PART III: PRACTICAL APPLICATION (Part 1)

CHAPTER 4

CRITICAL EVALUATION OF NORWAY AND THE USA AS INFORMATION AND KNOWLEDGE SOCIETIES

4.1 INTRODUCTION

As previously mentioned in chapter 1, this thesis consists of five parts. Part I, the introduction and framework; Part II, the theoretical foundation; Part III, practical application; Part IV, the recommendations and Part V, the conclusion. Part III, the practical application of the thesis, will consist of two chapters. This chapter will focus on globalisation in relation to developed communities and countries. The following chapter will concentrate on globalisation challenges for developing and the least developed communities and countries. Developed countries and communities are helped in their compliance with the various indicators of the criteria for the information and knowledge society, not only through globalization, but also through the constant interaction and exchange of data, information and knowledge between their local knowledge systems and the global knowledge system. The indicators of the criteria are based on the main criteria of the information and knowledge society that were identified and discussed in chapter 3, the theoretical foundation of this thesis, and are related to one another. By complying with these criteria, developed communities or countries can become information and knowledge societies. For the purpose of this thesis, Norway and the USA will be used as examples of developed communities or countries.

In this chapter, the author will firstly define the concept “developed.” Secondly, globalisation as a concept, as well as the process thereof, will be defined. Attention will be given to the various dimensions of globalisation, as well as the characteristics thereof. An important characteristic of globalisation

added by the author is that developed communities or countries can become information and knowledge societies, due to the constant interaction and exchange of data, information and knowledge between the developed communities' or countries' local knowledge systems and the global knowledge system. This chapter is concluded with a practical application where the author will investigate whether this interaction and exchange is prevalent in developed communities or countries, by discussing whether developed communities or countries are included within the information and knowledge society. The author will indicate how the interaction and exchange of data, information, and knowledge helps developed communities or countries comply with the specific stated indicators of the criteria of the information and knowledge society, and thus, helps developed communities and countries become information and knowledge societies.

4.2 SETTING THE SCENE

In Part I of this thesis, the author introduced the reader to the study by providing a brief reason for the study; namely to provide insight into and help solve some of the problems of the 21st century by helping to overcome the tension between global and local knowledge. The problems were aptly described by Nanzhao (2001): "The tension between global and local knowledge is one of several tensions to be overcome in solving the problems of the 21st century," Nanzhao (2001) in a report to the Sixth UNESCO-ACEID International Conference on Education, entitled "Information Technologies in Educational Innovation for Development: Interfacing Global and Indigenous Knowledge". The research will, thus, result in describing how developing communities or countries can overcome the tensions and problems of the 21st century and progress to become global information and knowledge societies through the interaction and exchange of information between their local knowledge systems and the global knowledge system.

To achieve this goal, the author will firstly show in this chapter, that developed countries are information and knowledge societies by indicating that they comply with the indicators of the criteria of the information and knowledge

society. These indicators of the criteria are based on the main criteria of the information and knowledge society that were identified and discussed in chapter 3.

In an attempt to define these indicators, the following definition of the information and knowledge society, which the author addressed in chapter 3, should also be borne in mind (see 3.3): “A society that is reliant upon a sophisticated physical and ICT infrastructure for the improvement of everyday living and working conditions. A society that values the importance of information as a key to economic wealth and prosperity and where there is an increase in information related activities, as well as an increase in human intellectual capability. The information and knowledge society ensures the freedom of information through the use of information and communication technologies. In such a society, modern information and communication technologies are utilised to achieve the interaction and exchange of information between their local knowledge system (tacit knowledge & explicit knowledge) and the global knowledge system (explicit knowledge) to create usable, relevant contextualised content and knowledge. This interaction and exchange of data, information, and knowledge will, in turn, ensure the respect of other people’s belief’s, norms, and religions due to the increase in and availability of information regarding these aspects.”

From this definition and supporting literature, the author discussed the following criteria that supply valuable information on what is needed by countries and communities to become information and knowledge societies (see 4.5):

- economic criterion;
- spatial and technological criteria;
- political criterion;
- social criterion;
- cultural criterion;
- physical infrastructure criterion;
- knowledge criterion.

As previously mentioned, in Part III of this thesis, the practical application, these criteria will further be elaborated and indicators identified that make up the specific criteria. In chapters 4 and 5 respectively, these indicators will be applied to communities and countries. If most of the indicators of the criteria of the information and knowledge society are met (as is the case with most developed communities/countries), then it can be deduced that the specific community or country is an information and knowledge society. If most or all of the indicators of the criteria are not met by a specific community or country, as is the case with most developing countries, then it can be concluded that the specific community or country is not an information and knowledge society and, accordingly, cannot benefit from the advantages of being an information and knowledge society.

In the following section, the author will discuss the concept of a "developed community or country."

4.3 CONCEPTS DEFINED: DEVELOPED COUNTRIES OR COMMUNITIES

Many synonyms for the concept "developed country" can be found in literature. Such synonyms include: 'industrialized countries'; 'more developed countries' (MDC); 'more economically developed countries' (MEDC); 'high economies'; as well as, 'high income countries.' Synonyms found in older literature include, 'first world,' and, 'North,' and the term, 'Western countries' also has a very similar meaning (Sachs, 2005). For the purpose of this thesis, the author prefers to use the term 'developed' as many of the above synonyms only have an economic focus, whereas this thesis will encompass more than just the economic sphere.

According to Sachs (2005), the term, developed country, is used to classify countries with developed economies in which the tertiary and quaternary sectors dominate. Different organisations use different criteria to determine the level of 'development' of a country. In the UN and World Bank system, there is no official definition for the concept 'developed', and the development of a country is determined by one of two ways. Firstly, by the *per capita*

income of the country (economies are divided according to 2005 GNI *per capita*) and, secondly, the country's ability to convert income into education and health opportunities, referred to as the HDI or Human Development Index.

According to the *per capita* income criterion, 'developed countries' are more commonly referred to as 'high income countries' or 'high income economies.' These 'high income' countries have a Gross National Income (GNI) *per capita* of $9,206 or more. However, this *per capita* income criterion does not work well in all cases. There are, for example, a group of 8 countries (including Israel, Kuwait and the United Arab Emirates) that are high-income countries but are classified as being 'developing' countries because of their economic structure or because of the official opinion of their governments (World Bank, 2006c). On the World Bank list of economies (World Bank, 2006c), there are 208 listed countries, of which only 56 are classified as being high-income countries. These include the USA, UK, Hong Kong, Australia, Canada, France, Germany, Italy, and Japan.

Referring to the Human Development Index (HDI) method, developed countries are the countries that have a HDI of 0.8 or more. As stated by the UN, on part of their website, this measurement is a statistical measure that gauges a country's level of human development and achievement in the following 3 basic areas of human development:

- Life expectancy at birth;
- Adult literacy and school enrolment;
- Standard of living as measured by the Gross National Product *per capita*.

According to the 2006 HDI Rankings, Norway is ranked first out of 177 countries with an HDI of 0.965. Ranked second is Iceland, with an HDI of 0.960, and third Australia with 0.957. The USA is only listed in eighth place, with a HDI of 0.948.

For the purpose of this thesis, the author will define 'developed countries or communities' as follows:
Developed countries are countries with developed economies where there is a constant interaction and exchange of information and knowledge between their local knowledge systems and the global knowledge system. Countries in which there is high life expectancy at birth, high adult literacy and school enrolment and whose standard of living is more than $9,206 *per capita*.

In the following section, the author will discuss the concept 'globalisation' by firstly defining the concept, and then discussing the process thereof. The dimensions, as well as the characteristics, of globalisation will also be addressed.

4.4 GLOBALISATION

4.4.1 Globalisation defined

Globalisation as a topic encompasses an extremely large study area, seeing that the concept deals with a great variety of social, economic and political change. For this reason the author will only briefly define the term, look at the process of globalisation, discuss possible dimensions, perspectives and characteristics of globalisation, before briefly discussing the advantages and disadvantages thereof. From the perspective of this thesis, globalisation is a very important concept, bearing in mind that it is the process that allows the possible interaction and exchange of information and knowledge, due to the benefits and advantages, for example, improved and shared ICT that it can make happen in developed communities.

Defining globalisation is no easy matter. Jones (1995:219) is of the opinion that, "…the definitional nature, empirical character and ultimate significance of interdependence and globalisation are all matters of considerable controversy and confusion." Although various disciplines have formulated definitions and contexts for the term globalisation, they all tend to focus on the type of change

relevant to their specific study field and the definitions are, thus, very varied in nature.

To a layperson, globalisation is the integration of the world's economies, including the financial flows, world trade across borders, the exchange and sharing of information and technology, as well as the movement of people. However, this is not an inclusive definition; a number of important aspects are excluded. As a result, it will not suffice for this thesis.

In 2004, Labonte *et al* described globalisation more inclusively as follows: "A process by which nations, businesses and people are becoming more connected and interdependent across the globe through increased economic integration and communication exchange, cultural diffusion (especially of Western culture) and travel," (Labonte *et al*, 2004). It is interesting to note, that this description ties in very closely to what an information and knowledge society is understood to be, as already discussed in chapter 3.

Koorevaar's (2002) definition of globalisation is similar to that of Labonte's, and defines globalisation as a process in which geographic spaces becomes less of a barrier in the establishment and provision of border crossing, long distance political, economic and socio-cultural relations. People become more and more aware of this fact. Networks of relations and dependencies therefore become potentially border crossing and international. This potential internationalization of relations and dependencies causes resistance, fear, actions and reactions.

Globalisation today is, however, viewed as far more than a world economy. According to Imade (2003), globalisation is a process consisting of technological, economic, political, and cultural dimensions that interconnect individuals, firms, and governments across national borders. According to Najjar (2003), globalisation can be viewed from an economic, social, legal, and political perspective. From an economic perspective, globalisation represents the spread of free-market capitalism; from a social perspective, globalisation represents the sharing and exchange of ideas, knowledge,

values, and believes. From a legal perspective, it represents rules and regulations such as the World Trade Organization (WTO), International Monetary Fund (IMF), and the World Bank and, from a political perspective, globalisation represents international relations and multilateral agreements and trade barriers (Najjar, 2003). This includes the development of the European Union (EU) and the African Union (AU). The sharing and exchange of ideas, knowledge, values, and beliefs is the driving force behind the interaction and exchange of data, information, and knowledge between developed communities local knowledge systems and the global knowledge system.

It is the author's opinion that although all the above-mentioned perspectives are equally important, the social perspective on globalisation is of the utmost importance seen from the perspective of this thesis. The sharing and exchange of ideas, knowledge, values, and beliefs is the driving force and the enabler of the interaction and exchange of data, information, and knowledge between developed communities' local knowledge systems and the global knowledge system. During this exchange of data, information and knowledge, citizens become empowered due to the potential augmentation of their existing frame of reference. Considering that data has no added meaning (as explained and defined in chapter 2) it is usually discarded, unless meaning can be added to, in which case data becomes information and it is added to their local knowledge system. In the course of this exchange, developed communities also interact and share their local knowledge with the global knowledge system, due to their existing and adequate ICT infrastructure. The author is thus of opinion that globalisation is a process of change that is enabled through the sharing and exchange of ideas, knowledge, values and beliefs. The process of globalisation will be discussed in more detail in the following paragraph.

4.4.2 The process of Globalisation

As can be seen from the above definitions, globalisation is viewed to be a process: a process that would initiate change in a variety of sectors in society,

e.g. economy, political and social sectors. Little *et al* (2001), describes this process as one that is eroding the differences, and that will produce a seamless global system of cultural and economic values. Thus, through the interaction and exchange of data, information and knowledge from a countries local knowledge system and the global knowledge system, local information can be distributed via for example ICT platforms and be assimilated within the global knowledge system. This information can help to erode the existing differences between nations and help to produce a seamless global system of cultural and economic values. Zekos (2003:142) is of the opinion that the process of globalisation, "…has led to the reduction of geographical, spatial and temporal factors as constraints to the development of society. It has resulted in an increased perception of the world as a whole, and a readjustment of societal thought and action away from national, and towards international and global spheres." Thus, this process can be viewed as a process from the industrial age towards the information age (Toffler, 1980): a process that can lead to the information and knowledge society.

However, what is driving this process? Buiter (2000) states that globalisation is, undeniably, driven by the removal of government-created barriers to the international movement of goods, services, people, financial capital, enterprises, and ideas, and that this has transformed the international and domestic competitive environment. The author is of the opinion that this is a very bold statement. The driving force of globalisation will differ depending from which perspective you view the process. According to Masahiko (2005), economic globalisation's driving force was the tendency to recover, shown by profit rates in advanced capitalist countries. Sundquist (2006) is of the opinion that from a political perspective, politically powerful groups within "beneficiary" nations that stood to benefit significantly, based on the unique situation in which they found themselves, drove the globalisation process. Further driving forces for globalisation include an increase in foreign direct investment (FDI), and the rapid progress in ICT technologies (Hayami, 2000).

However, prominent authors such as Cohen & Kennedy (2000), Hayami (2000), and Buiter (2000) concentrate on the growth and advance on ICT as

the central driver for globalisation. This allows information to flow cross-borders, freely and rapidly, which enables a truly global perspective. The author is, however, of the opinion that although ICT can be seen as one of the drivers of globalisation, the free flow of information across borders, which would be the result of globalisation, would not lead to an international and domestic competitive environment if the global information is not, firstly, contextualised into the community's own local knowledge system. For this reason, it is important that a process of exchanging data, information, and knowledge between the community's local knowledge system and the global knowledge system takes place.

In the following section, the author will look at some of the general characteristics of globalisation as stated in literature that are applicable to developed communities. Again, as the topic of globalisation is so broad, attention will only be given to the characteristics of globalisation that can enhance or impede the interaction and exchange of data, information, and knowledge between the community's local knowledge system and the global knowledge system.

4.4.3 The dimensions and characteristics of globalisation

The characteristics of globalisation are closely tied to the various dimensions of globalisation. As already discussed in defining the concept, globalisation has various dimensions or perspectives. According to Imade (2003), globalisation is a process consisting of technological, economic, political, and cultural dimensions, whilst Najjar (2003) is of the opinion that globalisation can be viewed from an economic, social, legal, and political perspective. When differentiating between dimensions/perspectives of globalisation, it is important to note that these are very difficult to isolate clearly. Visually, these dimensions can be portrayed as follows:

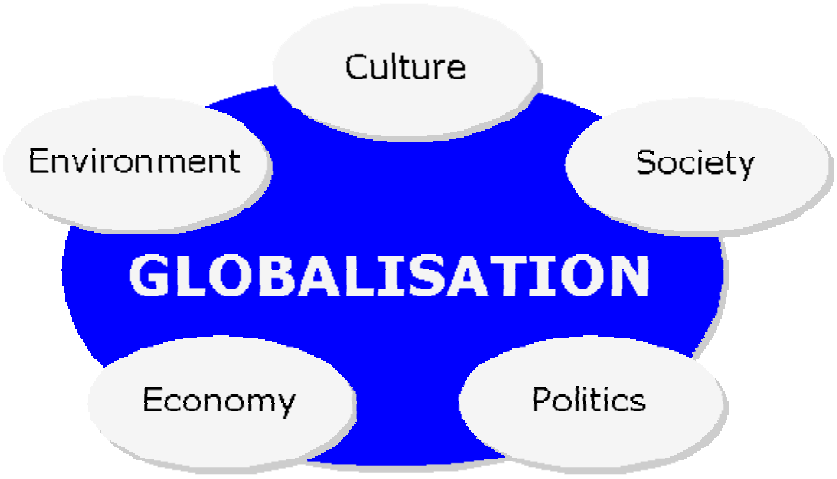


Figure 4.1: Müller dimensions of globalisation (Müller, 2007).

Müller (2007) does however not make provision for Imade's (2003) technological dimension/perspective or Najjar's (2003) legal dimension/perspective, which Najjar groups together with the political dimension. The author is of the opinion that these dimensions should be included within the figure and, that the figure should clearly show that the technological dimension underlies all the other dimensions. Visually these dimensions would thus look as follows:

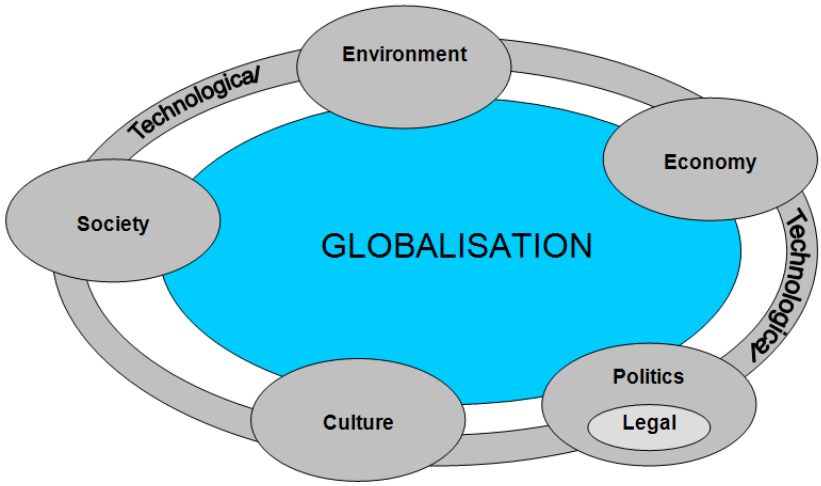


Figure 4.2: Integrated dimensions of globalisation

Desai (2001) is of the opinion that globalisation can be characterised by the following:

a) deregulated capital markets with the possibility of speedy transfer of capital;
b) ICT which allow possible action at a distance in real time (which can be very short);
c) active forex markets with supporting financial markets with new products [e.g. derivatives, options] which allow speculators to take positions in any currency around the world where there are opportunities for potential profit;
d) greater geographical spread and increased mobility of fixed, i.e. direct, investment;
e) rapid and linked reactions, for example; between different financial markets which work round the world round the clock, as well as between financial markets and forex markets;
f) the emergence of a global media network linked with a global communications network;
g) the fashioning a of a global consumer culture and a global music/film/TV culture benefiting from all the above, especially [b] and [f];
h) increased but as yet imperfect and legally impeded mobility of labour;
i) greater awareness, though, as yet, not very effective redress of human rights violations, ecological disasters, famines and refugee problems, benefiting from [b] and [f];
j) speeding up of technological change leading to increased concentration of capital via mergers and takeovers but at the same time increased competition between the surviving large companies.

These general characteristics of globalisation correlate with the dimensions of globalisation given by Müller (2007), Imade (2003) and Najjar's (2003). From an economic perspective/dimension, characteristic (a), (c), (g), and (h) focus mainly on the economic factors of globalisation. From a technological dimension, characteristics (b), (d), (e), (f) and (j) have a distinct technological and ICT connection. It is very interesting to note that very little attention is given to the political, social, or legal perspectives of globalisation. In fact, only characteristic (i) focus on political issues of globalisation such as human

rights, and refugee problems. It is clear that ICT are the prevalent driving force behind most of these general characteristics.

From the perspective of this thesis, the author would like to add another general characteristic of globalisation, from the social dimension/perspective. Globalisation can be characterized by the developed community or country becoming information and knowledge societies through the sharing of data, information, and knowledge. This is enabled by the interaction and exchange of data, information, and knowledge between the communities' local knowledge system and the global knowledge system. This characteristic will also be dependent and reliant upon ICT and the ICT infrastructure of the community or country in question. In the following section, the author will investigate whether this interaction and exchange is prevalent in developed communities and countries, by discussing whether those communities and countries comply with the identified indicators of the criteria of the information and knowledge society.

