages the people understand. This will require a

great deal of resources and commitment. Whilst there is a huge amount of information available on the Internet 'free' (or at least without further charge, once the connection is achieved and paid for), much of it is spurious, inaccurate, out of date, inappropriate and assessing its accuracy are skills that need to be acquired. Libraries have always considered that this is part of their core business and continue to do so in the electronic age".

Furthermore, and to reiterate an earlier point, access to information and the ability to assign the correct meaning to it does not always guarantee that the information related and problems of poor communities will be solved in a satisfactory manner. In some cases, access to relevant and useable information can even create unmet expectations. For example, there is little reward in making information on municipal services available to communities when these services cannot be provided to them. Based on the reality characteristics of information I am of opinion that it is of vital importance to ensure that the resources to which the information refers are also made available when making the information, which has a bearing on these resources, accessible to poor communities. The reason being that in most cases, information alone does not relieve poverty – the actual resource, on which the information has a bearing, must also be available and accessible and of use to satisfy needs.

4.4.9.2 Techno-economic and information infrastructural causes

4.4.9.2.1 Techno-economic causes

One of the biggest socio-economic reasons contributing to conditions of information poverty must certainly be sought in globalisation and the integration of the world's socio-economic life. The process of globalisation is driven by modern capitalism, which has migrated from a production-based economy to an information-based economy. The application of modern ICT in these different processes has also created a network of socio-economic and political relationships and is characterised by amongst others the globalisation of communications, the development of advanced information infrastructures and the globalization and integration of labour, production, services and finance (Friedman, 2005). The creators and distributors of information products and services as well as the producers of hardware and software for the information sector in the rich countries have grown exponentially to one of the largest economic sectors (Moore, 1998, Castells, 1996, Freeman & Soete, 1997, Webster, 2002, and van Audenhove, 2003).

A dominant driving force behind modern capitalism is the development of modern ICT. Van Audenhove (2003:48) mentions the development of what he refers to as "spectacular technological innovations", with specific reference to the Internet. The impact of the development of these new "spectacular" technologies can be summarised as follows:

- The introduction of new and modern ICT opens up new possibilities, of which the most important is the digitisation and accompanied manipulation of information. This has far-reaching consequences regarding the life cycle of information, in other words, the creation, duplication, capturing, organising, processing, storage and retrieval of information (see Chapter 3). The digitisation of information further allows for the first time the unbundling of information from its original physical carriers, such as objects (e.g. a house), paper and other print material in a different and unique way than previous ICT including writing and painting. Pre-digital information technologies did not have the ability to simultaneously reach million of people and allow synchronic interactivity and the customisation of needs. Due to modern ICT, digitised information has become interlinked (hypermedia), can "travel by itself" at nearly zero cost, can reach more people in an interactive way. Examples include e-mail, webcam technologies, as well as interactive TV. Modern ICT also allows for the customization of users' needs (Evans & Wurster, 1997). A good example of the ability to customize information according to user's needs is the booking of airline tickets where people can select their seats as well as meals online. There has indeed been a move from "textuality to multimediality" (Linguist, 1998:6). Modern ICT does not only allow better and more effective interactive communication between people. It has affected every industry and every service in the industrialised countries and has spread to all corners of society and the economy (Freeman & Soete, 1997; van Audenhove, 2003). According to Freeman and Soete (1997) modern ICT is fundamentally restructuring the service economy. They specifically refer to the trade-enlarging effect of ICT on services.

- An important outcome of the application of modern ICT in economic processes is the economic shift from production technology to information and more specifically knowledge technologies. Lyotard (1985) refers to this shift as the commodification of information,

while Castells (1996), Robins and Webster (1999) and Freeman and Soete (1997) all observed that knowledge has become the central notion in the new economy – which is referred to as the knowledge and/or innovation economy. In the words of van Audenhove (2003:49): "…it is clear that knowledge constitutes a central element in both the techno-economic paradigm and the information economy". The economic value of information and knowledge have been discovered. Peter Drucker (1998) also argues that knowledge has sidelined both capital and labour in terms of importance regarding production processes.

- Closely related to the knowledge economy is the so-called network economy. Capurro (2000) refers to the Italian philosopher Gianni Vattimo who argues that post-modernity has replaced the engine metaphor with the net metaphor. We live now in a web of human relations in a digital culture. Here the focus is on companies, levels of production as well as the interaction between companies (van Audenhove, 2003:58). In the network economy the focus is on the harmonisation and co-ordination of the local and the global economies (Braman, 1998:72). Firms develop networks to influence the market, introduce new products and maximise the overflow of information between firms. This led to strategic co-operation between firms. One way to do this is by means of sharing R & D resources. Van Audenhove (2003) and Freeman and Soete (1997) raise the concern that the sharing of R & D resources are mainly limited to "triad between Europe, the USA and Asia" (van Audenhove, 2003:59). Castells (1996:106) expresses also his concern that the developing regions are economically, technologically and socially marginalized and even in some cases excluded from participating in the global network economy. This trend raises important questions regarding the participation and sharing of information and knowledge by the developing nations. To quote Freeman and Soete (1997:348): "This geographically concentrated network of strategic alliances raises major issues about access for those countries/companies not belonging to the existing networks. In the absence of an international regulatory framework, it is likely that such technology networking will increase inequality of access to technology and investment. Such possibility of "exclusion" is characteristic of the process of increasing return and learning".