4.5 DEVELOPED COMMUNITIES OR COUNTRIES INCLUSION IN THE INFORMATION AND KNOWLEDGE SOCIETY

One of the most important characteristics of globalisation is the inclusion of the developed communities and countries within the global information and knowledge society, through the sharing of knowledge and ideas. This sharing of knowledge and ideas is enabled by the interaction and exchange of data, information, and knowledge between the developed local knowledge system of the communities and countries and the global knowledge system. These communities and countries can then take advantage of all the advantages and benefits that arise from this inclusion, as discussed in 3.6.2. To investigate whether developed communities and countries have become information and knowledge societies, the criteria for such a society, as described in chapter 3, will be applied to a developed community or country. Furthermore indicators for each of the criteria will be identified and the author will discuss whether the specific country complies with these indicators or not.

As already discussed in chapter 3, there are certain criteria that have to be in place for a community or country to become an information and knowledge society (see Section 3.5). These criteria are only intended to act as guidelines for the reader to asses the countries for information and knowledge society status. In the following section, the author will identify various indicators of which the specific criteria are comprised. The author will apply these indicators of the criteria to two developed countries, to assess whether they comply with these indicators and, thus, can be viewed as an information and knowledge society. The following scale will be used by the author to indicate whether these countries comply with the indicators or not. If the country does not comply with any of the indicators, then the country does not comply with the stated criteria of the information and knowledge society. If the country complies with at least one of the indicators of the stated criteria but less than half of the indicators, then the country only slightly complies with the criteria. In the case of the country complying with more than half of the indicators but not to all the indicators, the country partially complies with the criteria, and if all the indicators are complied with, then the country fully complies with the stated criteria. The author will also illustrate how the ability of these countries to combine their locally generated knowledge with the global knowledge system fosters their economic development and economic growth within the paradigm of globalization. This local / global knowledge sharing ability will be used to illustrate how developed countries have emerged to become information and knowledge societies.

For the purpose of this thesis, the author will refer to Norway (ranked number 1 according to the Human Development Index of 2006) and the USA, which, though regarded by the developing world as the epitome of development, was ranked eighth on the Human Development Index in 2006 (UNDP, 2006).

4.5.1 Economic criterion

As discussed in chapter 3 (see 3.5.1), the economic facet of an information and knowledge society is of the utmost importance. In such a society, information is seen as a key economic factor: as a resource, service,

commodity, a source of added value and employment (Martin, 1995). This economic aspect of the information and knowledge society is supported by authors such as Britz, *et al* (2006) and the economist Fritz Machlup (1962). In the information and knowledge society, people realize the importance of information and the value information and communication technologies hold. For the above to come to fruition, a very strong economy is needed. According to Calanag (2003), there is a close correlation between the economic development of a community or country and the development of information and knowledge societies. Through the development of a strong economy, people are provided with the opportunity for more and better employment opportunities. According to their website, the Canadian Department of Finance are of the opinion that these better employment opportunities would generate the revenues needed to maintain and enhance important programs that contribute to a strong information and knowledge society. Thus, the first indicator of the economic criterion is work opportunities leading to better income/wage opportunities. This can be measured through the unemployment rate of a community or country.

It is the opinion of the author that the unemployment rate of a developed community or country can be improved through the interaction and exchange of data, information, and knowledge from the local knowledge system of the community or countries and the global knowledge system. This can be achieved through information communication technologies, for example, the internet. Within developed communities and countries this would be possible seeing that they already posses the needed technological criterion. This criterion was already discussed in chapter 3 (see 3.5.2) and will be discussed in greater detail later in this section. Through the internet, local job opportunities can be made available, where people of other communities or countries can see and access the opportunities. If this exchange of data, information, and knowledge does not take place, people in the community and in neighbouring communities will not be aware of these opportunities and, thus, not benefit from them. In a similar fashion, members of a local community can access job opportunities offered in the rest of the world, thus improving work opportunities and improving the overall employment rate of

the specific community or country. Work opportunities can be stimulated further through the creation of new jobs that might not have been offered by a particular community or country because its members or citizens did not know such an opportunity existed. By making use of information communication technologies, members of a community or country can obtain information concerning jobs in other places that never existed within their own community or country and, thus, create more jobs and improve the overall unemployment rate.

The second indicator of the economic criterion is the standard of living of the specific country. According to the Wikipedia (Wikipedia, 2007d), the standard of living of a country, generally, is measured by standards such as income inequality, poverty rate, and the real income per person (that is, where the calculations have been inflation adjusted). This argument is supported by Spangenberg (2005) who is of the opinion that income inequality and distribution is one of the most important indicators of a sustainable information and knowledge society, which combines both the economic and social criteria of such a society. Income inequality metrics or income distribution metrics are methods used by economists to measure the distribution of income among the participants in a particular economy, such as that of a specific country or of the world in general. In 1997, a dataset on income inequality for 138 countries, over the period 1890-1996, was put together for the World Bank, by Klaus Deininger and Lyn Squire. This dataset comprises statistics relating to the poverty rate of the specific countries as well as the estimated income per person. The statistics for Norway and the USA will be discussed respectively later in this section.

It is the author's opinion that the standard of living in a developed community or country can be improved through the interaction and exchange of data, information, and knowledge from the local knowledge system of the communities or countries and the global knowledge system. As discussed above, local and global job opportunities can be made available through the use of information and communication technologies, providing the people with a greater selection of job opportunities than before. This can improve the

income inequality by providing members of the community or country with the necessary data, information, and knowledge to realise what income inequality entails. This realisation can then lead to rectification of the situation by providing the community or country with more and better job opportunities. These, in turn, lead to better wages or income and, thus, reduce the unemployment rate (as discussed above) as well as decrease the income inequality and poverty rate.

Spangenberg (2005) is of the opinion that growth in the Gross Domestic Product (GDP) of a country and low inflation rates are further indicators of the economic criteria seen from an economic perspective. In laymen's terms, the GDP of a country is the total market value of all the goods and services produced within the borders of that country during a specified period and, according to Lehohla (2006), the GDP of a country is a key indicator of the economic growth and health of the country. GDP also has a direct impact on the other indicators of the economic criterion.

The first of these is the unemployment rate of the country. When there is growth in the size and quality of the labour force and the unemployment is, thus, low, then the GDP of the country also grows favourably and, generally, is regarded to be in good health. A negative rate of change in GDP also negatively affects the other indicators of the economic criterion. If there is a negative growth or decline in GDP this indicates that the specific economy produced less than it did in the previous year, resulting in higher unemployment (the first indicator of the economic criterion) and a lower standard of living for the population (the second indicator of the economic criterion). The GDP of a country, thus, can be improved by the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. As discussed above, by exchanging data, information, and knowledge, information regarding better job opportunities can be made available through the use of information and communication technologies, thus, improving the unemployment rate. This, in turn, results in higher productivity and, so, a higher GDP.

A further indication of a growing and healthy economy is the Inflation rate of the specific country. Inflation is the result of the increasing prices for the goods and services that are consumed by the community or country. Generally, it is accepted, by authors such as Barro (1991), Bruno & Easterly (1998), and Sbordone & Kuttner (1994), that high inflation has a negative effect on medium and long-term growth of a country or community. In particular, high inflation has a direct and negative impact on the first indicator of the economic criterion, namely the income or wage opportunity. Empirical data shows that real wages fall sharply during periods of high inflation (Braumann, 2004). The South African Reserve Bank (2007) supports this argument by stating that high inflation is bad for people with fixed incomes. This is because people with fixed incomes see that in periods of high inflation, the purchasing power of their income diminishes over time. Other negative effects that high inflation has on the potential growth of a community or country are losses to savers and losses to taxpayers. For the savers, high inflation erodes the purchasing power of the amount saved and taxpayers face losses if their salaries are adjusted according to inflation but no adjustments are made to the specific income tax.

Thus, the following identified indicators of the economic criterion will be applied to Norway and the USA:

a. Unemployment rate.
b. Standard of living:
    i. Income inequality;
    ii. Poverty rate;
    iii. Real income per person.
c. GDP and inflation rates.

In the following section, the author will apply the above-mentioned indicators of the economic criterion to Norway and the USA respectively.

Norway

As previously stated, Norway is currently ranked Number 1 on the Human Development Index of 2006 (UNDP, 2006). The Norwegian economy is very prosperous and is very richly endowed with natural resources such as petroleum, hydropower, fish, forests, and minerals (NationMaster, 2007j). In the following section, the author will investigate Norway's position in terms of adhering to the three indicators of the economic criterion; unemployment rate; standard of living and GDP, and inflation rates.

a) Unemployment rate

In terms of the labour force, the proportion of employed males engaged in Norway's service sector is 61% and they work more than 40 hours per week. Norway has an unemployment rate of only 4.6% (2007) and, for a five year average (per 1000 employees), has only missed 135 days not worked due to strikes (www.nationmaster.com). Compared to other developed countries such as France, New Zealand and the United Kingdom, the Norwegian example is a very low unemployment rate, as can be seen in the following table:

Table 4.1: Unemployment rate as a percentage of the total labour force[1]

	Unemployment rate			
	2000	**2001**	**2002**	**2003**
France	10.0	8.8	8.9	9.7
New Zealand	6.0	5.3	5.2	4.7
United Kingdom	5.5	4.8	5.1	4.8
Norway	3.4	3.4	3.9	4.4

[1] Information extrapolated from OECD source data (OECD, 2005b).

From these statistics it can be deduced that Norway complies with this indicator of the economic criterion for the information and knowledge society, namely low unemployment rates.

b) Standard of living

As already mentioned, the standard of living indicator refers to three interrelated sub-indicators: income inequality, poverty rate, and real income per person. The author will firstly look at the income inequality in Norway.

According to the Norwegian Minister of Health and Care services, evidence suggests that the income gap is widening in Norway. The Gini coefficient, which is a measure of income inequality in a population, has risen steadily in Norway over the last decade. The Gini coefficient is a common measure of equality and ranges from 0, in the case of "perfect equality" (each share of the population gets the same share of income), to 100 in the case of "perfect inequality" (all income goes to the share of the population with the highest income). According to the Organisation for Economic Co-Operation and Development (OECD) Factbook (Förster & d'Ercole, 2005) the Gini coefficient in Norway increased by 10 – 20% in the years ranging from the mid 1980s to the mid 2000s. In the mid 1980's the Gini coefficient in Norway was 23.4, in the mid 1990's 25.6 and in the mid 2000's 26.1 (OECD, 2005b).

Secondly, the author will discuss the poverty rate in Norway. According to the International Comparisons chapter of The State of Working America (2004/2005) Norway has a very low poverty rate, estimated in 2000 to be 6.3%, rising to 6.4% for the 2004 estimate. In 2000, only 3.4% of children living in Norway were living in relative poverty. Norway is the only OECD country where child poverty rates are extremely low, and still continue to fall. Over the most recent decade for which comparable data is available, the proportion of children living in relative poverty has decreased in Norway by 1.8% (UNICEF, 2005).

The third sub-indicator of the economic criterion the author will discuss is the real income per person within Norway. Wages for services rendered is the most important source of real income for most of the population in Norway. According to the International Average Employment Income Comparison of the World Salaries Group (2007), the average annual wage for all salaried employees was 25,337 international dollars using the IMF PPP exchange rates and adjusted with the U.S. inflation rate. According to Statistic Norway (2006), 2, 703, 000 people received wages and remuneration in 2006, which is 63, 000 more than in 2005. From this statistic the author can deduce that the increase in wages had a direct impact on the first indicator of the economic criteria discussed by the author, namely unemployment, and that the unemployment in 2006 was less than in 2005. For all those that received paid wages and remuneration, the average (in Norwegian Krone, NOK) was NOK 262, 700 in the 2006 financial year ($42, 943), an increase of 5.7 per cent from 2005.

From the above discussion, the author can deduce that Norway has a very high standard of living when looking at the three sub indicators. Firstly, although evidence suggests that the income gap is widening in Norway, Norway still has a very low income inequality compared to other OECD member countries such as France, New Zealand and the United Kingdom the Gini coefficients of which are, respectively, more than that of Norway in each case. This is indicated in the following table:

Table 4.2: Income inequality according to the Gini coefficient in selected OECE member countries[2]

	Mid 1980's	**Mid 1990's**	**Mid 2000**
France	27.6	27.8	27.3
New Zealand	27.0	33.1	33.7

[2] Information extrapolated from OECD source data (OECD, 2005b)

United Kingdom	28.6	31.2	32.6
Norway	23.4	25.6	26.1

In terms of the second sub indicator, the poverty rate, Norway has the lowest child poverty rate of all the OECD member countries and one of the lowest poverty rates overall when compared to other member states such as the United Kingdom, New Zealand and the France, as can be seen in the following table:

Table 4.3: Income inequality according to the Gini coefficient in selected OECE member countries[3]

	Mid 1980's	**Mid 1990's**	**Mid 2000**
France	8.0	7.5	7.0
New Zealand	5.8	7.8	10.4
United Kingdom	6.9	10.9	11.4
Norway	6.9	8.0	6.3

With reference to the third sub indicator, the real income/wages of people, the average salary of working people in Norway is one of the highest when compared to other developed OECD member countries. This can be seen in the following table:

Table 4.4: International Average Employment Income Comparison[4]

	Annual Employment Income per Worker in Constant 2005 International Dollars
France	24,569
New Zealand	18,869
United Kingdom	24,612
Norway	25,337

[3] Information extrapolated from OECD source data (OECD, 2005b)
[4] Information extrapolated from the World Salaries Group (2007)

From all of the above statistics the author can, thus, deduce that Norway has a very high standard of living when looking at the three sub indicators: income equality, poverty rate, and real wages/income per worker. In the following section, the author will investigate Norway's position in terms of GDP and inflation rates.

c) GDP and inflation rates

According to the OECD, Norway is a chief beneficiary of globalisation and is enjoying one of its longest periods of above potential growth. The pace of real GDP growth reached 4.5% in 2006, and was the second highest GDP in the world (CIA World Factbook, 2007b). This GDP is based on Purchasing Power Parity (PPP) *per capita* GDP, and the 2006 estimate for Norway was $47,800 *per capita*. The GDP is projected to slow to, a still robust, 4% in 2007 and then to 2.5% in 2008 (CIA World Factbook, 2007g).

According to the Economic survey of Norway (2007), Norway is currently experiencing very low inflation. At the end of March 2007, inflation stood at 1.5% (Rasmussen, 2007). Since 2003, underlying inflation has remained well below the target set by Norges Bank at 2.5%. Further to this, the low inflation rate has had a direct impact on the first indicator of the economic criterion, namely the unemployment rate. According to the latest Norges Bank Watch report (Dørum & Holden, 2006), this low inflation should be seen as a chance to lower unemployment in Norway even more, which will affect the low employment sub indicator and improve the standard of living indicator of the economic criterion.

It is the author's opinion that the interaction and exchange of data, information, and knowledge between Norway's local knowledge system and the global knowledge system through the use of information communication technologies, plays a crucial role in the advancement of their economy. In terms of the first indicator, a low employment rate is achieved in Norway through the establishment of more job opportunities, employing people in the ICT sector and by increasing labour growth and productivity through the use

of information and communication technologies. As discussed above, local and global job opportunities can be made available through the exchange of data, information, and knowledge that is stimulated through the use of information and communication technologies. This provides the citizens of Norway with a greater selection of job opportunities than before. Further, this improves the income inequality in Norway by providing citizens with the necessary data, information, and knowledge. With this knowledge, the citizens can, firstly, realise what income inequality entails and then rectify the situation since they have been provided with more, and better, job opportunities, leading to better wages or income and, thus, reducing the unemployment rate as well as decreasing the income inequality and poverty rate. Thus, through the exchange of data, information and knowledge that is stimulated by information and communication technologies, (for instance, the internet), new job opportunities can be created, and labour growth productivity can be increased, by and through the use, and expansion, of e-commerce. According to the Norwegian ministry of Government Administration and Reform, in a publication entitled “E-Norway 2009,” the goal of the Norwegian Government is to make daily life easier for the population as a whole, thus improving the general standard of living, and ensuring security for future prosperity and welfare. Applied correctly, information and ICTs make an important contribution to the achievement of these goals. According to the OECD, ICT database and Eurostat Community Survey on ICT usage in enterprises 2002, more than 80% of Norweigan businesses use the internet for purchasing and selling, enabling greater job opportunities. This can be seen in the following figure:

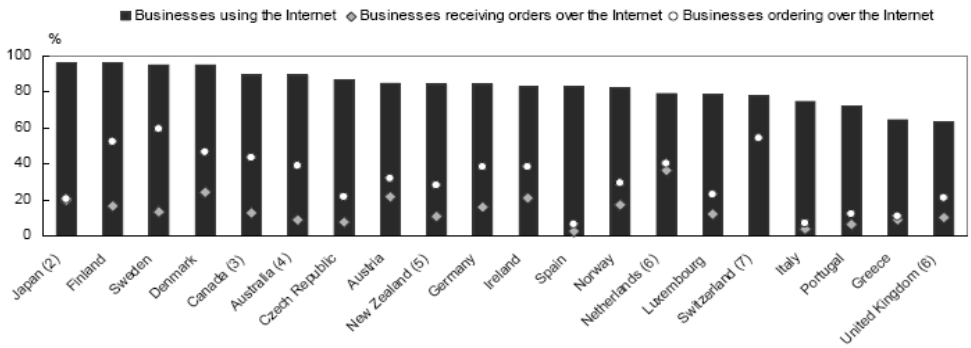


Figure 4.3: Businesses using the internet for purchasing and selling, 2001

Furthermore, there is an increase in labour growth and productivity through the use of information and communication technologies. In Norway, the labour productivity growth increased by 1.71% in the period, 1996 – 2002. The ICT contribution to this increase was 0.68%, suggesting that the use of ICT resulted in more job opportunities and less unemployment. This leads to the second indicator, the standard of living in Norway. When there are more job opportunities (created for example via the growth in e-commerce), then the standard of living of people in Norway will also be improved, as the people will have more money to improve their current living conditions, education and health. This improvement in the standard of living of the Norwegian population has a ripple effect downwards, onto the third indicator, namely, the GDP of the country. In essence, the higher the standard of living in a country, the higher the productivity of the country will be and thus the higher the GDP. It can thus be seen that the overall economy of Norway can be improved through the interaction and exchange of data, information, and knowledge between Norway's local knowledge system and the global knowledge system.

From all of the above statistics the author can infer that Norway has a very healthy economy when looking at the two sub indicators, namely high GDP and low inflation rate. It can thus be deduced that Norway completely complies with the economic criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Norway's economic situation and can be summarised as follows:

- Low unemployment rate;
- High standard of living expressed in a low poverty rate and high real income per person;
- High GDP and low inflation rates.

In the section to follow, the author will apply the three indicators of the economic criterion to the USA.

USA

Currently, the USA is ranked eighth on the Human Development Index (UNDP, 2006). Although not ranked 'Number One,' the USA is still the epitome of development to the rest of the world. As the largest shareholder in the World Bank, the USA is held to be one of the main fighters against poverty in the world (World Bank, 2007a). In the following paragraphs, the author will discuss America's position in terms of the unemployment rate, the standard of living, and the GDP and inflation rates.

a) Unemployment rate

According to the Bureau of Labor Statistics of the U.S (2007), the current unemployment rate has been reduced to 4.5%, which is the second lowest unemployment rate since 2000 (see Table 4.5 below).