- Information as such has become a form of digital capital and a tradable commodity that means money and prosperity. In the words of Harris (1997:4): "…intellectual property is hot property…society now recognises that information is quickly becoming the basis for the new economy, and intellectual property is the new economy strongest currency". Schiller & Schiller (1982 & 1986), Lyotard (1985) and Branscomb (1995) also argue that information is being treated as a commodity in modern capitalism, and its availability is mostly on condition of demand and supply and that it is saleable in the marketplace.

From a techno-economic perspective it can therefore be stated that this technology-driven economic paradigm shift has led to an increasing gap between rich and poor countries, societies as well as between individuals. In this process knowledge of, access to and the availability and use of modern ICT have become some of the most important criteria and precondition for this new form of capitalism. Those who "know" and those who "don't know" are therefore categorised according to these information related criteria. Rifkin (1995:xvii) points out this distinction, stating that "…the information and telecommunication technologies and global market forces are fast polarizing the world's population into two irreconcilable and potentially warring forces – a new cosmopolitan elite of 'symbolic analysts' who control the technologies and the forces of production, and the growing number of permanently displaced workers who have little hope and even fewer prospects for meaningful employment in the new high tech global economy". This concept has contributed to the perception that communities that do not have access to modern ICT do not form part of the global information economy and are therefore regarded as information-poor.

This understanding is further strengthened by the so-called cultural imperialism, a notion popularised by Herbert Schiller (1991) in which technology as the medium has become the message (e.g. the Internet). This has resulted in the relatively cheap distribution of large quantities of information from the West to developing communities without taking into account the level of knowledge in those communities. Against the background of this cultural imperialism another perception has risen, namely that information richness is measured in terms of the accessibility of this form of mass media.

4.4.9.2.2 Information infrastructure causes

As already indicated, the backbone of an information-rich country is a well-developed and maintained information infrastructure, that is, an infrastructure that does not only enable the communication and sharing of information, but also enables the ability to participate in the global digital economic and socio-political activities. Such an information based infrastructure must allow "…the spread of national, international and genuinely global information exchanges between banks, corporations, governments, universities and voluntary bodies…" (Webster, 2002:10).

A well developed and maintained information infrastructure covers a variety of issues and ranges from the traditional provision of libraries, publishers and booksellers to the distribution of the mass media and electronic networks (e.g. the Internet), but also the emerging formulation and application of information policies on national as well as regional levels. Naisbitt (1984:28) correctly points out that "…the computer technology is to the information age what mechanization was to the industrial revolution".

The problem is of course than nearly all developing countries lack such sophisticated information infrastructures. This had dire consequences for many of these countries as they are marginalised to effectively participate in the global information-based economy. These countries are furthermore excluded from most of the global knowledge sharing. Kularatne (1997:118), in his critique on the developing world comments: "Whether a coordinated and organised national information policy exists in a country or not, there are certain fundamental inadequacies in the information infrastructure of many Third World countries". Angell (1995:10) warns that those who are missing the information superhighway are doomed to failure. He wrote: "The future is being born in the so-called information superhighways… [and] anyone [that] bypasses these highways faces ruin". Castells (1998) sees a bleak future for specifically sub-Saharan Africa. He refers to Africa's technological apartheid at the dawn of the information age because of a lack of infrastructure or human capacity to deploy and utilise technology. It is worthwhile to quote Castells (1998:95) at length:

> "Because of the inability of African countries to produce/use advanced technological equipment and know-how, their imbalance of trade becomes unsustainable, as the added value of technology – intensive goods and services – continues to increase *vis-à-vis* the value of raw materials and agricultural products, limiting their

capacity to import inputs necessary to keep their commodity production systems in operation. It follows a downward spiral of competitiveness, as Africa becomes increasingly marginalized in the informational/global economy by the leap of technological change. The disinformation of Africa at the dawn of the Information Age may be the most lasting wound inflicted on this continent by new patterns of dependency, aggravated by the policies of the predatory state".

Even in cases where developing countries invest in modern ICT and the development of a well-equipped and maintained information infrastructure, people are in many cases still excluded from accessing most needed and relevant information. Due to the high cost of modern ICT, in particular connectivity costs, there is still this dichotomy of those who have the material means to access information and those who don't. The United Nations Development Program Report (UNDP) (1999:63) refers to this dichotomy as follows "…the network society is creating parallel communication systems: one for those with income, education and literally connections, giving plentiful information at a low cost and high speed, the other for those without connections, blocked by high barriers of time, cost and uncertainty and dependent upon outdated information".

4.4.9.2.3 Infrastructural causes

Related to the above mentioned cause is the problem of the lack of a physical infrastructure needed to support the information infrastructure. The challenging problem is that many policy makers tend to forget that this new information-based economy, which can also be referred to as a dematerialized and weightless economy, is underpinned and supported by a "materialized" and top-heavy infrastructure. Such an infrastructure includes harbours, airports, working railways, accessible roads, warehouses and physical addresses of people. The reason being that access to the "unbundled" products and services that is offered via the Internet, does not always implies access to the physical objects self. Exceptions are for example digital music and e-books. Tangible items such as medicine, vehicles, food and household items such as stoves that are bought over the Internet cannot be shipped as e-mail attachments or downloaded via websites. Delivery of these products requires a highly sophisticated and efficient physical infrastructure. A dematerialized information-based economy without a physical infrastructure to allow the delivery of the physical products is therefore of little use and, as I have explained earlier,

can even create unmet expectations. A rural healthcare worker may find wonderful information on the Internet about the prevention of a killer disease like polio, but this will be of little use if there are no roads and no vehicles to deliver the vaccines to the clinic, or if there is no working refrigerator to keep the medicine at a regulated temperature. Africa, as I will explain in the following chapter is a good case in point to illustrate this lack of a well developed and maintained physical infrastructure.