The USA's unemployment rate is approximately 1.2% higher, when compared to other developed countries, with the exception of France. When compared to Norway's unemployment statistics of 2003, the USA's unemployment rate is 1.6% higher. This is mainly due to the last recession, which ended in November 2001, although companies kept laying off employees until the summer of 2003 (USA Today, 2005). It is, however, very pleasing to see that this situation has improved, and when measured in 2007 was down to 0.1%, less than that of Norway, at 4.6%. This improvement is mainly due to the increase, of 2.2 million, in 2004's payroll jobs and the American Department of Labor's efforts in moving toward a demand-driven workforce system. The Department of Labor has, over the last few years, emphasised tailoring the job-training programs it supports to skills in demand, leading to good jobs at high wages. To help achieve this, the Department invests $12 billion a year on a publicly funded workforce investment system (OECD, 2005b).

Table 4.5: Unemployment rate as a percentage of the total labour force[5]

	Unemployment rate			
	2000	**2001**	**2002**	**2003**
France	10.0	8.8	8.9	9.7
New Zealand	6.0	5.3	5.2	4.7
United Kingdom	5.5	4.8	5.1	4.8
Norway	3.4	3.4	3.9	4.4
USA	4.0	4.7	5.8	6.0

From these statistics, it can thus be deduced that the USA complies with this indicator of the economic criterion of the information and knowledge society, namely low unemployment rates. In the following section, the author will discuss the USA's position in terms of the standard of living.

b) Standard of living

The standard of living in the United States is one of the top 15 in the world, by the standard economic measure of standard of living (DeNavas-Walt *et al*, 2007). Given this statistic, it may be surprising to most people to realise that the USA, one of the wealthiest nations on Earth, has the widest gap between rich and poor of any industrialized nation, and disparities continue to grow (Kirkhorn, 2000). As already mentioned, the standard of living indicator refers to three interrelated sub-indicators: income inequality, poverty rate, and real income per person (see 4.5.1).

Firstly, the author will discuss income inequality in the USA. Over the course of the last two decades, the gap between the highest and the lowest income families in the USA has grown from a position where the richest income was eleven times the poorest to 19 times (Bernstein, 2003). In the United States, the richest 1% of households owns 38% of all wealth (Wolff, 2003). This was not the case with other OECD countries. Household income distribution

[5] Information extrapolated from OECD source data (OECD, 2005b)

became markedly more equal in Spain and Ireland, and there were smaller reductions in inequality in Australia, Denmark and France (Förster & d'Ercole, 2005). This can be seen in Table 4.6, following, reflecting the income inequality according to the Gini coefficient:

Table 4.6: Income inequality according to the Gini coefficient in selected OECE member countries [6]

	Mid 1980's	**Mid 1990's**	**Mid 2000**
Australia	31.2	30.5	30.5
Demark	22.8	21.3	22.5
France	27.6	27.8	27.3
Norway	23.4	25.6	26.1
USA	33.8	36.1	35.7

From this data, it can be seen that the USA has the highest Gini coefficient, compared to other developed countries like Australia, Denmark, France and Norway. However, it is important to note, that when compared to other countries of the world, the USA's Gini coefficient is still very good. The highest Gini coefficient calculated by the CIA is that of Namibia, in 2003, at 70.7. During this period the lowest Gini coefficient calculated, in 2002, by the CIA was that of Demark, standing at 23.2 (CIA, 2006). As mentioned previously, the interaction and exchange of data, information and knowledge from the USA's local knowledge system and the global knowledge system, can contribute to a lower unemployment rate and lower Gini coefficient. Local and global job opportunities can be made available through the use of information and communication technologies, by for example utilising the internet as information exchange platform. Through this information interaction and exchange process, the citizens of the USA can be provided with more job opportunities, which would address the first indicator, namely a low unemployment rate. Furthermore, this information would enable the citizens of the USA to improve the existing income inequality. With the information and knowledge the USA citizens can realise what income inequality entails and

[6] Information extrapolated from OECD source data (OECD, 2005b)

rectify the situation by applying for better job opportunities which would lead to better wages or income and thus, reduce the income inequality.

In terms of the second sub indicator, the poverty rate of the USA, Wolf (2004) reports that the number of Americans living in poverty rose by 1.1 million to 37 million in 2004. This increased the national poverty rate from 6.3% in 2003 to 12.7% in 2004. When compared to other developed countries like Australia, Denmark, France, New Zealand, United Kingdom and Norway, as well as the rest of the OECD member countries, the United States has the highest poverty rate of 17.1, as can be seen in Table 4.7(OECD, 2005b):

Table 4.7: Poverty rate in selected OECE member countries

	Mid 1980's	**Mid 1990's**	**Mid 2000**
Australia	12.2	9.3	11.2
Denmark	5.3	3.8	4.3
France	8.0	7.5	7.0
New Zealand	5.8	7.8	10.4
United Kingdom	6.9	10.9	11.4
Norway	6.9	8.0	6.3
USA	17.9	16.7	17.1

However, although this comparison does not look very promising, as with the Gini coefficient discussed above, the USA's poverty rate is still much less than other countries, developed and developing, in the world. According to NationMaster (2007c), where 141 countries are listed with poverty data, the USA ranks 20th, with 121 countries having a higher poverty rate. According to this chart, the country experiencing the most poverty is Zambia with 82% of the population living below the poverty line.

The third sub indicator that to be discussed in terms of the standard of living indicator is the real income/wages of people. In the United States, the average salary of working people compares very favourably when compared to other developed OECD member countries. According to the World Salaries Group, (2007), the USA has the highest annual employment income per worker,

namely, $31, 410. This can be seen in the following table, reflecting the 5 countries with the highest annual employment income:

Table 4.8: International Average Employment Income Comparison[7]

	Annual Employment Income per Worker in Constant 2005 International Dollars
USA	31,410
Taiwan	26,148
Netherlands	25,466
Norway	25,337
Japan	25,184

From all of the above statistics and discussions, the author can thus deduce that the USA has a relatively high standard of living when looking at the three sub indicators: income equality; poverty rate, and real wages/income per worker. This is still true when the USA is compared to other developed countries like Norway, France, and the United Kingdom. However, when compared with the rest of the world, the USA has a very high standard of living, which is emphasised by the high annual employment income per worker. In the following section, the author will investigate the USA's position in terms of GDP and inflation rates.

c) GDP and inflation rates

According to the OECD (2007), the USA is more than five years into the recovery that followed the 2001 recession, and the economy continues to perform very impressively, though at a slightly slower pace than the previous years. This is mainly due to challenges in the labour force growth resulting in higher unemployment figures as discussed above in Section a, and higher income inequality discussed in Section b. This recovery in the economy is also reflected in the current GDP of the country, which increased 3.4% in 2006, compared with an increase of 3.2% in 2005. This GDP is based on PPP *per capita* GDP, and the 2006 estimate for the USA was $43,500 *per*

[7] Information extrapolated from the World Salaries Group (2007)

capita (CIA World Factbook, 2007d). From 2001, the recovery of the American economy can be seen reflected in the constant growth in the GDP based upon PPP, and a nominal decrease in inflation, as can be seen in the following table:

Table 4.9: USA GDP based on PPP *per capita* GDP and USA Inflation rate [8]

	2001	**2002**	**2003**	**2004**	**2005**	**2006**
GDP	35067.42	35950.59	37353.39	39497.67	41557.45	43538.23
Inflation rate	2.80	1.60	2.30	2.70	2.70	2.00

It is the author's opinion that the interaction and exchange of data, information, and knowledge between the USA's local knowledge system and the global knowledge system through the use of information communication technologies (like the internet), play a crucial role in the advancement of the USA's productivity and thus economy. This can be seen in the increase in productivity due to ICT and the growth of the e-commerce sector. According to the Security and Prosperity Partnership of North America (The White House, 2005), the USA recognises the crucial role that electronic commerce plays in stimulating economic growth and fostering international trade on a global platform. During the years 1996 – 2001, the ICT contribution to productivity growth in the USA was 1.90% (Telefonica, 2005), thus, improving productivity and improving the overall GDP of the country. According to McGann *et al* (2002), the internet is, by nature, a social tool, used to share data and information, and the USA is a highly social/interactive country; demonstrated by its emphasis on consumers' social interaction and team-oriented collaboration in the workplace. This aspect, together with other demographic issues (the USA being the world's wealthiest country in terms of GDP, at US$10.2 trillion as of early 2001), positions the United States extremely well for future commerce and ecommerce growth (McGann, *et al*, 2002). In 2000, the USA represented three quarters of all B2B (Business to Business) and B2C (Business to Consumer) e-commerce trade within the OECD countries. This can be seen in the following table, adapted from

[8] Information extrapolated from the IMF World Economic Outlook (2005).

McGann *et al* (2002) and is based upon the Forrester Global e-Commerce Model for 2000.

Table 4.10: USA Rates of Electronic commerce Activity compared to two other OECD countries.

In Billions	USA	Denmark	France
Total	488.655	3.302	9.920
B2B Trade	449.900	3.125	9.102
B2C Trade	38.755	0.177	0.818

According to the Forrester Research Group (2007), within both B2B and B2C sectors, there has been a significant growth over the past few years, and this growth is expected to continue within the USA over the next few years. This can be seen in the following figure that shows the USA's ecommerce over a period of 5 years, 1998 -2003:

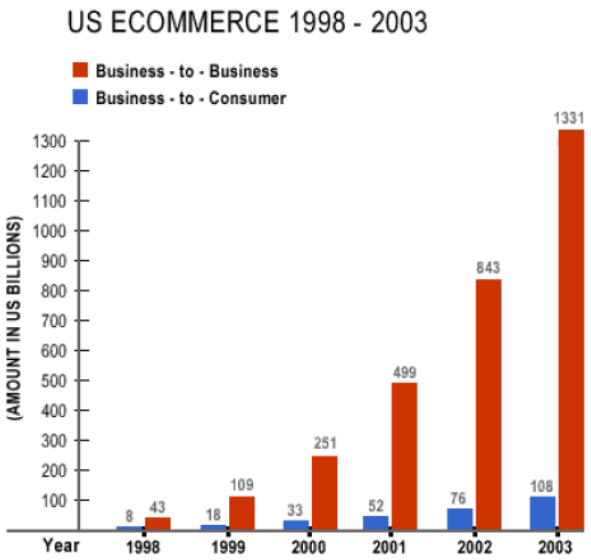


Figure 4.4: USA E-commerce[9]

It can thus be deduced that the USA completely complies with the economic criterion of the information and knowledge society. This deduction is based

[9] Information extrapolated from the Forrester Research Group (2007)

upon the comprehensive discussion concerning the USA's economic situation and can be summarised as follows:

- Low unemployment rate;
- High Standard of living expressed in a low poverty rate and high real income per person;
- High GDP and low inflation rates.

From these figures, it can be deduced that both Norway and the USA have an economy that is strong enough to support an information and knowledge society. In these societies, information is regarded as a key economic factor that can give businesses the competitive advantage. In the following section, the author will discuss the specific technological criterion needed by a community or country to become an information and knowledge society.

4.5.2 Spatial and Technological Criteria

As mentioned in chapter 3, a further criterion for the information and knowledge society discussed by Webster (2002) is the so-called spatial criterion. This criterion must be considered in terms of time and space. The physical location is no longer a barrier to access information, since the use of remote access and networks means that information can be accessed at any time (Goddard, 1991). These remote networks and computer and information technologies provide the infrastructure that enables information to be distributed. Seeing that this criterion is dependant upon the technological criterion, the author is of the opinion that it should rather be addressed together with the technological criterion than as a separate criterion on its own. If an adequate technological infrastructure is lacking, then the country or community will not be able to access information through use of these networks, and physical location will remain a barrier to accessing data, information, and knowledge from both the local knowledge system of the community or country and the global knowledge system.

As discussed in chapter 3 (see 3.5.1), the importance of an efficient ICT infrastructure for an information and knowledge society, as well as the way these technologies are transforming the world, were confirmed with the United Nations decision to hold the World Summit on the Information Society (WSIS, 2003). Not unexpectedly, the criteria for the development of such an ICT infrastructure for an information and knowledge society, are very extensive and complex, and are made up of various indicators. This technological infrastructure is the force that enables the flow of information to offices, factories, schools and educational facilities and to the home (Martin, 1995). However, the technological infrastructure can only enable the flow of information to these sites if there is an actual computer at the receiving end of this flow, meaning that there needs to be a computer in the office, factory, educational facility and in the home. The first indicator of the technological criterion thus refers to access and usage of personal computers. Here, access is defined as having a computer at home or readily available at work or at school. This access is needed for children if they are to prepare themselves for jobs in the information economy of the information and knowledge society.

The second indicator of the technological criterion relates to this first indicator, namely, access and use of a personal computer, although the second indicator concentrates on the network connection of the personal computer. It would ask, does the computer have access to the internet? The second indicator of the technological criterion is, thus, internet access and usage. According to the ITU (2005), there were an estimated 840 million internet users in the world, by the end 2004. This represents just over 13% of the total population. It is the author's opinion that this indicator is one of the most important, seeing that the internet is a platform where the data, information, and knowledge from the country or community's local knowledge system can interact and be exchanged with data, information, and knowledge from the global knowledge system. However, it is vital that an active internet connection is available for this to take place. Thus, countries and communities need access to the internet for this interaction and exchange to take place.

Thirdly, the spatial & technological criteria also refer to the implementation of, amongst other things, integrated broadband networks (Van Audenhove *et al*, 1999). This third indicator relates to the second indicator of the spatial & technological criteria, namely internet access and usage although the third indicator concentrates on the speed and effectiveness of this access. Broadband generally refers to a network connection, wired or wireless, of more than 2Mb (mega bytes) per second. This type of connection enables the spatial characteristics of this criterion. With the use of such a connection, time and spatial limitations are abolished as the user can access the internet and other network resources, at any time and at any place (providing this broadband connection is wireless). According to the ITU (2005), the introduction of broadband to provide high-speed internet access is very important for societies to become information and knowledge societies as it opens up new possibilities and visions as to how the internet can provide a platform for enhancing countries' social and economic development. Thus, the broadband networks enable the interaction and exchange of data, information, and knowledge from and to the internet at much greater speed and in much higher volumes than ever before. This also has an impact on one of the indicators of the social criterion of the information and knowledge society, namely the cost and affordability of the information, which will be discussed later in this thesis.

A fourth indicator of the spatial & technological criteria that is very important for communication purposes is telecommunication penetration. This indicator can be divided into two sub-indicators: fixed/main line penetration and mobile penetration. According to the ITU (2006b), the telecommunication industry has experienced continuous growth, resulting in a competitive and networked world. Although there has been relatively slow growth in fixed line penetration, there has been phenomenal growth in the mobile sector. On average, one out of three of the world's citizens is a mobile subscriber, but there are huge regional disparities. According to the World Telecommunications/ICT development report of 2006 (ITU, 2006b), Europe's mobile penetration rate stood at 71%, which is twice the penetration rate of the Americas (43%) and nearly four times the penetration rate of Asia, which

currently stands at 19%. A very important aspect of mobile penetration is the deployment of the third generation mobile services, referred to as 3G. Although these new services promise a wide range of new and innovative applications for users, they are unlikely to make a difference to the world's poorest within the next few years, as the majority of low-income countries have not yet deployed any 3G services. Even Europe, which was the leader in second-generation mobile network availability, is not a leader in 3G-network availability. Currently, 93% of the 3G subscribers are in Asia-Pacific and the Americas (ITU, 2006b).

It is the author's opinion that this extensive technological infrastructure is also the enabler for the interaction and exchange of data, information, and knowledge between the developed countries' local knowledge systems and the global knowledge system. As previously mentioned, most of the criteria for an information and knowledge society, for example, the economic criterion, social criterion, and political criterion can be stimulated by the interaction and exchange of data, information, and knowledge between the local knowledge system of developed countries and the global knowledge system. In this way, this interaction and exchange process aids the country or community to comply with the specific criteria. This is, however, not the case with the spatial & technological criteria for the information and knowledge society. The various indicators of the technological and spatial criteria are needed for the interaction and exchange process so that the exchange of data, information, and knowledge can stimulate the other criteria of the information and knowledge society. For this reason the spatial & technological criteria are of the utmost importance for the effective and efficient exchange of data, information, and knowledge between the developed country or community's local knowledge system and the global knowledge system. Thus, the following identified indicators of the technological and spatial criteria will be applied to Norway and the USA.

a) Access and use of personal computers.

b) Internet access and use.

c) Access to broadband service.

d) Telecommunication penetration:

i. Fixed/Main line penetration.
ii. Mobile phone penetration.

In the following section, the author will investigate whether these indicators are present in both Norway and the USA and, thus, would enable the interaction and exchange process.

Norway

According to the American University (2002) Norway's ICT infrastructure is considered to be relatively advanced although it is not 'cutting edge.' In the following paragraphs the author will investigate how advanced it is in terms of the four indicators of the technological and spatial criteria, namely, high access and use of personal computers, high access and use of the internet, high broadband connectivity and high levels of telecommunication penetration.

a) Access and use of personal computers

According to Statistics Norway (2006a), in the second quarter of 2006, 75% of all Norwegian households have access to a personal computer, 44% have access to a laptop, 57% have access to a desktop computer, whilst 5% have access to a handheld computer. These statistics are very good, although it can be seen in Table 13 below, that only 53% of people with a household income under 200 NOK have access to a computer, indicating that nearly half of the households earning less than 200 NOK do not yet have access to a personal computer.

In contrast to this, nearly 98% of people earning 600 NOK or more, have access to a personal computer. This income inequality was already discussed in the previous section, as of one the sub-indicators of the economic criterion of the information and knowledge society. These statistics further support the evidence of the Norwegian Minister of Health and Care Services, who suggests that the income gap is widening in Norway, and that

with this widening gap in income, will come a widening digital divide between those who have access to a personal computer and those who do not. This disparity can clearly be seen in the following table:

Table 4.11: Percentage with access to different ICT[10]

	Mobile phone	**Internet enabled mobile phone**	**Desktop computer**	**Laptop**	**PC**	**Handheld computer**	**Internet**	**Broadband telephony**
All households	95	59	57	44	75	4	69	17
Family type								
Families with children	98	77	75	38	92	8	86	23
Families without children	93	51	50	58	69	3	62	14
Household income. NOK 1 000								
Under 200	84	48	27	33	53	3	46	7
200-399	94	49	47	31	64	2	54	9
400-599	98	66	72	47	87	4	80	22
600 and more	99	76	78	69	98	9	96	28
Unspecified	97	51	59	35	68	3	63	17

From these statistics, it can be deduced that computer access for earning higher incomes is high (98%) and that access is relatively high for lower income groups (53%). The author is of the opinion that access to a computer is very important for the interaction and exchange of data, information, and knowledge to take place between the local knowledge system and the global knowledge system. Without such access, citizens would not be able to utilise platforms such as the internet for this interaction and exchange process and

[10] Information extrapolated from Statistics Norway (2006a)

thus would not be able to transfer their local knowledge to the global knowledge through for example the creation of local websites, or placing local information on bloggs, forums etc. In the same way, without access to a personal computer, citizens will not be able to download global information from the global knowledge system and take advantage of the possible benefits this information can hold.

If Norwegian citizens have adequate access to a computer, this sharing and exchange can take place using the internet as platform. With the use of a computer, these citizens can access the internet and, thus, the global knowledge system, enabling the flow of data, information, and knowledge from the global knowledge system to the local knowledge system.