4.4.9.3 Censorship

4.4.9.3.1 Introduction

One of the cornerstones of an information-rich society is the freedom of people to have access to information as well as the ability and right to communicate their ideas – in short: the right to freedom of expression. This right is protected in most democracies and is universally recognised as a fundamental human right. Article 19 of the Universal Declaration of Human Rights of the United Nations states:

> "Everyone has the right to freedom of opinion and expression; this right includes the freedom to hold opinions without interferences and to seek, receive and impart information and ideas through any media and regardless of frontiers."

Although one certainly has the freedom of expression, there is general consensus that this freedom (as is the case with other forms of freedom) comes with certain restrictions and responsibilities, which societies have always required from their members. Some of these limitations and restrictions include hate speech, defamation, promotion of terrorism and child pornography. These limitations and restrictions are necessary and do not contribute to information poverty.

At the heart of an information-rich society lies the ability to access information. People are able to make informed choices and wise decisions that affect their lives. However, when this right of access to information (excluding the above-mentioned categories) is restricted by the government it touches on one of the cornerstones of an information-rich society. State censorship, which places restrictions on the media and on individuals to express their opinions and access the works of others, can be seen as an important contributor to information poverty.

4.4.9.3.2 Internet, censorship and information poverty

Initially it was thought that the Internet as a new form of virtual communication would allow individuals and groups around the world to communicate free from state interference. The Internet has indeed the ability to create the foundation for an information-rich society. To a certain extent this has been achieved due to the nature of the Internet. It is, for example, difficult to regulate and trace global information traffic by a government. National laws by governments do not apply internationally and currently there is no international law that really covers censorship on the Internet. It is therefore relatively easy to distribute messages through different channels and networks around the globe. Many Internet service providers (ISPs) also protect the privacy of their users (Lipinski, Buchanan & Britz, 2004). To a certain extent one can say that the Internet contributes to a society where individuals and groups have the opportunity to access information and to share their ideas. Norris (2001:6) is, for example, of the opinion that "…digital networks have the potential to broaden and enhance access to information and communications for remote rural areas and poorer neighbourhoods, to strengthen the process of democratisation under transitional regimes, and to ameliorate the endemic problems of poverty in the developing world".

However, although it is difficult to control the flow of information on the Internet, national governments still try, by means of stricter legislation to control the flow of information on the Internet. Sussman (2001) points out that the explosion of information on the Internet is tempting governments from the developed as well as developing worlds to consider restricting content on the Internet. In the words of Hamelink (2000:143) : "It should be realized that the state censorship is – despite decentralized nature of the networks – certainly possible. It is not so much the technical nature of the Net – as if often claimed – that hampers censorship, but rather the lack of international cooperation". The fact that computers, which provide access to information on the Internet, are located in physical spaces, and that they belong to individuals or companies that fall under the jurisdiction of a country makes it to a certain extent possible to control their actions. National lawmakers in many countries have designed specific legislation to restrict users from access to certain websites and also to limit the freedom of ISPs.

Examples of countries that apply strict control over ISPs and Internet users include:

- Singapore. Here the numbers of ISPs are limited and ISPs are forced, under law, to use software that filters out undesirable sites. Undesirable sites include sites that can insult the government. ISPs are considered broadcasters and as such require licenses to operate. This falls under the so-called Singapore Broadcasting Authority Class License Scheme (Hamelink, 2000: 140).

- China is another country with strict and oppressive legislation regarding ISPs and Internet users. According to the China Internet Computer Network Information Centre, all Internet connections must be made through state institutions, and information threatening the security of the state is punishable by law. All ISPs have also to register with the police. Internet users must also register and must sign a declaration that they will not visit any "illegal" sites on the Internet (Hamelink, 2000:141). The media watchdog group, Reporters without borders (RSF), in a recent report (June 2004) described China as a dictatorship which "gags the Internet". It tops the list of the most repressive countries for Internet users. According to the report China is the country with the biggest prison for "cyber-dissidents" (The Age, 2004).

- Vietnam: All ISPs have to register with the government. ISPs are viewed as broadcasters and are obligated by law to report all "illegal" trafficking of information to the government. Government officials are allowed to control and monitor all network traffic (Hamelink, 2000:142). As part of new government policy, all Internet café owners can be fined or put in jail if they allow clients to access illegal information. Illegal information includes anti-government information (USA Today, 2004).

- The African continent: In a number of democratic African countries governments control access to the Internet. This is done by allowing only one ISP which is controlled by the state. It is furthermore very expensive to access the Internet and only those who can afford it can gain access thereto. Libya, Tunisia, Sierra Leone and Sudan are amongst the top 20 countries in the world where access to the Internet is most controlled (de Beer, 2001).