This flow can also go in the opposite direction, if the citizens of Norway create their own websites, newsgroups, and blogs, containing data, information, and knowledge from their local knowledge system. In this way, information from their local knowledge system can be shared with the rest of the global knowledge system. However, this will only be possible, if there is adequate access to computers and an internet connection, which will be discussed in the following paragraph. With such a high percentage of the population having access to a computer, the Norwegian population can truly benefit from this interaction and exchange, which, in turn, can help stimulate other criteria of an information and knowledge society.

b) Internet access and use

As can be seen in the previous table (Table 4.11), as from the second quarter of 2006, 69% of all households in Norway have access to the internet. Furthermore, 81% of the population has used the internet during recent months, and 59% use the Internet every workday. In the following table from Statistics Norway, frequency as well as location of internet use can be seen for the second quarter of 2006:

Table 4.12: Use of the internet, frequency and location[11]

		Frequency				Location			
	Percentage of all that have used internet in last 3 months	At least once a workday	At least once a week, but not every week	At least once a month, but not every week	Less than once a month	At home	At place of work	At place of education	By another person
All persons	81	59	18	4	1	73	47	12	13
Sex									
Males	84	66	14	3	1	77	48	12	15
Females	78	51	22	5	1	69	46	12	11

From this table it can be seen that more people (73%) have access and use the internet from home than from work (47%), or from a place of education such as a school, college, or university (12%). Although these statistics look very good, a similar disparity can be seen in terms of internet use and income inequality (see Table 4.10). Only 46% of Norwegian people earning 200 NOK or less have access to the internet compared to 96% of Norwegians earning 600 NOK or more. This income inequality has a direct impact on computer and internet use and will have to be rectified by the Norwegian government if the whole population is to benefit from the advantages the information and knowledge society bring (see 3.6.1). In terms of the purpose of the internet use, the main purpose of using the internet in Norway is searching for information or the use of online services. As can be seen in the following figure, 90% of Norwegians uses the internet for communication. During 2006, the part of the population that has bought or ordered goods or services for private use over the internet has shown moderate growth. There is an increase from 41% in 2004 and 55% in 2005 to 61% in 2006.

[11] Information extrapolated from Statistics Norway (2006b)

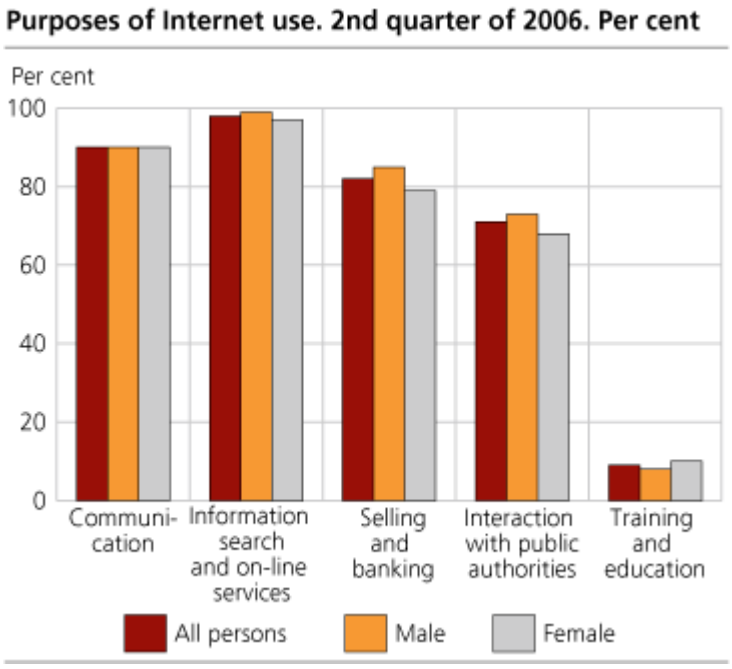


Figure 4.5: Purpose of Norwegian internet use[12]

As already mentioned, computer and internet use are two of the indicators of the spatial and technological criteria that are needed for the interaction and exchange process so that this process can stimulate the other criteria of the information and knowledge society. The internet is a perfect platform for this interaction and exchange process and internet access and use is, thus, of the utmost importance for the effective and efficient interaction and exchange of data information and knowledge between Norway's local knowledge system and the global knowledge system.

c) Access to broadband service

Although the computer and internet access and use statistics for Norway have been very good the last few years, broadband access in the country was a problem in recent years due to the speed and cost thereof. To rectify this situation, Norway started a process of developing a stable and secure broadband infrastructure that could offer high-speed connectivity via access networks to homes, businesses, government agencies, and organizations

[12] Information extrapolated from Statistics Norway (2006b)

(American University, 2006). This process really paid off and by the second quarter of 2006, 80% of all internet connections in Norway were broadband connections. Furthermore, 48% of the Norwegian population had ADSL by the second quarter of 2006 (Statistics Norway, 2006a). These statistics indicate that in terms of the spatial characteristics of this criterion, Norway is very well positioned and can utilise this broadband network to connect to resources at any time and place, thus abolishing the traditional time and space constraints. However, the same disparity can be seen in terms of broadband access and income inequality. In the following table (Table 4.13), it can be seen that this disparity is even bigger, and that broadband access for the population earning less than 200 NOK is 25% and people earning between 200 and 300 NOK only 33%. Compared to the higher income brackets of between 400 NOK to 500 NOK and 600 NOK and more, access to the internet via a permanent broadband connection such as ADSL or other xDSL technologies stands at 59% and 71% respectively.

Table 4.13: Type of internet access[13]

	With access to the internet			**Dial-up**			**Permanent connection**		
	Permanent connection	**Dial -up**	**Don't know**	**Modem**	**ISDN line**	**Don't know**	**ADSL or other xDSL tech.**	**Cable TV**	**Other**
All households	57	11	1	7	4	0	48	9	1
Family type									
Families with children	75	10	1	6	5	0	64	8	2
Families without children	50	12	0	7	4	1	41	10	0
Under 200	39	7	0	5	2	0	25	12	1
200-399	41	12	1	9	2	1	33	7	0

[13] Information extrapolated from Statistics Norway (2006b)

400-599	66	14	0	8	5	1	59	8	1
600 and more	84	12	0	4	8	0	71	12	1
Unspecified	53	9	1	6	3	0	47	5	0

It is the author's opinion that broadband access is of utmost importance for the effective interaction and exchange of data, information and knowledge from Norway's local knowledge system and the global knowledge system. Broadband access allows for the transfer of higher quantities of data, information, and knowledge (in different media) to be exchanged and at a much higher speed than other internet connections, and thus overcoming the constraints of time and space. Furthermore, as previously mentioned, this will have a direct impact on the pricing of the data, information, and knowledge. Cost and affordability of information will be discussed later in this chapter as sub-indicators of the usable content indicator of the social criterion of the information and knowledge society.

d) Telecommunication penetration

As already mentioned, the telecommunication penetration indicator is divided into two sub-indicators, namely fixed or main telephone line penetration and mobile penetration. According to the ITU (2005), in Norway there are approximately 4.62 million people with a total telephone subscriber penetration (fixed line and mobile) of 148.98 telephones per hundred people. In terms of fixed/main line penetration, it is very interesting to note that the number of main telephone lines (in 1000's) decreased during the period 2000 - 2005. In 2000 there was approximately 2401.0 (000's) main telephone lines compared to the 2129.0 (000's) main telephone lines in 2005 (ITU, 2005). This correlates to the fall in fixed/main telephone lines over the same period. There were 53.31 lines per hundred people in 2000, but only 46.08 telephones lines per hundred people in 2005. This decrease is mainly due to the increase in mobile penetration. One of the main reasons why the mobile phone has challenged the fixed/main line has been the dramatic drop in prices, triggered by major competition in the mobile sector (ITU, 2005).

Although not very high, this fixed/main telephone line penetration is very necessary for the interaction and exchange of data, information, and knowledge between Norway's local knowledge system and the global knowledge system. Although very slow, a fixed/main telephone line can be used to establish a dial-up internet connection that would enable the user to access the internet and, through this platform, exchange data, information, and knowledge.

In terms of mobile penetration rates, mobile subscribers increased in the period 2000 – 2005. In 2000, there was an estimated 3224.0 (in 1000's) mobile subscribers and by 2005 this amount increased to 4754.5 (in 1000's). This correlates to 102.9 mobile subscribers, per 100 people, and is 69.1% of the total telephone subscribers. In terms of third generation mobile services, Norway has shown great progress in the uptake of these services. According to the Norwegian Ministry of Transport and Communication, there were only two third-generation public mobile communications systems (3G) in Norway by 2006. The first third generation mobile services was launched on the 1st of June, 2005 by Netcom, a subsidiary of Teliasonera. This UMTS network is the most extensive 3G network in Norway and provides coverage to 240 towns and urban areas (UMTS forum, 2005). In an effort to facilitate the establishment of a new mobile network and better infrastructure, the Ministry of Transport and Communications announced a vacant spectrum license to operate a third generation public mobile communications system (3G), in July 2006. The Norwegian Minister of Transport and Communication, Liv Signe Navarsete (2006) is of the opinion that more mobile operators can provide better and lower priced mobile services and possible increased coverage throughout Norway.

The author is of opinion that telecommunication penetration is very important to the central problem statement of this thesis as it directly influences the interaction and exchange of data, information and knowledge from the Norwegian local knowledge system and the global knowledge system. Through the use of a fixed telecommunication line,

Norwegian citizens can establish a dial-up connection to the internet and thus through this connection utilise the internet as exchange platform. As previously mentioned, this type of internet connection is very slow, but much more affordable, as will be discussed later in this thesis. Through the use of a mobile connection, a much faster internet connection can be established and can this interaction and exchange process take place much faster and thus much more effectively. This faster connection is however more expensive and will be discussed in greater detail under the fourth criterion of the information and knowledge society, namely the social criterion.

As can be seen from these statistics, Norway has a very adequate ICT infrastructure that would enable Norwegians to access information through the use of remote access and networks and, therefore, the physical location is no longer a barrier. Through these remote networks and ICT, the technological infrastructure is provided that enables information to be distributed. Thus, the author can deduce from these statistics that Norway complies with the high spatial and technological criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Norway's ICT infrastructure and can be summarised as follows:

- high access and use of personal computers;
- high Internet access and use;
- high access to broadband service;
- high telecommunication penetration.

It is the author's opinion that this comprehensive technological infrastructure will enable Norway to successfully exchange data, information, and knowledge from their local knowledge system, with data, information and knowledge in the global knowledge system and, by doing so, aid Norway to comply with the other criteria of the information and knowledge society.

In the following section, the author will investigate whether the USA complies with the various indicators of the technological and spatial criteria of the information and knowledge society.

USA

According to Miller (2003) of the Information Technology Association of America, an underlying secure ICT infrastructure is essential to benefit from the advantages of the information and knowledge society. In the following section, the author will investigate whether America has such an infrastructure, by applying the four indicators of the technological and spatial criteria of an information and knowledge society on the USA.

a) Access and use of personal computers

According to the US Census Bureau (2003), 61.8% of all American households have their own computer. This highlights the issues concerning ownership versus access. Although only 61.8% own a personal computer, the statistics for computer use are greater. In terms of computer access and use, 86.1% of USA citizens aged between 3 and 18, have access and use a computer at home, work or school, whilst 63.7% of people over 18 use a computer regularly at home, school or work. These 2003 statistics for the USA are much better than the 2006 statistic of 75% of people who have access to a computer in Norway. In the following tables of the US Census Bureau (2003) these statistics can be seen clearly:

Table 4.14: Presence of a personal computer in USA home

	Total households	Presence of a computer			
		Yes		No	
		Number	Percent	Number	Percent
TOTAL HOUSEHOLDS	113,126	69,936	61.8	43,190	38.2
AGE OF HOUSEHOLDER					

.15-24 years	7,115	4,034	56.7	3,081	43.3
.25-34 years	19,718	13,543	68.7	6,174	31.3
.35-44 years	23,856	17,482	73.3	6,374	26.7
.45-54 years	22,905	16,464	71.9	6,440	28.1
.55-64 years	16,488	10,405	63.1	6,083	36.9
.65 years and over	23,044	8,007	34.7	15,037	65.3

Table 4.15: Use of computers at home, school or work, USA citizen aged 3-17

People aged 3 to 17 years	Uses a computer at home, school, or work			
	Yes		No	
	Number	Percent	Number	Percent
61,897	53,289	86.1	8,608	13.9

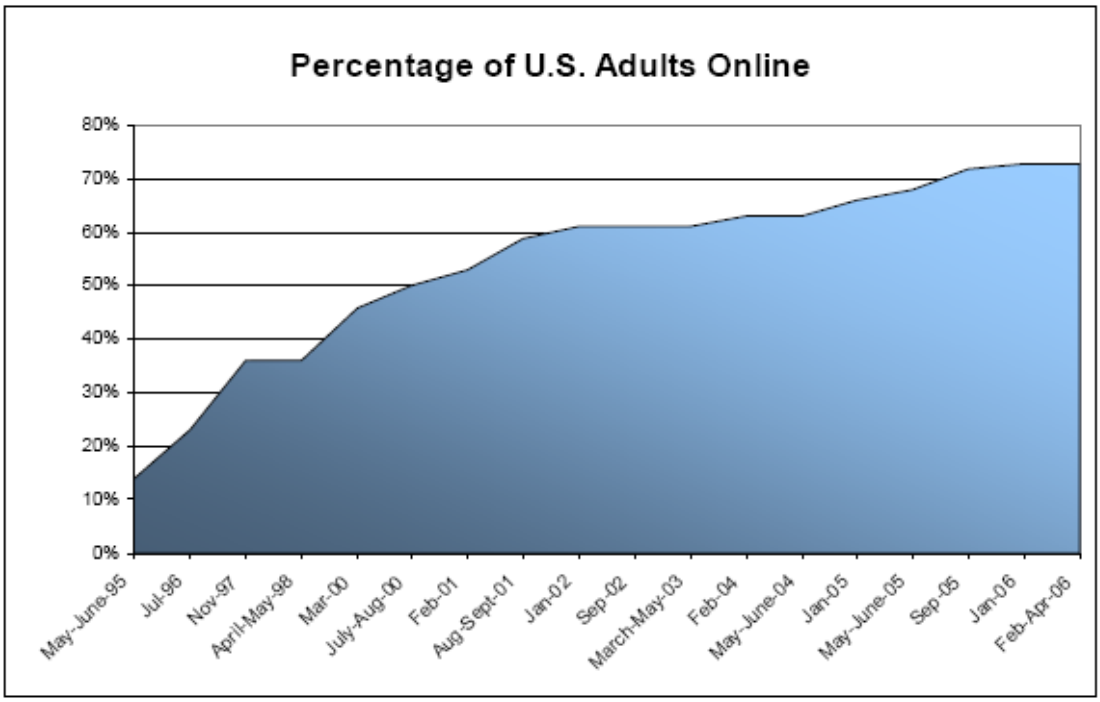
Table 4.16: Use of computers at home, school or work, USA citizen aged 18 and over

People aged 18 years and over	Uses a computer at home, school, or work			
	Yes		No	
	Number	Percent	Number	Percent
213,426	135,991	63.7	77,435	36.3

From these statistics, it can be deduced that there is a high percentage of people in the USA who own their own computer and a very high percentage who have access to a computer in the USA. It is the author's opinion that, as in Norway, citizens of the USA are able to interact and exchange data, information, and knowledge from their local knowledge system with data, information and knowledge in the global knowledge system. With such a high percentage of the population owning their own computer and having access to a computer, the American population can benefit from this interaction and exchange, which, in turn, can help aid the USA to comply with the other criteria of an information and knowledge society.

b) Internet access and use

It is very interesting to note that although Norway is ranked higher on the Human Development Index than the USA, more Americans have access to a personal computer than in Norway, and more Americans have access to, and use, the internet, than the citizens of Norway. Compared to the 69% of Norwegians who have access to the internet from home in 2006, 73% of American households have access to the internet (Madden & Fox, 2006). In the following graph it can clearly be seen how internet access and use has increased in the last decade in the USA:



Source: Pew Internet & American Life Project Surveys, March 2000-April 2006. All surveys prior to March 2000 were conducted by the Pew Research Center for People & the Press.[2]

Figure 4.6: Percentage of U.S adults online

Despite this, internet use still varies significantly across different age groups. While 88% of 18-29 year-olds now use the internet, 84% of 30-49 year-olds, and 71% of 50-64 year-olds, only 32% of those aged 65 and older say they go online (Madden & Fox, 2006). When compared to income, the tables on internet use show a similar relationship in the USA as they do in Norway; people in the lowest-income households are considerably less likely to use the

internet. Only 53% of adults earning less than $30,000 in annual income go online, compared to the 80% of those whose earn between $30,000-50,000. Adults who fall in the high-income bracket earning $50,000 or more exceed the national average for internet penetration. In the high-income bracket of people earning between $50,000 and $75,000, 86% use the internet, compared with 91% of adults living in households earning more than $75,000 (Madden & Fox, 2006).

A further interesting fact concerning the USA's internet access and use is the increase of Americans who feel that the internet has greatly improved their ability to shop. The number of internet shoppers has nearly doubled over the last five years from 16% in 2001, to 32% in 2006, indicating an increase of 16%. This is much higher than the increase in Americans who feel that the internet has improved their ability to do their job. Here an increase of only 11% can be found, as it increased from 24% in 2001 to 35% in 2006 (Madden & Fox, 2006).

As previously mentioned, the first two of the indicators of the technological and spatial criteria, namely computer and internet use, are needed for the interaction and exchange of data, information, and knowledge from the USA's local knowledge system and the global knowledge system. This process in turn can aid the USA to comply with the other criteria of the information and knowledge society. With such a high percentage of internet access and use, the USA will be able, effectively and efficiently, to exchange data, information, and knowledge from their local knowledge system with the global knowledge system. Through this interaction and exchange process, information can be utilised from services such as e-government, e-health and e-learning initiatives, which can lead to the improvement of life for the American citizen. These initiatives will be discussed later in this thesis. In the following section, the author will discuss one of the types of internet connection, namely access to broadband services.

c) Access to broadband service

According to the Federal Communication Commission (2007), all Americans should have affordable access to robust and reliable broadband products and services. However, slightly less half the population currently have such a connection from home. Thus only approximately half the population can utilise this connection and benefit from the abolishment of the traditional time and space constraints, according to the spatial characteristic of this criteria. This half of the population can, with the use of this broadband connection, utilise and use networked resources at their own convenience, at their own time and space. USA statistics concerning access to broadband services, the third indicator of the spatial and technological criteria of an information and knowledge society, are not as impressive as the previous two indicators. According to Horrigan & Smith (2007), 47% of all adult Americans have a broadband connection at home as of early 2007, a five percentage point increase from early 2006. Among individuals who go online from home, 70% have a broadband connection, while only 23% use a slower, dialup connection (Horrigan & Smith, 2007). The decline in dialup connections in the USA, and the increase in broadband connections over the last decade, can be seen in the following figure:

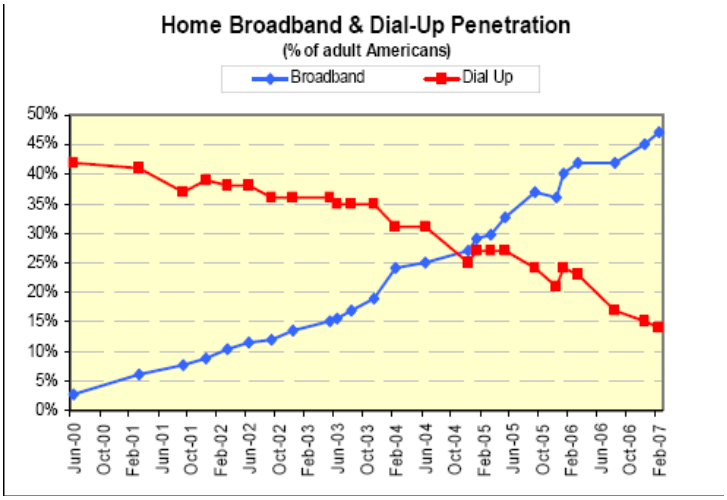


Figure 4.7: Dial up connections versus broadband connection[14]

[14] Information extrapolated from Horrigan & Smith (2007)

In 1996, Congress recognized the importance of broadband through Section 706 of the 1996 Telecommunications Act, which directs the FCC to, "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans." The Commission's goals were to:

- Broaden the deployment of broadband technologies;
- Define broadband to include any platform capable of transmitting high-bandwidth intensive services;
- Ensure harmonized regulatory treatment of competing broadband services;
- Encourage and facilitate an environment that stimulates investment and innovation in broadband technologies and services.

The current broadband statistics show that these goals have not fully been met, seeing that more than half (53%) of the USA's population currently does not have access to broadband services. It is further very interesting to note that the USA's statistics for the first two indicators of the technological and spatial criteria of an information and knowledge society are better than those of Norway. However, Norway's access to broadband services is currently 1% better than that of the USA.

Thus, according to these statistics with regard to the first three indictors of the spatial and technological criteria, the USA has a very extensive ICT infrastructure that would definitely be able to sustain the development of an information and knowledge society. The American population have adequate access to personal computers, as well as the internet that can be used as a platform for the interaction and exchange process. As was discussed above, 47% of the total American population will be able to utilise a broadband connection for this interaction and exchange process, which will enable them to interact and exchange a much bigger volume of information at much higher speed. This more efficient interaction and exchange process will aid the USA to comply with the other criteria of an information and knowledge society. For example, through the use of a personal computer and a broadband connection, citizens of the USA will be able to exchange their local data,

information and knowledge, i.e. local cures and remedies, local food recipes, information concerning local arts, crafts and music, to the global knowledge system. In this system, other people can access this local information, and purchase the local arts and crafts. This would lead to an improvement of the citizens quality of life and consequently improve their poverty rate and increase their employment rate, which are both indicators of the economic criterion. Thus through the use of computers and an internet connection, the interaction and exchange process can be enabled which in turn can aid the USA to comply to the economic critierion of an information and knowledge society.

d) High telecommunication penetration

Similar to Norway, the USA has also shown a decline in total fixed lines over the period 2001 – 2005. As can be seen in the following chart, the USA showed the largest absolute decline in fixed lines. In other words, the USA has the greatest amount of fixed lines fewer in 2005 than in 2001. This decline of 8% or 15.3 million lines, was the largest, followed by Japan with a 12% or 8.9 million lines and then the United Kingdom who had 4% or 1.6 million fewer lines in 2005 than 2001. This trend can clearly be seen in the following figure (Ofcom, 2006):

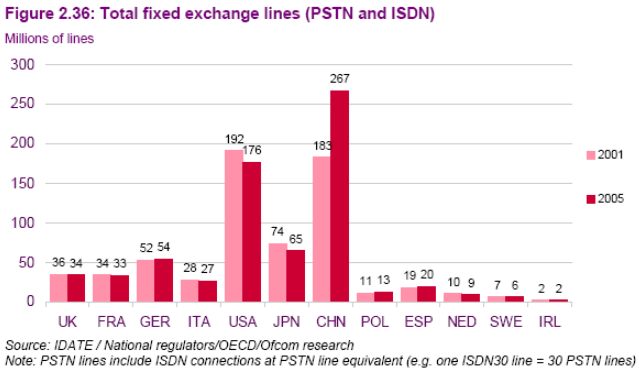


Figure 4.8: Total fixed exchange lines

In terms of fixed lines per 100 inhabitants, the USA has the third most fixed lines, namely 60, of all OECD countries. Only two countries have more than the USA: Sweden (with 69) and Germany (66). Expressed in this fashion, the

decline in fixed lines can more clearly be seen. In 2001 there was approximately 67 fixed lines per 100 inhabitants. This figure declined in 2005 to the above mentioned 60 (Ofcom, 2006).

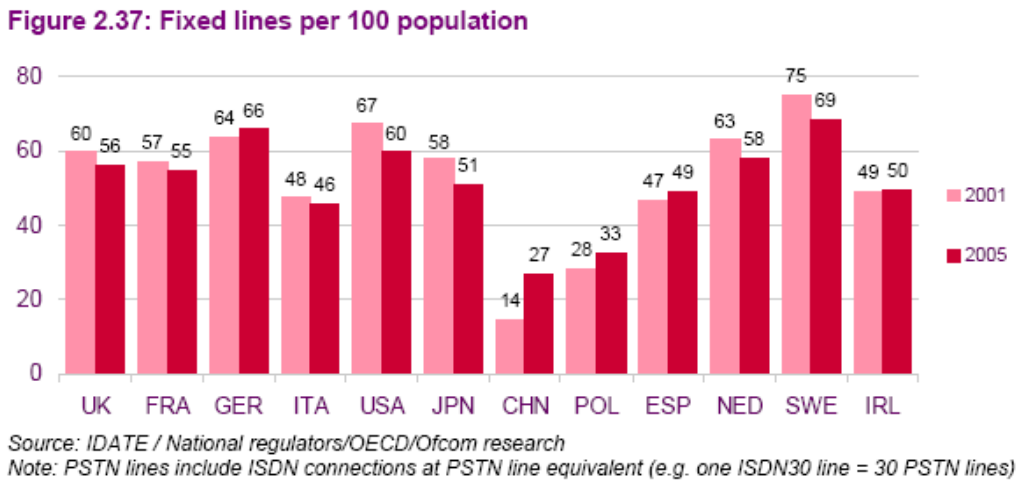


Figure 4.9: Fixed lines per 100 inhabitants

In America, the cell phone has become an integral and, for some, an essential communications tool. This can be seen in the increase in mobile phone subscriptions in the period 2001-2005. During this period mobile subscriptions increased by 80 million, to 208 million subscriptions in 2005 (Ofcom, 2006). This increasing trend is in contrast to the decreasing trend experienced in fixed line connections for the same period. The increasing trend can clearly be seen in the following figure:

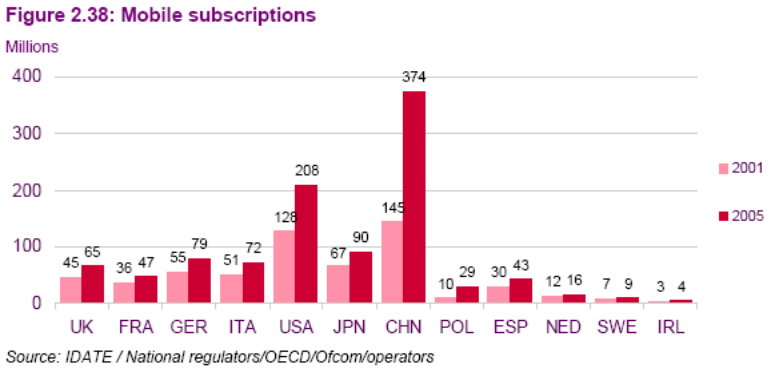


Figure 4.10: Mobile subscriptions in the period 2001 - 2005

The same trend can been seen when these statistics are expressed in mobile subscriptions per 100 inhabitants. In the period 2001 – 2005, this figure increased to 70 mobile subscriptions per 100 inhabitants compared to the 45 subscriptions in 2001 (Ofcom, 2006).

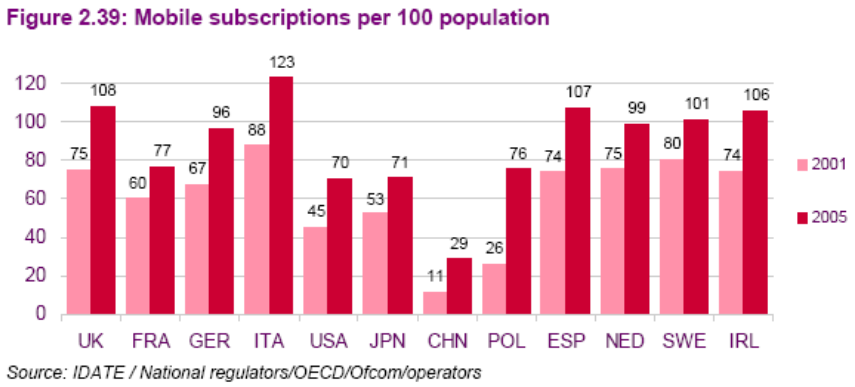


Figure 4.11: Mobile subscriptions per 100 inhabitants

Furthermore, an interesting and striking fact concerning mobile technology is that Americans are using their mobile phones to change the way they spend their time. According to Rainie & Keeter (2006), 41% of cell phone owners say they fill in free time when they are travelling or waiting for someone by making phone calls.

As can be seen in the previous figures concerning fixed line and mobile line penetration, the USA is one of the leading countries together with other developed countries such as Sweden, Germany and Japan. However, the same cannot be said for the 3G connections and services within the country. By 2005, the USA only had 2.7 million 3G connections, which is very low compared to Japan, with 29 million connections and Italy with 10.8 million connections. In terms of the physical penetration of 3G in the population, the USA stands at 0.9%, which is much lower than Japan where 22.7% of the population have access to broadband services, and Italy where 18.6% of the population has access to these services. These figures can be seen in the following two figures (Ofcom, 2006):

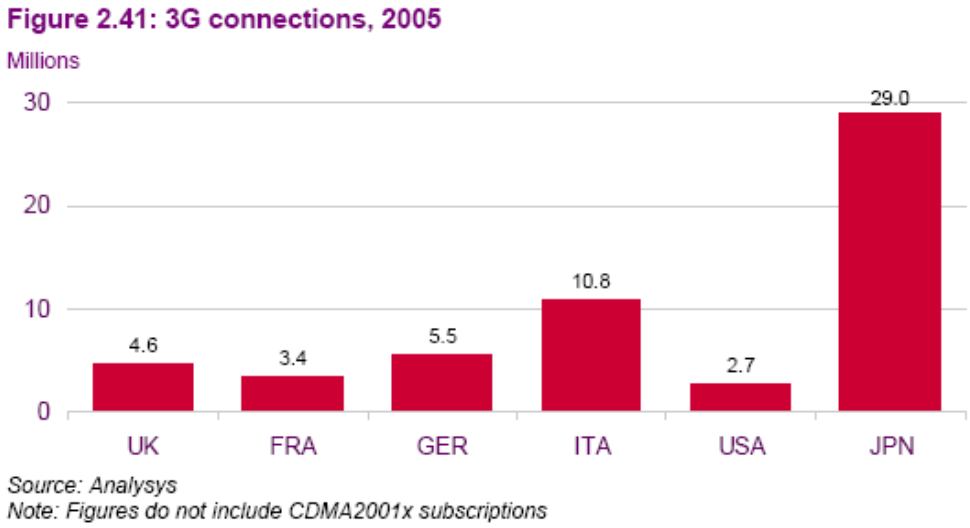


Figure 4.12: 3G connections

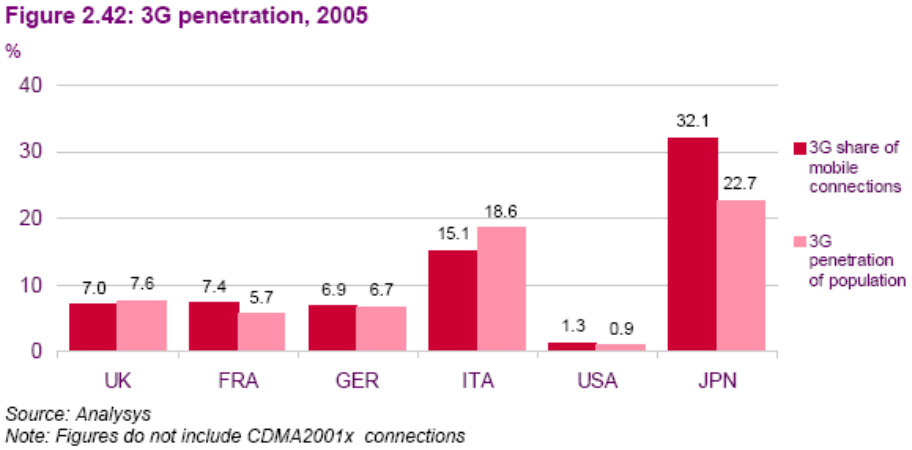


Figure 4.13: 3G penetration, 2005

Although the 3G statistics of the USA are not, perhaps, so impressive, the high levels of fixed line, mobile phone and broadband penetration are adequate for the interaction and exchange of data, information, and knowledge between the USA's local knowledge system and the global knowledge system. As already mentioned, a fixed or main telephone line can be used to establish a slow, but functioning, dial-up internet connection that would enable the user to access the internet and through this platform exchange data, information, and knowledge. Thus, the author can deduce from these statistics and figures that the USA completely complies with the high spatial and technological criteria of the information and knowledge

society. This deduction is based upon the comprehensive discussion concerning the USA's ICT infrastructure and can be summarised as follows:

- high access and use of personal computers;
- high Internet access and use;
- high access to broadband service;
- high telecommunication penetration.

Through the high broadband penetration, high speed, big volume interaction and exchange can take place enabling the USA to benefit from the advantages of an information and knowledge society.

The author can thus deduce from these figures and statistics that both Norway and the USA have an efficient and effective ICT infrastructure that definitely complies with the spatial and technological criteria of an information and knowledge society.

In the following section, the author will discuss the various indicators of the political criterion of an information and knowledge society, and investigate whether Norway and the USA complies with these indicators.

4.5.3 Political criterion

As already discussed in the previous chapter (3.5.3), an information and knowledge society can be successful if the society has the necessary infrastructures and levels of democracy to ensure the information-based rights of citizens such as freedom of access to information, freedom of expression and intellectual property rights. According to President George W. Bush (2003), in a speech to the American Enterprise Institute, the world has a clear interest in the spread of democratic values, because stable and free nations do not breed the ideologies of murder. However, how many of the nations of the world can really be classified as being 'free?' According to Freedom

House (2007)[15], the following is a Map of Freedom, which shows which nations are Free, Not Free or Partially Free:

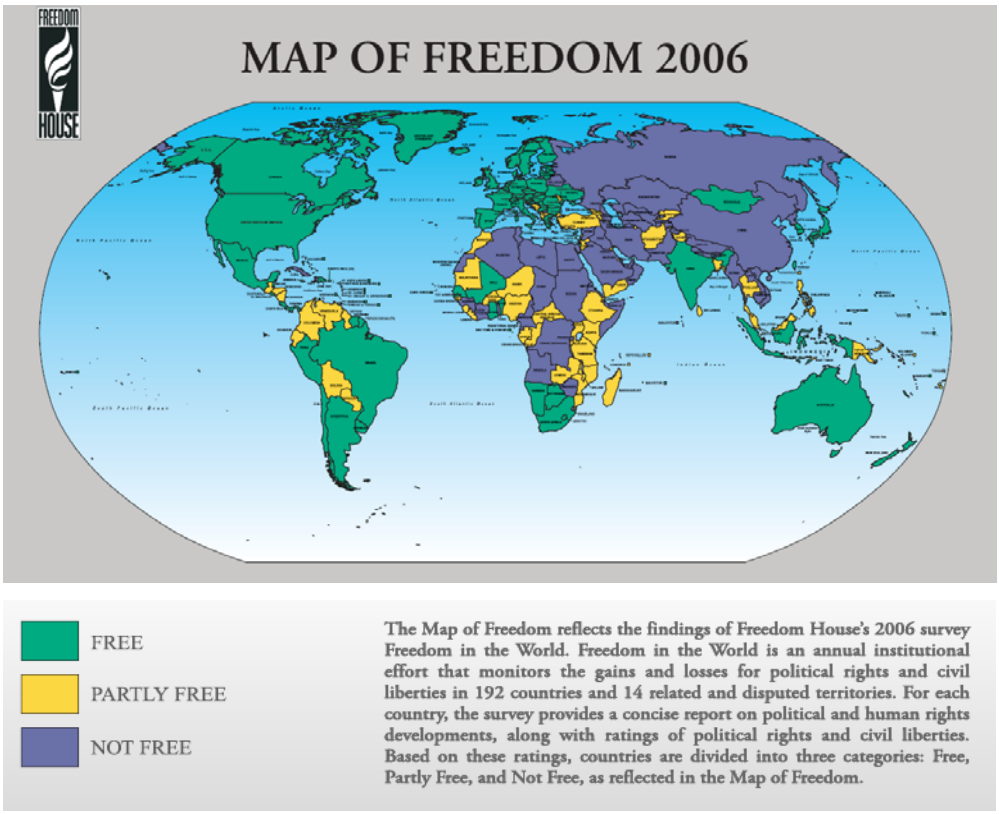


Figure 4.14: 2006 Map of freedom in the World

This "freedom" is measured by Freedom House as the opportunity to act spontaneously in a diversity of fields outside government control and the control of other centres of potential domination. Furthermore, this "freedom" is measured according to two broad categories: political rights and civil liberties. Thus a country is only regarded as being 'free' in these categories if they obtain a ranking from 1 to 2.5 for each. From the 192 countries and 14 territories, only 90 countries can be considered 'free' in 2006. A further 58 countries are classified as being partly free and 45 countries, not free. In the following table, these statistics are clearly shown as well as the global trend towards freedom in the 30 years between 1976 and 2006. It is reassuring to see that in the last three decades, the amount of free countries has increased

[15] Freedom House is an independent non-governmental organization that supports the expansion of freedom in the world.

from 42 to 90, and the amount of countries classified as being not free, has decreased from 68 in 1976, to only 45 in 2006 (Freedom House, 2007).

Table 4.17: Global trend of Freedom over the last four decades

The Global Trend

Year Under Review	Free	Partly Free	Not Free
1976	42	49	68
1986	57	57	53
1996	79	59	53
2006	90	58	45

Thus, the first indicator of the political criterion for an information and knowledge society is that countries have to be free. In other words, countries have to have high levels of democracy. This indicator is highly complex and consists of various sub-indicators. The author will discuss the following sub-indicators: the right to freedom of expression, the right to freedom of information, and Intellectual property rights.

According to the Universal Declaration of Human Rights (UDHR) of the United Nations (United Nations, 1948), the right to freedom of expression is an individual human right that is guaranteed in all international human rights treaties and is enshrined in the Universal Declaration of Human Rights. The right's status as a legally binding treaty obligation was affirmed in Article 19 of Universal Declaration of Human Rights. The article states: "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers," (United Nations, 1948). Countries thus have the right to receive, impart and exchange data, information, and ideas from their local knowledge systems with the global knowledge system by making use of the internet as media. According to the Commonwealth Human Rights Initiative (CHRI, 2006), the right to freedom of expression is also seen as a cornerstone of democratic freedom. For

example, freedom of expression helps guarantee the free operation of competing political parties and viewpoints and, thereby, helps secure a high level of democracy.

Furthermore, this free operation of competing political parties would not be possible without the second sub-indicator, namely, freedom of information. This will be discussed in the following paragraph.