4.4.9.4 Intellectual property rights (IPR) regimes

Depending on how they are interpreted and applied, IPRs can have a significant positive or negative effect on information poverty. This is because IPR regulate and control the political economics of the distribution of information products and services. To understand this impact of IPR regimes on information poverty contextually, the following preliminary remarks need to be borne in mind.

4.4.9.4.1 Introduction

Intellectual property has unique dual characteristics, namely the right to own (control) information together with the right of access thereto. These dual properties are protected in the judicial notion of intellectual property and individuals have the right to benefit from both access and control. Intellectual property systems are therefore designed to:

- protect the moral rights of the creators of intellectual property products (moral justification);
- recognise and protect the right of fair compensation for the creation and distribution of information products (economic justification) and
- enhance, to the benefit of the common good, the creation and accessibility of new knowledge (social justification) (Hamelink, 1999:158).

The historical and philosophical origins of IPR are rooted in the West. These information based rights are mainly based on the Lockean labour theory as well as the Hegelian personality theory. According to these theories individuals have property rights and, according to the proponents of intellectual property rights, these rights extend to intangible intellectual property rights (Drahos, 1997). The first IPR legislation originated in England upon adoption of the Statute of Queen Anne in 1709. Initially, the publishing industry in England was strongly monopolistic and censorship was applied. The latter was particularly at the behest of the church and the state (Miller & Davis, 2000:285-287). The Statute of Queen Anne granted more rights to authors and placed greater restrictions on the monopolistic rights of publishers. The IPR legislation of most of the former British colonies, South Africa included, is modeled on the British system. The historical development of IPR in the United States radically differs from that of Britain. In the US, the emphasis was more on the stimulation of creativity and the distribution of knowledge (Lessig, 2004). Lessig (2004), for

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instance, points out that until the beginning of the twentieth century, copyright had to be specifically applied for in the US. In other words, published works were not automatically protected by copyright. In theory this philosophy still forms the cornerstone of American IPR regimes. Further on in this discussion I will show that this basic IPR philosophy is no longer applied in the US.

One also has to bear in mind that most of the non-Western cultures do not perceive intellectual property rights on the same plane as the West. In fact, there are some cultures to which ownership as known to Western traditions is antithetical. For example, most African people believe that ownership of information is rarely vested as a property right, and that it is rather a benefit that should be shared freely by the community (Britz & Lor, 2003). The People's Republic of China is another example. For cultural and historical reasons it does not recognise intellectual property in the same way as the West (Beam, 1995). Cultural and historical development is tied to Confucianism and Communism and emphasises the good of society at the expense of personal reward. It is seen as an honour to copy someone else's work (Lara, 1997). Copying is therefore not stealing. Intellectual property rights, although internationally acknowledged and regulated, are therefore still to a large extent culturally dependent and relative to the culture in which they operate. However, I will argue that the Western view tends to dominate.

Although intellectual property rights cover a wide range of information-related products, there are two areas of IPR that have a significant impact on information poverty. These are: copyright and patents. Copyright protects original works of authorship fixed in any tangible medium (Britz & Lipinski, 2001). Ideas are therefore not copyrightable. The copyrighted work must also fall into one of several categories of authorship. These are: literary, musical, dramatic, pantomime and choreographic, pictorial, graphic and sculptural, motion pictures and other audiovisual, sound recordings, and architectural. The creator is vested with certain rights, but at the same time there is a bundle of fair use rights that allows users to access and use the information product for free. Copyright can therefore be seen as a limited monopoly. Patent laws also regulate access to and use of information products. These comprise a more complex set of rules containing statement of claims regarding "things" or "objects" patented. WIPO (World Intellectual Property Organisation) defines a patent as "…a document, issued by a government office, which describes the invention and creates a

legal situation in which the patented can only be exploited (altered, used or sold) by, or with the authorisation of the patentee". Once granted, a patent endures for a number of years. In South Africa it is 20 years. As is the case with copyright, the purpose of patent is to create an incentive for knowledge creation for the benefit of society.

4.4.9.4.2 Impact and affect on information poverty

Shift towards protection of information
One of the alarming trends in IPR regimes that has a direct bearing on information poverty is the growing neglect of the original idea of IPR regimes, namely to achieve a balance between on the one hand the preserving of the information commons (access to information) and on the other hand the providing of incentives for the creators and owners of information products (ownership of information).

Access to information products and services, which is a cornerstone of an information rich society, has become more difficult – not because of cultural and social barriers, but mainly because of a stricter application of IPR regimes worldwide. There seems to be a tendency to structure IPR regimes in such a manner that they generate more income for those corporations and individuals who own and control information products (Drahos, 2003). This alarming trend must be interpreted and understood against the background of the information society in which we are living where the digital environment, with specific reference to the Internet, for the first time provides the opportunity to create an information commons where information and knowledge can be distributed to the largest number of people at about zero cost (Becker, 2003:1). The following developments in the field of IPR will prove this shift towards the ownership provision of IPR regimes:

- The rich and developed nations, in particular the European Union (EU) and the US, have taken a leadership role in the setting of international standards to ensure that IPR owners, which are mostly from these rich nations, are protected worldwide. They have also been successful in tying IPR to general trade agreements and have established a legal framework for countries around the world to upgrade their IPR regimes in accordance with these international agreements (Britz, *et al.*, 2006; Chang, 2003).