The second sub-indicator of high levels of democracy is the right to freedom of access to information. According to the United Nations, the right to information underlies all other human rights. For example, the first indicator, namely, freedom of expression, inherently relies on the availability of adequate information to inform opinions. Thus, you cannot truly have freedom of expression if you do not have access to the adequate information. The interpretation of this right has changed and evolved over decades. Most modern interpretations of this right assume it implies a positive obligation upon states to provide political information to citizens. According to the Commonwealth Human Rights Initiative, failure of the state to provide access to political information or state suppression of information can lead to the most egregious forms of human rights violations (CHRI, 2006). Furthermore, the right to information is also fundamental to effective democracy, which requires informed participation by all. This view is supported by Bannister & Connolly (2007), who is of the opinion that freedom of political information is essential for public participation. According to him, democracy is based on the consent of the citizens and that consent can only be given if the government informs citizens about their activities and recognises their right to participate. Thus, the public is only truly able to participate in the democratic process when they have information about the activities and policies of the government. This relates to the next indicator of the political criterion, namely increased participation and consensus in the political process that will be discussed as the third sub-indicator in the following paragraph.

The third sub-indicator of the high level of democracy indicator of the political criterion is intellectual property rights. These rights, very broadly, mean the

legal rights that result from intellectual activity in the industrial, scientific, literary, and artistic fields. According to The World Intellectual Property Organization (WIPO), countries have laws to protect intellectual property for two main reasons. The first reason is to give statutory expression to the moral and economic rights of creators in their creations and the rights of the public in access to those creations. The second is to promote, as a deliberate act of Government policy, creativity and the dissemination and application of its results and, to encourage fair trading which would contribute to economic and social development. It is the author's opinion that these three sub-indictors are very important to the central problem statement of this theses as they directly influences the interaction and exchange of data, information, and knowledge from local knowledge systems to the global knowledge system. If there are intellectual property rights in place in a specific country, then the citizens of that country have the opportunity to disseminate and share their local knowledge with the rest of the world in the global knowledge system, because they would know that their intellectual activities as creators would be protected. These rights, furthermore, also have an impact upon the second sub-indicator, (the right of access to information) as intellectual property rights give statutory expression to the moral and economic rights of the creator of the information, but also grant the public access to that information. In 2007, the Property Rights Alliance[16] published the first international comparative study that measures the significance of both physical and intellectual property rights and their protection for economic well-being for seventy countries around the world, representing ninety-five percent of world GDP. This study is a very valuable tool for comparative analysis and future research on global property rights, and will be used by the author to compare the intellectual property rights situation in both Norway and the USA respectively.

As mentioned previously, freedom of expression and freedom of information will, in turn, lead to the second indicator of the political criterion, namely a political process characterized by increased participation and consensus. Although this increased political participation does not have a direct impact

[16] The Property Rights Alliance is a non-partisan advocacy organization that utilizes research, lobbying and educational efforts to protect physical and intellectual property rights around the globe

upon the interaction and exchange of data, information and knowledge from the local knowledge system and the global knowledge system, this indicator indirectly impacts upon the interaction and exchange process. In a country where there is very little participation within the political processes of the country, there are no or very few initiatives where the citizens can partake within such a process. However, in countries characterised by high levels of participation within the political process, many initiatives exist through which this interaction and exchange process can take place, for example e-government initiatives. This statement can be illustrated by means of the following example. Through e-government initiatives, the interaction and exchange process will thus entail the interaction and exchange of local political data, information and knowledge, by for example partaking in political Web blogs that are made available through these e-government Web portals. In such a blog, local citizens can discuss local political issues. Furthermore due to the fact that these blogs are available through accessing the internet as exchange platform, other people accessing the global knowledge system can also contribute global political issues to the discussion. E-government initiatives such as these will be discussed in greater detail under the Social criterion of the information and knowledge society. This second indicator of the political criterion can be thoroughly researched by investigating the voter turnouts of both Norway and the USA in national elections over a period. If the voter turnout increased, this would indicate an increased participation in the political processes of the particular country, and if the turnout decreased, there would be lesser citizen participation in the political process.

In the following section, the author will apply the following indicators of the political criterion of the information and knowledge society, to Norway and the USA respectively:

a. Levels of democracy:
    i. Freedom of expression.
    ii. Freedom of information.
    iii. Intellectual property rights.
b. Political participation.

Norway

a) Levels of democracy

The Norwegian Minister of Local Government and Regional Development, Mrs. Åslaug Haga (2006), is of the opinion that, historically, democracy is strong in Norway and, in present day, democracy is considered to be more important than ever. This opinion is supported by the *Freedom in the World 2007* report, published by Freedom House. According to this report, Norway has a political rights and civil liberty ranking of 1, which indicates that Norway is very close to the political and civil liberty freedoms as drawn from the Universal Declaration of Human Rights. These freedoms represent the fundamental components of freedom, which include an individual's ability to:

- Participate freely in the political process;
- Vote freely in legitimate elections;
- Have representatives that are accountable to them;
- Exercise freedoms of expression and belief;
- Be able to freely assemble and associate;
- Have access to an established and equitable system of rule of law;
- Have social and economic freedoms, including equal access to economic opportunities and the right to hold private property.

In terms of the first sub-indicator of high levels of democracy, namely freedom of expression, the Norwegian State secretary, Raymond Johanse (2006), is of opinion that the universally recognised human right of freedom of expression is another pillar of democracy. This right is protected within the Norwegian Constitution in Article 100, which states that: "Everyone shall be free to speak his mind frankly on the administration of the State and on any other subject whatsoever," (Newth, 2002:1). In 1902, the limits of free expression as specified in Article 100 were elaborated, and new concerns were introduced, such as the consideration of relations to foreign powers and that of national security. In 1996, a Royal Decree appointed a Norwegian Governmental Commission on Freedom of Expression. The commission presented its report, Official Norwegian Report 1999: 27, entitled, "Freedom of Expression Should

Take Place - Proposal for a new Article 100 of the Constitution," to the Minister of Justice in 1999. The core principle (from within the first paragraph) of the amendments proposed by the Commission reads: "There shall be freedom of expression." The amendments incorporate both the European Convention on Human Rights and the UN Charter on Human Rights, thus making them into Norwegian law (Newth, 2002).

A further very important project concerning the right to freedom of expression in Norway, is *The Beacon for Freedom of Expression,* a bibliographical database on freedom of expression and censorship world-wide that was designed and produced by the Norwegian Forum for Freedom of Expression (1995-2001). The project is now managed by the Norwegian Steering Committee hosted by the Norwegian Library Association and contains publications on:

- censorship and freedom of expression world wide;
- censorship of books and newspapers world wide during the last decade;
- censorship of books and newspapers from selected historical periods and countries.

In the true spirit of Article 19 of the UN Universal Declaration of Human Rights, the database is freely available to users world-wide (Beacon for freedom of expression, 2007).

In terms of the second sub-indicator of the high levels of democracy indicator of the political criterion, namely freedom of access to information, this right is also enshrined in Norwegian law. The Freedom of Information Act of 19 June 1970 No. 69, was revised and updated on 20 June 2003. The revision was done by Ronald Walford in close co-operation with Sandra Hamilton and subject to the approval of the Ministry of Justice. According to Johanse (2006), the Norwegian government presented its proposal for a new freedom of information act to the parliament in 2005. This new act will replace the current Freedom of Information Act of 1970. The purpose of the reform is

threefold: to strengthen transparency in the public administration and the access to official documents; to make the act more accessible both to the public and to the administration; and, finally, to adapt the legislation to the new possibilities provided by new technologies. The fundamental principle of the current act is retained – the principle that essentially all documents that are prepared in any public office are open to the public, unless they may be exempted from disclosure on few and specific legal grounds. The Norwegian State secretary, Raymond Johanse (2006) is, further, of the opinion that this act will ensure a transparent public sector, which is a prerequisite for a true democracy. However, the right to information cannot be addressed without addressing the opportunities created by modern technology. ICT create challenges and new divides, but at the same time vast possibilities. Johanse (2006) supports this view, and states that information technology may be used to facilitate informed, open debates, increased transparency and, therefore, may strengthen the accountability of government decisions. Thus, it can be seen that this sub-indicator of the political criterion is also reliant upon the spatial and technological criteria of the information and knowledge society. Through the use of modern ICT, data, information, and knowledge from the Norwegians' local knowledge systems can be shared with the global knowledge system. Through this process, Norwegian citizens would have access and the right to more information, and this can lead to greater governmental transparency.

In terms of the third sub-indicator of the high levels of democracy indicator, intellectual property rights, Norway is ranked first of seventy countries in the International Property Rights Index (IPRI) of 2007, with a total score of 8.3 out of 10, where 10 represents the strongest property rights protection. The 2007 IPRI comprises a total of eleven factors, which are divided into the three main categories: Legal and Political Environment (LP), Physical Property Rights (PPR), and Intellectual Property Rights (IPR). When looking at Norway's performance within the individual categories of the index, one discovers that Norway scores especially high in the Legal and Political Environment category (LP) as well as in the Physical Property component (PPR). In the LP category, Norway shares the category's second rank with Switzerland and Denmark,

just behind New Zealand. Within the PPR category, Norway ranks first, with very high scores in the related sub-categories. Norway's weakest performance is found in the area of intellectual property rights (IPR), where it occupies the 7th rank with a score of 7.9 (the maximum in this category is 8.8) (IPRI, 2007).

Although Norway's weakest performance in the IPR index is in the area of Intellectual property rights, Norway has done a great deal to establish and enforce laws that protect intellectual property. According to Bretz (2002), intellectual property rights are seen as a fundamental requirement for nurturing, rewarding, and stimulating Norwegian innovation and creativity, and thus, improving their knowledge based capabilities. Norway actively supports the international efforts to protect intellectual property rights by being a member in various Global Intellectual Property Organisations. These include the following:

- *World Trade Organization (WTO)* - As a member of the World Trade Organization, Norway is bound the Trade-Related Aspects of Intellectual Property (TRIPS) agreement (www.wto.org/english /tratope/tripse/trips_e .htm);
- *World Intellectual Property Organization (WIPO)* - Norway is a member of the World Intellectual Property Organization, which is a United Nations agency that is tasked with maintaining and improving the worldwide value of intellectual property. WIPO believes that technology sectors (for example, software and biotech) are major drivers of economic development in any country and are fundamentally driven by the protection IP in the domestic and foreign markets (www.wipo.org).

As previously mentioned, intellectual property rights play a very important role in the interaction and exchange of data, information, and knowledge from the Norwegian's local knowledge system to the global knowledge system. With these rights in place and secured by membership in the above mentioned global Intellectual Property Rights organisations, the citizens of Norway can

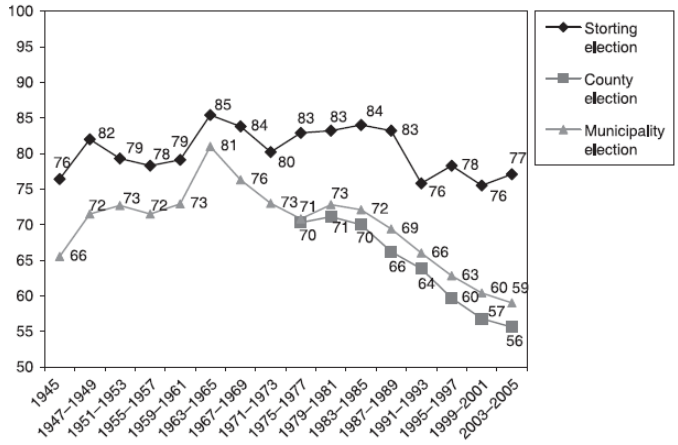
freely share their local knowledge with the rest of the world in the global knowledge system, because they know that their intellectual activities, as creators, are protected.

The author can, thus, deduce from the above discussion about the three sub-indicators of the high level of democracy indicator of the political criterion, that Norway truly is a free nation with high levels of democracy. In the following section, the author will investigate the citizens of Norway's participation in the political processes of the country.

b) Political participation

As mentioned previously, this second indicator of the political criterion does not have a direct impact upon the interaction and exchange of data, information and knowledge from the local knowledge system and the global knowledge system. This indicator does however have an indirect impact upon the interaction and exchange process, as this interaction and exchange process of this indicator is limited to political data, information and knowledge. In a country where there is very little participation within the political processes of the country, there are no or very few initiatives where the citizens can partake within such an interaction and exchange process, for example through initiatives such as e-government portals and websites. However, in countries characterised by high levels of participation within the political process, many initiatives exist through which this interaction and exchange process can take place. According to Listhaug & Grønflaten (2007), political participation in Norway has been decreasing over the last few decades. This is very worrisome seen from the perspective of this thesis, as this decrease in political participation can lead to decreased opportunities for these Norwegian citizens to partake within the interaction and exchange of political data, information and knowledge form their local knowledge system to the global knowledge system, where the e-government Web portals reside. This statement can be illustrated by the following example. As can be seen from the decrease in political participation statistics in the figure below, less and less Norwegian citizens are partaking within the political processes. These

citizens, who are not partaking within the political processes, will thus not partake in the interaction and exchange of local political information through platforms and initiatives such as the existing eNorge e-government Web portals that reside within the global knowledge system. These citizens thus have fewer opportunities to partake within the interaction and exchange process. This decrease in political participation can be seen clearly in statistics relating to the voter turnout in county and municipality elections. In the most recent local county elections, held in 2003, turnout reached an all-time low, with 56% compared to a peak of 71% in 1979 (these elections were first held in 1975). Turnout at the 2003 municipality elections reached a post-war low of 59%, down from a high of 81 percent in 1963. These results can be seen in the following figure (Statistics Norway, 2005):



Notes: Storting elections are held every fourth year, beginning in 1945 in the figure above. Elections to the counties and municipalities are held halfway into the Storting term (beginning in 1947 and 1975, respectively). To simplify the figure, we use 2-year time spans, such that one time-point covers both elections to the Storting, counties and municipalities.
Sources: Aardal (2002); Statistics Norway (2004); http://odin.dep.no/krd/html/valgresultat2005/frameset.html

Figure 4.15: Turnout at the 2003 municipality elections

Although a major decline is visible in county and municipal elections from 1975 to 2005, elections on a national level have only shown a gradual decline from 1985 to 2005. However, when looked at from a more holistic perspective, taking into account all the voter turnouts as from 1945, these figures have shown great consistency. From a voter turnout of 75% in 1945, turnout slightly increased over the period 1947 – 1949 to an all time high of 82%. In the period ranging from the early 1960's to the late 1980's voter turnout stabilized

around 82%, 83% and 84%, where it started to decline back to the starting point of around 76% in 2005 (Listhaug & Grønflaten, 2007).

In an effort to address the voter turnout decline at municipal and county level, the Norwegian government has opted for implementing an e-government program called e-norway (e-norge). This program will be discussed in more detail under the social criterion of the information and knowledge society. Through this program, and similar ICT based programs, the Norwegian government hopes to increase the access to government information and, in doing so, create better governmental transparency.

Thus, it can be see from this discussion, that although national voter participation and turnout has nominally decreased in Norway, programmes are being implemented to rectify the situation so that the Norwegian public can participate in the information and knowledge society, through the use of ICT based programs that facilitate the exchange and sharing of data, information, and knowledge. Thus, the author can deduce that Norway completely complies with the political criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Norway's political situation and can be summarised as follows:

- High levels of democracy, expressed in the existence of the right to freedom of expression, the freedom of access to information and various intellectual property rights and
- Increasing political participation.

In the following section, the author will investigate whether the USA complies with the political criterion of the information and knowledge society.

USA

a) High levels of Democracy

According to the History of Democracy, the Constitution of the USA, adopted in 1788, provides the world's first formal blueprint for a modern democracy. Thus, it can be seen that The USA has a very long history of democracy which can be traced back to the eighteenth century. From then onwards the USA has always been a crusader for democratic principals. This can be seen in former President Ronal Reagan speech inaugurating the National Endowment For Democracy (NED) in 1983: "I just decided that this nation, with its heritage of Yankee traders, ought to do a little selling of the principles of democracy."

According to the *Freedom in the World 2007* report, published by Freedom House, the USA has a political rights and Civil liberty ranking of 1, which indicates that they are as close to the political and civil liberty freedoms as drawn from the Universal Declaration of Human Rights, as Norway, who also has a ranking of 1. This ranking is based upon a number of freedoms as mentioned earlier in this chapter, and includes the freedoms as stipulated in the sub-indicators of this high democracy indicator, namely, freedom of expression, freedom of Information and the freedom of creators of intellectual property, as expressed in intellectual property rights (Freedom House, 2007).

In terms of the first sub-indicator, freedom of expression, this is protected by the first Amendment of the USA's constitution (Levy, 1986). This amendment is considered by some to be the single most important guarantor of the rights of Americans, and encompasses all forms of expression, namely - freedom of religious practice, freedom from government-imposed religion, freedom of speech and the press, the right to assemble peacefully and the right to petition the government for redress. According to the Encyclopedia of Everyday Law (Shae Irwing & Nola, 2007), freedom of expression is among the freedoms most cherished by Americans and the founding Fathers, who were of opinion that any true democracy had to be based on these freedoms. This led the way

for the protection of other freedoms, amongst others the freedom of information.

In terms of the second sub-indicator of the high levels of democracy indicator of the political criterion, namely freedom of information, this freedom in protected in the USA by the The Freedom of Information Act (FOIA). This act generally provides that any person has the right to request access to federal agency records or information. Four decades ago, former US President Lyndon Johnson signed the Freedom of Information Act on Independence Day, stating, “I signed this measure with a deep sense of pride that the United States is an open society in which the people’s right to know is cherished and guarded,” (Banisar, 2006:5). The FOIA was originally enacted in 1966, but due to inherent weaknesses in the act, it was amended in 1974. At the same time, the US Congress enacted the Privacy Act of 1974, which supplements the FOIA. When individuals make requests for information regarding them, certain privacy protections had to be kept in mind, for which this act made provision. However, this ‘new’ amendment still did not cover any electronic information held by government departments, and in 1996, the US Congress enacted the Electronic Freedom of Information Act Amendments of 1996, which addressed the subject of electronic records (US Department of Justice, 1996).

According to Banisar (2006), freedom of information has been around for over 200 years, and it is still evolving. Many countries have followed the example set by the USA in ensuring this essential right and more than half of all the existing FOI laws have been adopted in the last decade. Banisar (2006) is of the opinion that the FOIA was not the first of its kind in the USA. Some US states have provided access to records for over a century. Some of this specific legislation, prior to the FOIA of 1966, providing access includes the following provisions:

- Court records and legislative materials have been long open;
- The Federal Register began publishing in 1936;

- In 1946, Congress enacted the Administrative Procedures Act (APA). Section 3 of the APA required that government bodies publish information about their structures, powers and procedures and make available "all final opinions or orders in the adjudication of cases."

According to the U.S. Department of Justice (2004), the FOIA has proven to be very successful in providing individuals access to government information. In 2004, there were over 4 million requests made to federal agencies under the FOIA and the Privacy Act, which is 800 000 more than the 3.2 million requests made in 2003.

When applying the third sub-indicator of the high levels of democracy indicator of the political criterion, namely, intellectual property rights, to the USA, the following interesting fact comes to light. Although, historically, the USA has been a leader on most fields of democracy, this is, unfortunately, not the case with regard to intellectual property rights. Unlike Norway's first place ranking out of 70 countries in the International Property Rights Index of 2007, the USA is only in joint fourteenth place, sharing this ranking with Ireland and Canada, with a total score of 7.4 out of 10. Although this is still a relatively good ranking compared to the lowest score of 2.2, achieved by Bangladesh, the USA's ranking is only just good enough to place it within the top 25% of all seventy countries ranked. This can be seen in the following table:

Table 4.18: Intellectual Property Rights Index Ranking by Quartile[17]

Top 25 Percent	2nd Quartile	3rd Quartile	Bottom 25 Percent
Norway (rank 1)	France (rank 19)	Turkey (rank 38)	Peru (rank 55)
Netherlands (rank 2)	Spain (rank 20)	Czech Republic (rank 39)	Honduras (rank 56)
Denmark (rank 3)	South Africa (rank 21)	Panama (rank 39)	Romania (rank 56)
Sweden (rank 3)	Portugal (rank 22)	Malawi (rank 41)	Ukraine (rank 58)
New Zealand (rank 3)	Chile (rank 23)	Mexico (rank 42)	Kenya (rank 59)
United Kingdom (rank 3)	Israel (rank 23)	Morocco (rank 42)	Guatemala (rank 59)
Germany (rank 3)	Korea (rank 25)	Brazil (rank 42)	Ecuador (rank 59)
Australia (rank 3)	Malaysia (rank 25)	Colombia (rank 45)	Pakistan (rank 59)

strongest

[17] Information extrapolated form the International Property Rights Index Report (2007)

Switzerland (rank 9)	Tunisia (rank 27)	China (rank 45)	Russia (rank 63)
Austria (rank 9)	Italy (rank 27)	Philippines (rank 47)	Nigeria (rank 64)
Finland (rank 11)	Greece (rank 29)	Indonesia (rank 47)	Paraguay (rank 65)
Singapore (rank 12)	Hungary (rank 30)	Poland (rank 49)	Venezuela (rank 66)
Japan (rank 13)	Mauritius (rank 30)	Dom. Republic (rank 49)	Nicaragua (rank 67)
Ireland (rank 14)	Thailand (rank 32)	Argentina (rank 51)	Ethiopia (rank 68)
Canada (rank 14)	India (rank 33)	Egypt (rank 51)	Bolivia (rank 69)
United States (rank 14)	Costa Rica (rank 33)	Bulgaria (rank 51)	Bangladesh (rank 70)
Hong Kong (rank 17)	El Salvador (rank 35)	Tanzania (rank 51)	
Belgium (rank 18)	Uruguay (rank 35)		
	Lithuania (rank 35)		

weakest

Although ranking only fourteenth does not sound very impressive, viewed from a different perspective, namely the region where the above seventy countries reside, North America comes in second, very close after Western Europe. This can be seen in the following graph:

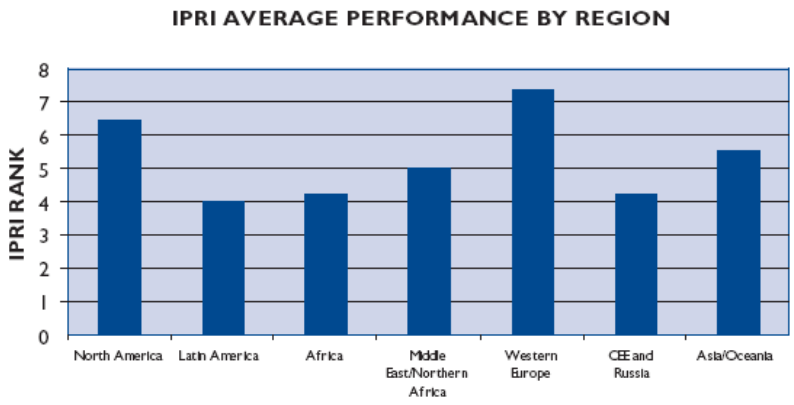


Figure 4.16: Average IPRI performance by region.[18]

From the above graph it can be seen that North America, scoring a 6.4 average is still slightly lower than Western Europe, scoring 7.4, but still better than the all country average of 5.3. From this graph the author can deduce that American creators of data, information, and knowledge will have the intellectual property protection to freely share and exchange their ideas from their local knowledge system with the global knowledge system. Thus, due to the protection of their intellectual property, American citizens will not be inhibited to share their local data, information and knowledge with the global knowledge system. In the following section, the author will investigate

[18] Information extrapolated form the International Property Rights Index Report (2007)

whether these high levels of democracy have led to an increase in political participation by the American citizens.

b) Increased Political participation

Taking the population figures into account, the voter turnout statistics for the USA are slightly worse than that of Norway. According to a report by Holder (2006), based upon statistics from the US Census Bureau, in the presidential election of November 2004, there was a voter turnout of 64% of voting-age citizens. This was higher than the 60% who turned out in the previous presidential election of 2000. The 2004 turnout was the highest turnout in a presidential election year since 1992, when there was a voter turnout of 68%. Another record was achieved in the 2004 presidential election with the overall number of people who voted being 126 million, a record high for a presidential election year. This was an increase of 15 million voters from the previous presidential election in 2000. According to Holder (2006) the voting age population increased by 11 million during this same 4-year period, thus indicating a real increase of 4 million voting citizens. Although these figures look extremely good, it is still considerably lower than the 75% voter turnout in Norway's last national election.

A further interesting fact pointed out by Holder (2006), is that 32 million people did not register to vote in the 2004 presidential election. Although there were many given reasons why they did not register, including excuses such as transportation problems and not meeting the deadline, 15 million people, (46% of the non-registered voters) reported that they were not interested in the election process of the country. As mentioned previously, this indicator indirectly impacts upon the interaction and exchange process, as this process is limited to the interaction and exchange of political data, information and knowledge. The author is of opinion that this 15 million people who were not interested in the political processes of the country will thus also not be interested in partaking within the interaction and exchange process of political data, information and knowledge that can be created through initiatives such as e-government portals and websites. The US government hopes to re-

kindle this interest, by making government more citizen-centric and by providing citizens with easy access to accurate, consistent, and timely government information. The author is further of opinion that an indirect relationship thus exists between increasing the political participation within a country and the usable and affordable content indicator of the Social criterion of the information and knowledge society, which will be discussed in the following section. Through the use of these e-government initiatives, USA citizens can partake within the interaction and exchange of political data, information and knowledge from their local knowledge system. This interaction and exchange process can thus provide the citizens access to accurate, consistent and timely government information, which in turn can re-kindle the interest of these citizens in the political processes of the country. Thus, the author can deduce that the USA completely complies with the political criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning the USA's political situation and can be summarised as follows:

- High levels of democracy, expressed in the existence of the right to freedom of expression, the freedom of access to information and various intellectual property rights and
- Increased political participation.

From the above discussions, it can be deduced that both Norway and the USA have high levels of democracy, which can be seen in the protection of the following freedoms: freedom of expression, freedom of access to information and intellectual property right protection. With these freedoms in place, citizens can freely, and without the fear of prosecution, share and exchange their data, information, and knowledge from their local knowledge system with the global knowledge system. This ultimately leads to greater government transparency and greater participation in the countries' political processes. This was measured by investigating the voter turnout in both Norway and the US which indicated that although high levels of democracy are in place in both the US and Norway, there is still a lack of interest in the political processes of the countries. To rectify this lack of interest, both

governments have invested in the creation of e-government programmes and e-voting initiatives. These initiatives, which will be discussed later in this chapter, will help to ensure active participation by the inhabitants of the two countries in the political process of the country through the interaction and exchange of political data, information and knowledge. For example, these e-government initiatives can provide political blogs and discussion forums where local and international people can partake in political discussions concerning local or international political issues. The author can, thus, deduce from this discussion that both Norway and the USA comply with the political criterion of an information and knowledge society. In the following section, the author will address the social criterion for becoming an information and knowledge society.

4.5.4 Social criterion

As the social criterion impacts on all aspects of human life, this is a very multifaceted criterion. Martin (1995) is of the opinion that in an information and knowledge society, information is seen as an enhancer of the quality of life. This sentiment is supported by the UNESCO (2003) Round Table on "knowledge societies", which, in preparation for the World Summit on the Information Society (WSIS), stated that:

> "Our Governments are committed to the improvement of the quality of life of our citizens and economic strength of our societies and to the achievement of an equitable and peaceful global community. The building of knowledge societies is an essential means to achieving these objectives and opens the way to humanization of the process of globalization."

Thus, an information and knowledge society is characterized by widespread information consciousness and end-user access to high quality information that will improve the quality of life of the citizens. This notion is supported by Thapisa (1996), who feels that global information should promote human development as well as the quality of life of citizens in areas such as health, education, and social services. From this the first indicator of the social

criterion of the information and knowledge society can be inferred, namely, the improvement of the quality of life. According to the Wikipedia (Wikipedia, 2007b), quality of life of the citizens of countries is of particular importance in economics and political science, and is measured by many social and economic factors such as the standard of living. As the standard of living and its three sub-indicators (income inequality, poverty rate and real income per person) have already been discussed under the political criterion of the information and knowledge society (see 4.5.3) the author will concentrate more on the health aspects related to the quality of life of citizens. From this perspective, quality of life is particularly important in health care, where monetary measures do not readily apply. The improvement of the quality of life in terms of good health prospects can be measured by looking at three sub-indicators. Firstly, low mortality rates and high life expectancy of citizens of the particular countries, secondly, the number of practicing physicians and, thirdly, by looking at the total expenditure on health as a share of GDP.

In terms of the first sub-indicator, mortality, the United Nations published *The World Mortality Report 2005* that provides a broad overview of mortality rate changes in all countries of the world during the latter half of the 20th century. This is the first report of its kind and is a valuable research tool for analysing levels and trends in mortality rates in all regions of the world (United Nations, 2005). This report will be utilised to obtain the country information regarding mortality rates for both Norway and the USA, which will be discussed later in this section, as well as for South Africa and Niger, which will be discussed in the following chapter.

According to the United Nations' *World Population Prospects: The 2006 Revision*, life expectancy is increasing in the world while the mortality rate is declining in most of the established market economies. However, in economies in transition, mortality rates are stagnant or even increasing, largely due to the deterioration of social and economic conditions and, in some developing countries, because of the spread of HIV. The world average for life expectancy at birth is 67.2 years. On average, male lives are slightly shorter, estimated at 65 years, whereas females, on average, live longer; to

an estimated 69 and a half years (United Nations, 2006). The mortality rate of citizens is very important to the central problem statement of this thesis as it directly influences the interaction and exchange of data, information and knowledge. These citizens will not partake within the interaction and exchange process if they are concerned about their mortality. Thus if there are issues present affecting their mortality such as HIV, etc they will be less inclined to partake within this process. However, the interaction and exchange of data, information and knowledge can in turn also influence the mortality rate of a specific country. Through this interaction and exchange process important global health information as well as local health remedies can be accesses and distributed that could improve the health and thus mortality rate of the specific country.

The second sub-indicator of the quality of life, namely, the number of practicing physicians, refers to the number of physicians, general practitioners and specialists (including self-employed) who are actively practising medicine in public and private health care institutions. The amount of practising physicians is a very good indicator of the status of the health services and health care of a particular country. If the health services of a country are good, then the working conditions for physicians will be favourable and there will be many practicing physicians. When there are more practising physicians, more patients can be treated and the quality of healthcare of the particular country increases. However, if the health services of a country are poor, then the working conditions will be less favourable, and there will be fewer practising physicians who can treat patients. Thus, the health care of the particular country declines. This indicator is also closely related to the third sub-indicator of the quality of life, namely the total expenditure on health as a share of GDP. If the total expenditure on heath as a share of GDP is high, then it can be inferred that more money is spent by the particular government to better the health service and care of the specific country and will there be more practising physicians. It is the author's opinion that the amount of practising physicians can have a direct and indirect impact upon the interaction and exchange of data, information and knowledge. With regard to the direct impact upon the interaction and exchange of data, information

and knowledge, these practising physicians can, through an existing ICT infrastructure, have access to the global body of medical knowledge. By partaking in e-health initiatives, these practicing physicians can exchange their local medical data, information and knowledge with the data, information and knowledge in the global knowledge system. Thus, this interaction and exchange process can benefit the health of the local population. With regard to the indirect impact upon the interaction and exchange process, the amount of practising physicians can affect the overall health and health care of the citizens in the country. In turn, the overall health of the citizens can have an impact upon the interaction and exchange process, as citizens who are ill, and cannot get adequate health care due to limited physicians will be less inclined to partake within this interaction and exchange process. According to the OECD (2007) Health Data Report, the average amount of practising physicians per 1000 population in 2005 was 3. This, as well as the statistics for the rest of the OECD member countries, can be seen in the following chart:

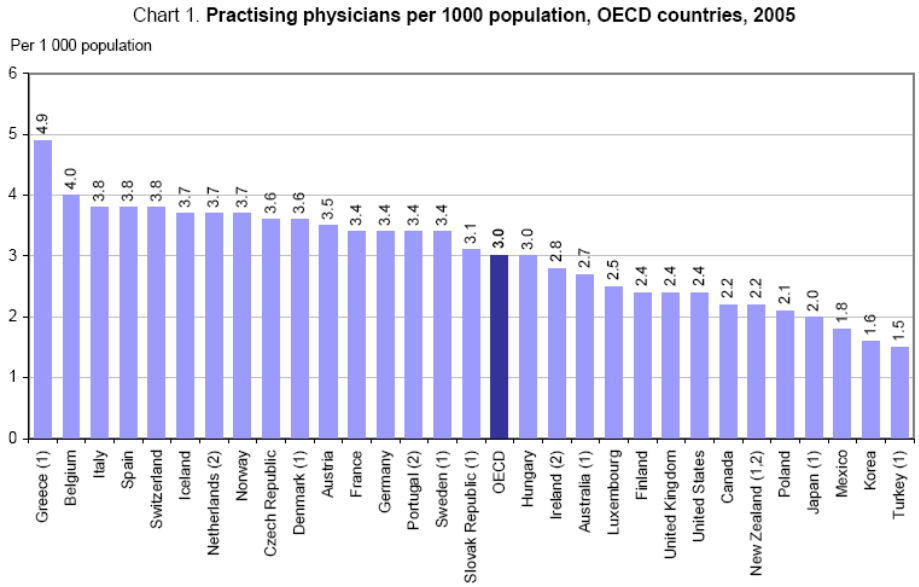


Figure 4.17: Practising physicians per 1000 population, OECD countries, 2005[19]

The total expenditure on health, as a share of GDP, is an indicator that measures the final consumption of health care goods and services added to

[19] Information extrapolated from OECD (2007)

capital investment in health care infrastructure. According to the OECD (2007) Health Data Report, the expenditure on health in most OECD countries is a large and growing share of both public and private expenditure. This level of health spending varies widely across countries, and reflects the different market and social factors as well as the different financing and organisational structures of the health system in each country. If a health system in a particular country in not well financed, the health care of that country will be poor and will there be fewer practising physicians, as discussed above. However, if the financing is adequate, then there will be enough finances to invest in a high quality health care infrastructure and will there be more practising physicians. The average total expenditure on health in the countries, in 2005 was 9% of their total GDP which is a 2.1% increase from the 6.9% expenditure in 1990. This can be seen in the following chart:

Chart 3. **Total expenditure on health as a share of GDP, OECD countries, 1990 to 2005**

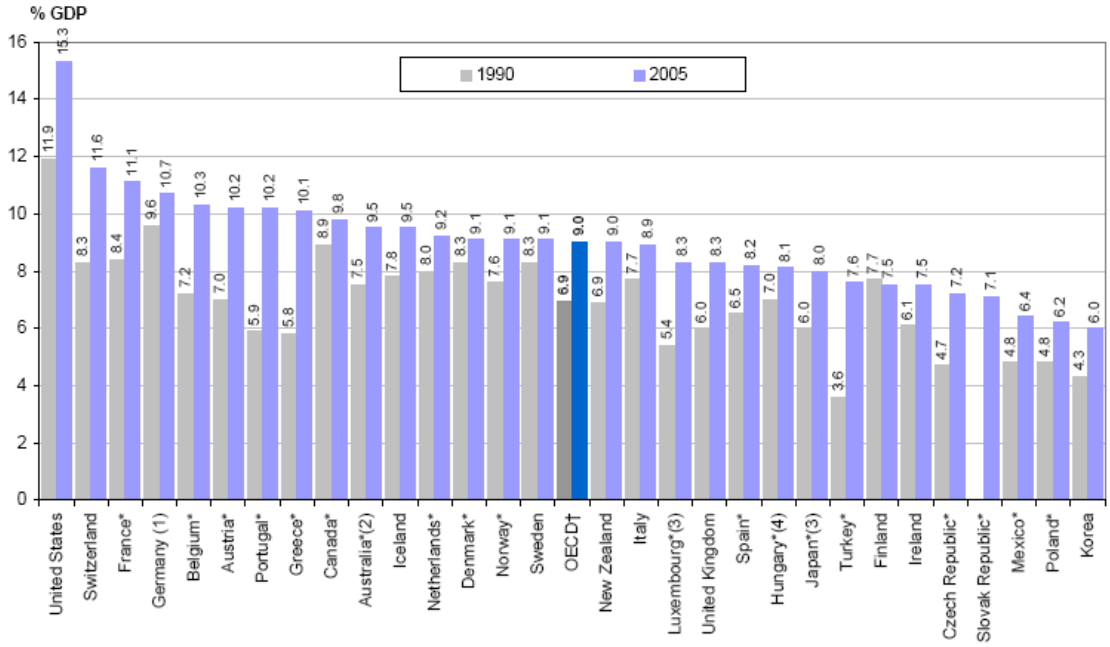


Figure 4.18: Total expenditure on health as a percentage of GDP, OECD countries, 2005[20]

As can be seen in this chart, of all the OECD countries Turkey was spending the least in 1990 with only 3.6% of the GDP being spent on health. The

[20] Information extrapolated from OECD (2007)

expenditure on health of Norway and the USA will be discussed later in this section. According to Europe's Information Society Thematic portal (eEurope, 2007), the information and knowledge society offers new possibilities for improving almost every aspect of healthcare, from making medical systems more powerful, to providing better health information to everyone through the use of modern ICT. These initiatives referred to as e-health, will be discussed later in this section, under the third indicator of the social criterion, namely, modern public services.

The second indicator of the social criterion of an information and knowledge society is education opportunities. Within an information and knowledge society, effective education and training systems are vital to ensure economic competitiveness and social inclusion. This sentiment was endorsed by the WSIS in their declaration of principals, in which they recognise that education, knowledge, information, and communication are at the core of human progress and their vision of a people-centred, inclusive and development-oriented information society (WSIS, 2003). Furthermore, education is, first and foremost, a fundamental human right, spelt out in Article 26 of the Universal Declaration of Human Rights (United Nations, 1948), which declares that, 'elementary' education shall be free and compulsory, and that higher levels of education will be equally available on the basis of merit.

Seen from a development perspective, this undertaking was also re-iterated in 2000 by the Dakar Framework for Action, which was adopted by the World Education Forum in Dakar, Senegal. In Article 6 of this framework, education is seen as, "the key to sustainable development and peace and stability within and among countries, and thus an indispensable means for effective participation in the societies and economies of the twenty-first century, which are affected by rapid globalisation." Thus, education is the indispensable means for effective participation in the information and knowledge society. This indicator can be measured by looking at two sub-indicators. The first of these is the literacy level of the country, whilst the second is the amount of years for which education is compulsory in the specific country.