- The two key instruments used to achieve this are the World Trade Organization's (WTO) Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) which were agreed upon in 1994, and the United Nation-based World Intellectual Property Organization's (WIPO) Copyright Agreement (1996) (von Hielmcrone, 2000; Harris, 1997; Thomas & Lee, 2002).
- As an implementation of these agreements the US enacted the Digital Copyright Millennium Act (DMCA) in 1998 and it was followed in 2001 in Europe by the EU Copyright Directive.
- With these agreements the scope and duration of IPR has grown enormously. IPR related to information on the Internet is now covered together with digital rights management and the anti-circumvention laws, which enforce technical restrictions on accessing information on the Internet.
- The US and the EU have extended the post-mortem copyright from 50 to 70 years. The WIPO Copyright Treaty now includes the protection of databases that were previously considered public information.
- According to the World Bank Legal Review (Intven, 2003) the patent applications have also increased from 1.8 million in 1990 to 7.1 million in 1999. The TRIPS Agreement further allows for the patenting of life forms and pharmaceuticals and by implication the appropriation and commoditisation of indigenous knowledge (Thomas & Lee, 2002: 6-7).
- Major industries such as IBM, Microsoft and AOL-Time Warner have backed these international agreements to protect their financial interests (Thomas & Lee, 2002:6-7).

It would therefore not be an overstatement to conclude that IPR owners have a formidable set of tools at their disposal, both in terms of technology and legislation, to protect their rights worldwide.

Fair protection of intellectual property rights, within the original philosophy of IPR, is one thing. The problem arises when protection is designed in such a way that it benefits the owners and distributors of information products and services at the expense of access to essential information. Many individuals and organisations have expressed their concern and voiced their criticism against this new trend in IPR regimes. Toner (2003:7) refers to this trend as "social terror" and according to Drahos (2003:3), "…intellectual property begins to look like a game in which the rich have found ways to rob

the poor". According to Bollier (2003:1) we are moving towards market enclosure, taking information out of the public domain into the private zone. The Copy Left movement refers to the current trend as the creation of a "permission culture" (Boynton, 2004) and Lessig (2004) is advocating for an "access culture". These sentiments were echoed at the World Summit on the Information Society (WSIS Geneva 2003) and many civil society groups strongly oppose the current trend in IP and even reject the term Intellectual Property Rights, because "…the only rights associated with information and knowledge are those of owners" (Siochrú, 2003:3).

Becker (2003:1) correctly points in my view out that the future of the information society will be shaped by how the conflict is resolved between those who see information as a commodity to be sold to consumers versus those who see information as a common good that must be freely available. This shift will have a profound effect on the information poor.

Property and piracy
The shift toward the commercialisation of information is not the only reason for the stricter application of IPR. An important factor, which directly and indirectly contributes significantly to information poverty, is the enormous increase in piracy of information products worldwide. This is largely owing to the fact that digital information can be copied and distributed at almost zero cost and with the greatest of ease. Information piracy is moreover no longer limited to text-based information products, but includes all multimedia formats of information.

The financial impact of this trend on international information industries is indeed alarming and particularly affects the entertainment and software industries. For example, the US software industry counted losses of between $10 to $14 billion annually and the total retail value of pirated software was an estimated $12,2 billion in 1999. One in every three copies of business software applications in the world is illegal (Oz, 2002). Another example of this trend is given by Miaorops (2000:C11) who reports that for every $3 worth of products (patented) exported out of the US, American companies lose up to $1 to piracy. This explains, according to Miaorops (2000), why pharmaceutical companies in the US, in order to protect their intellectual property, pressure the US administration to impose stronger intellectual property legislation.

As a multi-billion dollar international industry intellectual property theft is threatening the whole information-based industry in the Western World. The damaging effect on this industry must be evaluated against the background that one third of the income of the G7 nations comes from information products and services (Gurnsey, 1995:5). In 2002 the copyright industries accounted for 5.24% of the US gross domestic product and they were bigger that all other major industry sectors. In 2002 the international loss to the US economy due to copyright piracy was an estimated $20-$22 billion globally (International Intellectual Property Alliance, 2003).

This justifies, according to the International Intellectual Property Alliance (IIPA), the call for a stricter application of IPR legislation worldwide. According to Eric Smith, the president of the IIPA (2003:1), the "… rapid growth of e-commerce and the Internet bring new opportunities and challenges, particular for these copyright industries whose products will increasingly be traded globally using the new distribution technology. Unless we safeguard the Internet from the scourge of intellectual property theft, the medium will never reach its full potential to contribute to global economic growth and cultural diversity through local creativity. We appreciate the efforts by the US government to secure ratification and full implementation of the WIPO Internet Treaties by all countries. Furthermore, governments must take actions to ensure that their enforcement regimes comply with their WTO TRIPS Agreement obligations and, use legitimate software in governmental offices".

From an information poverty perspective one can indeed ask the question: How legitimate is the case for using information piracy as a reason for a stricter application of IPR? At first glance, and based on the assumption that people have a right of ownership of information, it seems to be justified in those cases where the culprits are those who steal information to enrich themselves – in other words, when basic information needs are replaced by information greed and desires at the expense of those who create and distribute information. This argument is also used to justify the application and use of Digital Right Management (DRM) technologies to protect IPR from piracy. According to Beristain (2003:31), the "…biggest potential of this technology [DRM] is the capacity for the rights owner to manage distribution and to be able to collect royalty fees".

However, it is still an argument motivated by the ownership/economic interest underlying IPR and becomes less convincing in those cases where

poor third world countries have to "steal" essential information to survive and develop because it is too expensive in the marketplace. Siochrú (2003:3) is, for example, of the opinion that the TRIPS Agreement merely gave the IP industry a "…huge stick to wave at so-called 'pirates', and introduced a single corporate-friendly regime in IPRs". As such it seems that there is a good case to argue that the reaction of the information owners to apply stricter IPR regimes due to an increase in information piracy is not fully justified.

Intellectual property and development
I have already pointed out that information, and more specific access to essential information, is instrumental in and essential to all human development. A lack of access to information can therefore seriously hamper development and as such contributes to a situation of information poverty.

Stiglitz (2003) emphasised the fact that there can be no development without knowledge sharing and knowledge management. Knowledge enhances the return on investment and capital "provides the opportunity to make use of recently acquired knowledge" (Stiglitz, 2003:93). Development strategies therefore need a clear outline on a strategy to manage and distribute knowledge. Education, as the core of any development, and its infrastructure should therefore be one of the high priorities for successful development. As regulators of educational resources, innovation and ideas IPR policies can make a substantial difference to development. But currently not enough is happening. Scientific journals are, for example, still too expensive for academic and scientific institutions in developing nations, and Stiglitz (2003:102) correctly warns that the "excessive protection of IPRs may end this virtuous cycle of knowledge transmission and regeneration in the developing world".

There is therefore a rightful fear around the world that the shift toward a stricter application of IPR regimes will further impede development and restrain developing nations from gaining access to education and health information. It would, however, be unfair to directly accuse the two main international bodies that regulate the IPR regimes, namely the WTO and WIPO, of a lack of sensitivity to the cause of the developing nations (Britz, *et al*., 2006). There is enough evidence to suggest that both these bodies have the developing nations high on their agendas (WTO, 2003:93-100; WIPO Press Release, 1998). For example, the WTO released a special declaration at the Doha Ministerial Conference (November 2001) that the

TRIPS Agreement should not prevent member countries from taking certain measures to protect the health of their citizens. Some flexibility was also built into the agreements such as compulsory licensing (WTO, 2003: 82).

The WTO and WIPO are also committed to assisting developing nations to conform to the TRIPS and WIPO Agreements. In a joint press release, the WIPO and WTO (WTO, WIPO Press Release, 1998) explain their role in assisting developing nations: "This process involves bringing their laws on copyright, patents, trademarks and other areas of intellectual property into line with the agreement, and providing for effective enforcement of these laws in order to deal with piracy, counterfeit goods and other forms of intellectual property infringements".

However, this process is part of the problem for developing nations. According to research done by the South Centre (2002), these agreements are ultimately oriented to set up an international legal framework for a global IPR regime. This will further limit the policy space left in the hands of developing nations under the TRIPS Agreement regarding IPR issues. The project of the South Centre was funded by the United Nations Developing Programme (UNDP) and had as its aim to monitor and analyse the work of the WTO from a developing nations' perspective (South Centre, 2002).

Correa and Musungu (2002) therefore argue that the WIPO and TRIPS Agreements did not help to advance developmental goals of the developing countries. They rather strengthened the economic interest of powerful multi-national corporations and the governments that represent them. Not only do developing countries have to comply with these agreements, but the standards set in TRIPS and WIPO are far better suited to the needs of the developed nations. This has limited developing nations in developing of their own policies regarding IPR. Drahos (1997:201) reflects the same sentiment in his evaluation of the TRIPS Agreement: "TRIPS was not the product of carefully co-ordinated economic analysis. Rather it was the manifestation of rent-seeking desires of those multi-nationals that saw opportunity for themselves in redefining and globalizing intellectual property rights".

Deere (2003) also points out that in cases where developing countries, for example, resisted implementing the TRIPS agreement, developed countries, the US in particular introduced other related measures to force these

countries to increase their IPR standards and to apply it more strictly. Such measures can included economic sanctions, as well as the incorporation of additional IPR standards in regional and bilateral agreements (Britz, *et al*., 2006). Deere (2003:11) points out that such TRIPS "plus" agreements can even result in the obligation of developing countries to introduce higher IPR standards at a faster pace than TRIPS requires. This can have devastating effect on their own economic development.

This unwillingness of the developing world to adhere in full to international IPR regimes furthermore leads to the developed world's reluctance to invest and export its knowledge and information technologies (hardware and software) to those countries that do not protect their IPR (Intven, 2003). I argue that this has a severe effect, not only on development, but also on the knowledge production in these countries.

4.4.9.5 Brain draining

4.4.9.5.1 Introduction

I view brain draining or the migration of well-educated people from mostly developing countries to the developed world as a significant contributor to information poverty. It should be interpreted against the background that knowledge plays a strong central role in the techno-economic paradigm and is seen as the most important production factor in all economic spheres (Castells, 1996; van Audenhove, 2003). Freeman & Soete (1997:3) point out that "…it would not be unreasonable to regard education, research and experimental development as the basic factors in the process growth, relegating capital investment to the role of the intermediate factor". Brain draining has a serious moral, socio-political and economic effect on these nations. I will deal with the moral effect later in the thesis, but it is, for example, estimated that the monetary value of the exodus of people out of Africa exceeds the value of all the development aid that African countries have received from the developed world (Britz & Lor, 2003: 165).

4.4.9.5.2 Migration and brain draining

In the analysis of the effect of brain draining on information poverty four important facts should be born in mind (Britz & Lor, 2003).

- First, the migration of people around the world is not a new phenomenon and certainly not unique to the current era of globalisation. The movement of people has been part of human

history since the earliest times. There was a surge in the late 19th century when a large number of Europeans migrated to amongst others the US. This peak in human movement was reversed in the first half of the 20th century, partly due to the two world wars. In the last 50 years the trend has again shifted towards greater globalisation and resulted in the establishment of international organisations such as the WTO and WIPO (World Bank Briefing Papers, 2000).

- Second, and related to the first point, is the fact that it is a normal phenomenon for professional people to migrate to other countries to sharpen their skills, gain experience and build professional networks (Britz & Lor, 2003; Meyer, *et al.*, 2001).

- Third, it is a basic human right that people can move freely to wherever they want, to make a better living and to exercise their professional skills.

- Fourth, the movement of people around the world can be used to the benefit of their home countries as well as the world. There are certain prerequisites and one of them is the management of this process. In reaction to the well known drain of Indian scientists to the US Nancy Birdsall (Human Development Report, 2001), special advisor to the Administrator of the UNDP, comments: "In a global market, people with the right skills will naturally migrate to the high-tech, high wage frontier, wherever it is. But we do see signs that when countries create the right conditions – including openness to new investment and new ideas – they can recapture some of what they have lost. The Indians in Silicon Valley are an important part of Bangalore's success". South Africa and South Korean are other countries who have programs in place to encourage skilled emigrants to return.

4.4.9.5.3 Impact on developing countries

However, the alarming factor is that a large number of highly qualified people in the developing world leave their countries in search of better job opportunities and living conditions for themselves and their families. The concern is that most of them never return to their home countries. Van Audenhove (2003:58) correctly points out that it is very questionable whether developing countries under these circumstances will ever be able to bridge the, as he puts it, "knowledge gap". Meyer *et al.* (2001:316) also comment: "The migration of skilled persons contributes to the sharpening of inequalities, both between countries and within countries, that is such a characteristic feature of globalisation.   At the same time, those very

inequalities as between countries, further promote and underpin the process of skill migration which responds to the growing skill wage gap as between the developed and developing world".

According to the UN Human Development Report (2001) brain draining costs the developing countries billions of dollars. During 2001 India alone had lost more that US$2 billion in human resources. This is mainly due to the migration of scientists to the US.

Africa is on the brink of a 'brain collapse'. Some of the horrific statistics provided by the International Organisation for Migration (IOM) and the UN's Economic Commission (2000) for Africa are:

- Between 1960 and 1975 an estimated 27 000 highly qualified Africans left the continent.
- This number increased to 40 000 between 1975 and 1984.
- The number doubled in 1987. It then represented 30% of the highly skilled labour force.
- Africa lost more than 60 000 professional people between 1985 and 1990 and an estimated 20 000 every year since then.

Another study by the World Bank (2002) reported that some 70 000 highly qualified African scholars and experts leave their home countries every year in order to work abroad. Africa spends an estimated US $4billion annually on recruiting some 100 000 skilled expatriates (World Markets Research Centre 2002). Although these statistics does not correctly add up in terms of numbers, it bring across a very clear message, namely that brain draining is a serious threat to the African continent.

Apart from the direct and indirect economic impact of brain draining on most of these countries, it has also a profound effect on health care – not only in terms of costs but also in terms on human resources. After a week-long visit to Southern Africa during June 2004, James Morris, the UN special envoy for humanitarian needs in Southern Africa, made the following comment based on his observations: "The number of trained health practitioners, teachers, and other professionals that are succumbing to HIV/AIDS is causing a truly extraordinary human resources vacuum in societies across the region;" and: "It is impossible to counter the crisis if people aren't on the ground to implement effective programming, or to deal

with the sick and dying, or to care for the unprecedented number of orphans and other vulnerable groups." (IRINnews.org, 2004).

4.4.9.6 Information and documentation trade

4.4.9.6.1 Introduction

Another contributing factor to information poverty, and one that is closely related to brain draining and the knowledge economy, is the international trade in information and documentation. Information and documentation trade refer to the international flow of scientific and scholarly publications. It is a known fact that only a small proportion of the world's scholarly and scientific literature that is published in high-ranking journals and indexed in key research tools originate from the developing nations (Britz & Lor, 2003; Gibbs, 1995 and de Koker, 1995).

4.4.9.6.2 Trade barriers

What causes this trend? According to Gibbs (1995) scientists from developing countries face severe obstacles when they wish to contribute to the international body of scientific and scholarly knowledge which is predominantly published in Western scientific journals.

A series of these barriers can be identified. Based on research done by Britz and Lor (2003) I summarise the most important barriers:

- Research done in the developing countries is sometimes viewed as inferior or of lesser quality. Apart from plain prejudice, some of the research undertaken is indeed of poor quality. This is among others due to poor training and/or a lack of equipment and an inability to command English.
- Poor communication between scientists in the North and the South must also bear some of the blame. The inadequate flow of scientific literature from the North to the South makes it difficult for researchers in the developing countries to reach the cutting edge of research in their fields. Access to high-quality scientific journals is also very expensive and these journals are in many cases inaccessible to researchers in developing countries.
- Much of the research done in the developing countries does not get published in the well established international academic journals. This is mainly due to a lack of access to publication media. Britz and Lor (2003) point out that some of the research might end up being

published in the grey literature and can, due to poor bibliographic control, get lost to the scientific community and not form part of the world's body of knowledge.

- Rosenberg (2002:51, 54, 55) also points out that authors in the developing world, and more specifically Africa, run into considerable difficulties when they want to publish in local journals. There are a variety of reasons. Academic journals are declining, and libraries are reluctant to subscribe to these journals because of the fact that they are poorly managed.

- Scientists from developing countries who do publish in local academic journals find that their contributions are mostly ignored by the developed world (mostly the West). Most of these journals are also not indexed in the major indexing databases. This has led to the perception that these journals are not up to standard and that the content is of a lower quality.

4.4.9.6.3 South-to-South trade

One important aspect that is sometimes overlooked is the fact that these barriers also impede the flow of knowledge between the developing countries themselves – in other words the South-to-South information trade. This is mainly because of the fact that bibliographic control in most developing countries is poorly developed (Lor & Britz, 2005). Developing countries are therefore dependent on the international indexing and abstracting services – which are mostly situated in the rich North – to retrieve and access their own body of scholarly and scientific knowledge. In many cases these publications are not indexed and are therefore lost, not only to the countries of origin, but also to their neighbours in the South and the people in the North.

4.4.9.6.4 Death of local trade

The fact that local journals in developing countries are not always well managed and not indexed in the prestigious international indexing and abstracting databases led to an inclination and even active decision of many authors in developing countries not to publish in local journals (Britz & Lor, 2003:164). This trend poses a serious threat to the survival of journals in developing countries. Fernandez (1999:23), as well as Cao and Suttmeier (2001:968), points out that this is not a new phenomenon. Scientists from the developing world prefer to publish in high ranking international journals because it is more advantageous to their own careers. I would argue that the

use of the Internet could accelerate this trend and this can in turn contribute to the disappearance of scholarly and academic publications in developing countries.

4.4.9.6.5 South-North trade: the document drain

Another significant contribution to information poverty is the so-called document drain (Limb, 2002:52). Document draining refers in this context to the initiatives by well-resourced research and other libraries in the North to purchase books, government documents, journals and other materials published in the developing world.

Britz and Lor (2003) list a number of major research libraries involved in this practice, for example, the Library of Congress; the Melville J Herskovits Library of African Studies, Northwestern University, Evanston, Illinois; the Centre for African Studies Library at Leiden University, the Netherlands; and the School of Oriental and African Studies Library, University of London, England. Specific programmes include the Co-operative Acquisitions Program of the Library of Congress, the Co-operative Africana Microfilm Project (CAMP) in the United States, and the work of the Standing Committee on Library Materials on Africa (SCOLMA) in the United Kingdom.

The implication of this trend is clear: Scholars from developing countries will find more comprehensive, better organised and better preserved collections of their own body of knowledge in these libraries that in their own countries.

Another serious and relating issue is the looting, theft and illicit sales of the body of cultural knowledge of developing countries. I refer specifically to the looting of archaeological objects, illicit sales of the works of art and the illegal trade in rare books and unique manuscripts. Various international agreements have been reached to protect the cultural properties of indigenous people (Galla, 1997).

However, not much has been researched on the questionable trade in books and other forms of publications (Limb, 2002). One example of this "trade in books and documentation" is the apparent decision by the African National Congress (ANC), the leading political party in South Africa, to deposit thousand of boxes of its archives with the University of Connecticut in the

United States. Rumour had it that is due to the inability of the University of Fort Hare (a university in South Africa) to look after the material properly. According to the agreement the original material will reside in North America, and the University of Fort Hare will be provided with a set of microfilms (Britz & Lor, 2003; Carlisle, 2000; University of Connecticut, 1999).

4.5 Conclusion

In this chapter I argued that information poverty is not a new concept and the experience of being information-poor is as old as human history. The notion of information poverty was first coined in the 1950s and gained popularity in the information era, which was accompanied by the phenomenal growth of modern ICT.

Based on a thorough literature overview I came to the conclusion that, although the notion of information poverty is used widely, there is little agreement on what exactly it means. I identified three major interrelated approaches to information poverty in the literature. These are: an information connectivity approach focusing on the connectivity to ICT; the content approach where the focus is on the effect of the unavailability of essential information to people; the human approach which I defined as the knowledge or hermeneutical approach where the emphasis is on the ability of people to apply meaning to information and to benefit from it. A few related perspectives to information poverty were also discussed.

Following from the literature study I proposed my own approach to information poverty. I found the most suitable way was to start with the description of a hypothetical ideal information-rich society. I based this on the main characteristics of information which were described in Chapter 3. This approach offers many advantages – one can, for example, identify the main causes of information poverty, understand the different degrees of information poverty and use this ideal situation to develop strategies to address information poverty. Based on this ideal information-rich situation I then defined information poverty and highlighted the intellectual capital of an information poor society.

In my further deliberations on information poverty I illustrated that different degrees and levels of information poverty can be distinguished and that it is possible to measure them qualitatively as well as quantitatively. I discussed

the main causes of information poverty in more detail because I will use these arguments in Chapter 5 to show that information poverty is a serious moral issue.