Since 2003, the United Nations has made the needs of adults and the goal that people everywhere should be able to use literacy to communicate, a decade-long effort. For this reason the theme for the United Nations Literacy Decade (2003-2012) is, "Literacy for all: voice for all, learning for all." Unfortunately, literacy is still a dream that is unattainable to many. According to UNESCO, more than 780 million of the world's adults are still regarded as being illiterate and cannot read, or even write, their own names. To improve this situation, UNESCO has implemented the LIFE (Literacy Initiative for Empowerment) project. LIFE will be implemented in 35 countries, where either the literacy rate is lower than 50% or there is a population of more than 10 million citizens without literacy competencies. It will be implemented, over a 10-year period, starting in 2006, and ending in 2011 with the evaluation and assessment of the project.

According to the UNESCO Institute for Statistics, (2007b), the average literacy rate for the world for the period 1995 – 2005, is 82.4%, for youths (15 years to 24 years) and adults (15years +). The lowest literacy rate can be found in Burkina Faso, which only has an adult literacy rate of 12.8%. The countries with the highest literacy rates, 99% and higher, include countries such as Hungary, Slovakia, Armenia and the Russian Federation. The literacy rates for Norway and the United States will be discussed later in this section. The author is of opinion that the literacy rate of the citizens of the country is very important to the central problem statement of this thesis as it directly influences the interaction and exchange of data, information and knowledge. Citizens who have a very low literacy level will not be able to understand the data, information and knowledge within the global knowledge system and will not be able to interact or exchange local printed information. The author is further of opinion that the literacy rate of citizens can also be improved through this interaction and exchange process. This statement can be illustrated by means of the following example. Through the utilisation of the ICT infrastructure citizens can access digital libraries such as the International Children's Digital Library (ICDL). These libraries provide readers who have various levels of literacy, with appropriate reading material specifically suited for their level. Through interacting, accessing and using libraries such as

these, readers can improve their reading skills and thus improve their literacy level. Libraries such as these will be discussed later in this thesis.

Compulsory education is education on a primary (and sometimes secondary) level, which, by law, children are required to receive and governments to provide. According to an UNESCO publication, authored by Cynthia Guttman (2003), and entitled: "Education in and for the information society," the transition from countries to knowledge societies creates the challenge of raising the educational standards within the country. This raise can be obtained by increasing the amount of years of compulsory education within the country. As mentioned above, compulsory primary education is regarded as a basic human right and is protected by the Universal Declaration of Human Rights (United Nations, 1948). However, compulsory primary education is not enough. According to research of UNESCO and the OECD, entitled, *Financing Education – Investments and Returns* (2002) countries can reap rich dividends by investing in human capital in secondary as well as tertiary education; not just primary education. Although compulsory tertiary education has not yet become a reality in the world, many countries are investing in compulsory secondary education. According to the UNESCO global education digest (2006), Angola has the lowest compulsory education at only 4 years and the countries with the highest amount of compulsory education are Belgium, Germany, and the Netherlands each of which has 13 years of compulsory education. The author is of opinion that the amount of compulsory years of education also directly impacts upon the citizen's ability to partake within the interaction and exchange of data, information and knowledge from their local knowledge system and the global knowledge system. Through these years of compulsory education scholars are equipped with the necessary skills, i.e. computer literacy skills that will empower them to use a computer and the internet and thus use these technologies as a platform for the interaction and exchange process.

The third indicator of the social criterion, supported by initiatives of the European Commission, such as eEurope 2005 and the i2010, is the development of modern public services. The eEurope 2005 initiative was

launched at the Seville European Council in June 2002 and has been endorsed by the Council of Ministers in the eEurope Resolution of January 2003. This initiative is designed to develop modern public services and a dynamic environment through the widespread availability of broadband access. It ended in 2005, and was followed up by the i2010 initiative. This is the European Commission's strategic policy framework that lays out broad policy guidelines for the European information society and knowledge economy in the years up to 2010. One of the main points that this initiative promotes is research into ICT and the application to improve social inclusion through better more modern public services. Thus, this indicator will look at the following online initiatives: e-government and e-voting initiatives; improvements in the health public service sector through e-health initiatives; and the importance of e-learning initiatives in a society increasingly based on knowledge and information.

The first sub-indicator of well-developed public services, supported by Martin (1995), is e-government including e-voting initiatives. According to Martin (1995), much of the focus on the political effects of information-generated change has, traditionally, been on the possibility and potential benefits of enabling more people to participate in elections through various means, for example, electronic government, electronic polling and electronic voting. These initiatives are referred to as e-government and e-voting. E-voting is the practice where citizens are given the opportunity to cast their votes electronically. This does not, necessarily, imply casting a vote over the internet, although internet voting is one dimension of electronic voting. According to the Norwegian Ministry of Local Government and Regional Development (Haga, 2006) there are three dimensions of e-voting that have to be considered. First, a division is made between traditional paper ballot systems and electronic systems. Electronic systems can include different automated systems or kiosk solutions in which the vote is cast in a terminal, much like a cash machine, in the polling station. The second division is made according to where the vote is cast, whether in the polling station under the supervision of publicly appointed election officials or in a place where nobody can control the way in which the vote is cast, whether at home or at work. The

first situation is referred to as 'voting in controlled environments,' whilst the second situation is 'voting in uncontrolled environments.' The latter environment is applicable when votes are cast over the internet, from any geographical location, from computers at home, at work, or from any computer that has internet access.

On a computer, the task of casting a vote will be very easy and consist of marking one's choices on a checklist or marking one's suggested changes for one or more candidates and then pushing the send-button. There are great advantages to this kind of voting. The Norwegian Ministry of Local Government and Regional Development is of the opinion that electronic voting can help to increase political participation in a decade marked by an international decrease in participation in the political process, especially by the younger generation (Haga, 2006). Availability is an important aspect of a democratic society. Since e-voting may be done from any geographical site in the country or any place in the world, the voter does not have to personally appear in his or her home district. The potential availability, thus, increases drastically for citizens, i.e. for the student living away from home, for the disabled who have problems moving from one place to another or for citizens temporarily living abroad or travelling. It is the author's opinion that this indicator is very relevant to the interaction and exchange of data, information, and knowledge between the communities' local knowledge system and the global knowledge system. Using the internet as a platform for e-government and e-voting initiatives provides the perfect stage for the interaction and exchange of data, information, and knowledge. Through the use of these initiatives, communities can now access political information which relates to the first indicator of the political criterion, (high levels of democracy) that is achieved through the right of access to information. Furthermore, citizens can access their right to vote through e-voting initiatives, which might have been previously difficult to do, due to geographical and spatial limitations. Therefore, it can be seen that this indicator is also closely related and dependant upon the spatial and technological criteria discussed in the previous section. Without the necessary and adequate technological infrastructure, citizens would not be able to interact and exchange data,

information, and knowledge, and thus would not be able to increase their participation in the country's political processes through the use of e-government and e-voting initiatives.

The second sub-indicator of the development of modern public services is initiatives that can improve the public health services through the use of modern ICT, also referred to as e-health initiatives. With advances in ICT, people are empowered to make improvements to their health as a direct benefit of ICT. Through the use of ICT, the general public as well as professionals can access health information from various platforms and databases. Furthermore, ICT can be used for other e-health innovations such as electronic health records and computer-assisted prescription systems. In 2006, the World Health Organisation undertook a global survey on e-health with which to gather baseline data on the current state of e-health initiatives. Executed between mid-2005 and mid-2006, it represents the first attempt to examine e-health from a regional as well as global perspective. According to this report, most industrialised countries have raced forward in developing e-health initiatives, but many developing countries are unable to share in these advantages due to limited resources, such as the lack of a sophisticated ICT infrastructure (WHO, 2006). This sophisticated technological criterion of the information and knowledge society has already been discussed earlier in this chapter (4.5.2).

These technological limitations also impede developing countries from focussing their attention on the development and adoption of e-health policies. In the following figure, the adoption of e-health policies in the participating WHO member states can clearly be seen:

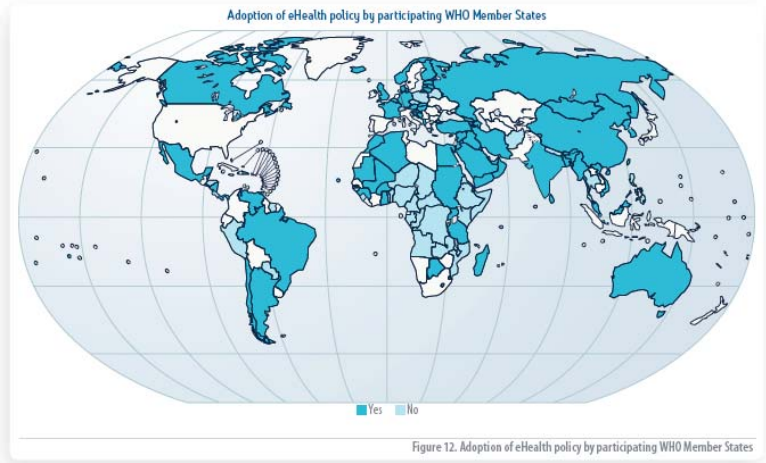


Figure 4.19: Adoption of e-health policies[21]

As can be seen from this figure, e-health policies have been developed and adopted by most European countries as well as countries in the Americas. Unfortunately, few countries in Africa have followed the same example.

It is the author's opinion that e-health initiatives can promote the interaction and exchange of data, information, and knowledge from the local knowledge system with data, information, and knowledge from the global knowledge system. For example a woman who has been diagnosed with breast cancer and offered two treatment protocols, can access global information using the internet as a platform. Through this platform, she can access information from leading global cancer institutions, in her own language and, thus, compare the risks and benefits of each treatment. Information can also be shared from other patients' local knowledge systems and, though accessing other cancer patients' blogs and websites, experiences and information can be shared and exchanged.

The third sub-indicator of modern public services is the improvement of education through e-learning initiatives. As already discussed above under the second indicator of the social criterion (education opportunities), effective education and training systems are vital to ensure economic competitiveness and social inclusion within the information and knowledge society. One way

[21] Information extrapolated form the WHO (2006)

to obtain effective education and training within a country is by utilising ICT for educational purposes. Commonly referred to as e-learning, these initiatives harness the power of ICT to ensure modern public services in education. For the purpose of this thesis, e-learning is defined as formal and informal education and information sharing that uses digital technology. According to Pfaus (2004), it is clear that in countries where e-learning is developing at a very fast pace, governments play a significant role. For example, the European Union's eEurope 2005 Action Plan encourages the development of e-learning programs across Europe. Government initiatives are also behind major e-learning advancements in Sweden, Canada, and South Korea (Pfaus, 2004).

In 2006, the Economist Intelligence Unit Ltd, together with the IBM Corporation, published e-learning readiness study of the world's 60 largest economies. This study ranks a country's ability to produce, use and expand internet-based learning — both formal and informal, at work, at school, in industry, in government, and throughout society. According to this White paper, e-learning readiness means more than just connectivity. The best-connected countries in the world, with the best ICT infrastructure, are not necessarily the top e-learners or top ranking in terms of e-learning readiness. Other factors such as a strong education system and adequate online content also play a vital role in the e-learning readiness of a country. These factors are summarised under four main areas: *connectivity* (the quality of the ICT infrastructure), *capability* (is the country capable of e-learning, based on literacy rates, and trends in training and education), *content* (the quality and volume of online learning materials) and c*ulture* (behaviours and beliefs that support e-learning development). These rankings can be seen in the following table:

Table 4.19: E-learning readiness ranking 2006.[22]

2006 e-readiness rank (of 68)	2005 rank	Country	2006 e-readiness score (of 10)*	2005 score	2006 e-readiness rank (of 68)	2005 rank	Country	2006 e-readiness score (of 10)*	2005 score
1	1	Denmark	9.00	8.74	35	32	S. Africa	5.74	5.53
2	2	US	8.88	8.73	36	34	Slovakia	5.65	5.51
3	4	Switzerland	8.81	8.62	37	35	Malaysia	5.60	5.43
4	3	Sweden	8.74	8.64	38	40	Lithuania	5.45	5.04
5	5	UK	8.64	8.54	39 (tie)	37	Latvia	5.30	5.11
6	8	Netherlands	8.60	8.28	39 (tie)	36	Mexico	5.30	5.21
7	6	Finland	8.55	8.32	41	38	Brazil	5.29	5.07
8	10	Australia	8.50	8.22	42	39	Argentina	5.27	5.05
9	12	Canada	8.37	8.03	43	41	Jamaica	5.03	4.82
10	6	Hong Kong	8.36	8.32	44	42	Bulgaria	4.86	4.68
11	9	Norway	8.35	8.27	45	43	Turkey	4.77	4.58
12	12	Germany	8.34	8.03	46	46	S. Arabia	4.67	4.38
13	11	Singapore	8.24	8.18	47	44	Thailand	4.63	4.56
14 (tie)	16	N. Zealand	8.19	7.82	48	45	Venezuela	4.47	4.53
14 (tie)	14	Austria	8.19	8.01	49 (tie)	50	Peru	4.44	4.07
16	15	Ireland	8.09	7.98	49 (tie)	47	Romania	4.44	4.19
17	17	Belgium	7.99	7.71	51	48	Colombia	4.41	4.18
18	18	South Korea	7.90	7.66	52	52	Russia	4.30	3.98

From this discussion, it can be seen that these modern public services, in areas such as e-government, e-health and e-learning are dependant upon a sophisticated and effective ICT infrastructure. With such an infrastructure in place, government, health, and educational information from the local knowledge system can be shared and exchanged with data, information and knowledge from the global knowledge system. Furthermore, this sharing and exchanging is dependant upon an infrastructure that can enable high volume and high speed information flow, such as a broadband connection.

A further aspect of the social criterion, and discussed by Britz *et al* (2006) as one of the main pillars of the information and knowledge society, is content that is usable and affordable. As already mentioned in chapter 3 (see 3.5.2), access to information alone is not enough, and being connected even with the best ICT infrastructure, does not necessarily mean to be informed. To enhance the quality of life within an information and knowledge society, people need information that is usable. Thus, the fourth indicator of the social criterion is usable content. The sub-indicators of usable content can be deduced from Britz *et al* (2006) who are of the opinion that the information in the information and knowledge society should be affordable, available, timely, relevant, readily assimilated, and in a language the user can understand (Britz

[22] Information extrapolated form the 2003 e-learning readiness rankings (IBM, 2003)

et al, 2006). Thus, the first sub-indicator of usable content is information that is affordable.

Affordability of information is also closely related to the economic criterion of the information and knowledge society. This criterion has already been discussed (see 4.5.1) and amongst other indicators, refers to the unemployment rate of the country, the income inequality, the poverty rate as well as the real (i.e. inflation adjusted) income per person. If there is a high unemployment rate in the specific country leading to a high poverty rate and low income per person, then citizens of the country will be less inclined to pay for information and an internet connection to obtain the information. However, if the unemployment rate is low, as in most developed countries (see 4.5.1) leading to a low poverty rate and high real income per person, citizens will be more inclined to pay for the information and, as a result, the information will be more affordable to them.

Affordability of information can also be measured by investigating the pricing of the monthly internet connection. Whether this connection is a slow dial-up connection, or a faster broadband connection, the user still has to pay a monthly subscription to this service. In the following table, a comparison was made showing the pricing of internet connections in seven European countries as of November 2006. This study was conducted by Analysis Consulting Limited (2007), and compared broadband services and prices in Belgium against six other benchmarked countries. The benchmarked countries chosen were Austria, France, Germany, the Netherlands, Sweden, and the UK. These countries were specifically chosen for their proximity to Belgium, their similarity in terms of GDP *per capita*, the similarity of their market structure, a comparable broadband penetration per household and also because they also include markets of a similar size to Belgium. From the table below, it can clearly be seen that the pricing over the seven countries differs dramatically, from country to country as well as between the various connection speeds. For a 500kbits per second connection, the lowest price a user can expect to pay 14.85 euros per month, compared to the 22.27 euros the same speed connection will cost in the UK.

Table 4.20: Lowest price offer (euros) per country[23]

	8000kbit/s and above	*4000kbit/s and above*	*2000kbit/s and above*	*500kbit/s and above*
France	14.90	14.90	14.85	14.85
Netherlands	19.95	19.95	14.95	14.95
Sweden	24.95	24.95	21.68	16.23
UK	26.72	26.72	22.28	22.27
Average	33.49	27.06	21.51	17.73
Belgium	39.00	24.90	24.90	19.90
Germany	39.94	29.99	23.99	16.99
Austria	69.00	48.00	27.90	18.90

Exhibit 3.9: *Lowest price offer per country for different offer ranges in the benchmark countries [Source: Analysys]*

The information in the table above also clearly shows the price increase over the different download speed range. This difference in price is the highest in Austria, where the user would only pay 18.90 Euros for a 500kbit/s connection compared to the 69.00 Euros for a connection of 8000 kbits/s. The author is of the opinion that the affordability of information is of particular importance to the central problem statement of this thesis. If connection to the internet is not affordable for the citizen in the particular country, then the sharing and exchange of information will not take place and citizens will not share their data, information, knowledge and experiences with the rest of the world. However, if the internet connection were more affordable, then this would stimulate citizens to share and exchange data, information, and knowledge from their local knowledge system with data, information and knowledge in the global knowledge system. The author is further of the opinion that the pricing for a higher speed connection is also crucially important. It would be very difficult to share and exchange data, information, and knowledge over a extremely slow internet connection. This slow connection would be a deterrent to citizens to share and exchange their knowledge, if higher speed connections were beyond their ability to pay. In the same way, the sharing and exchange of data, information, and knowledge can be stimulated if a higher speed connection is more affordable to the citizen of the particular country. The affordability of information as well as the affordability of an internet connection is one of the big barriers to the sharing and exchange of

[23] Information extrapolated from Analysis Consulting Limited (2007)

data, information, and knowledge in developing countries. This issue will be discussed in the following chapter.

Secondly, information should be timely and available. When discussing this second sub-indicator of the usable content indicator from an electronic content perspective, it also refers to the technological criterion of the information and knowledge society already discussed. Through the use of modern ICT, electronic content can be made available at any time and in any space, thus, also taking the spatial nature of ICT into account. The physical location is no longer a barrier to access information through the use of remote access and networks and, therefore, information can be accessed at any time (Goddard, 1991). Thus through the use of modern ICT, information can be timely and available.

However, this perspective raises an intricate problem. Through the use of modern ICT, the information that is largely available comes from developed countries that can afford the technological infrastructure. Local information from developing countries, for example on the African continent, is rarely made available. According to Britz *et al* (2006), mostly non-African content is made available in Africa. This problem, together with the lack of e-content in developing countries will be discussed in the following chapter.

Another way to investigate the availability of electronic information is to look at the amount of internet hosts within a country. Internet hosts publicly host information and then make this information readily available to anyone that has access to an internet connection.

This sub-indictor further also relates to the pricing and affordability of information discussed above. According to the World Information Access Project (2007), in nine of the 24 most populated cities of the world, the average person spends at least 10% of their daily income to pay for an hour of internet access at a commercial access point. This is made necessary because they do not have access at home. The nine cities are Karachi, Mexico City, Beijing, Buenos Aires, Sao Paulo, Dhaka, Rio de Janeiro, Cairo,

and Lagos. However, some of these countries represented by these cities have fewer internet hosts than other countries. In fact, eight of the most populated cities are actually in countries at the bottom quartile for number of internet hosts. Thus, the citizens in those eight cities who can afford an hour of access may be able to browse the World Wide Web, but they may not be able to find a significant amount of content and local content on hosts in their own country (World Information Access Project, 2007). This sub-indicator also relates to the knowledge criterion of the information and knowledge society. People in London (6,899,006 hosts in country) or New York (27,555,180 hosts in country) spend a small portion of their daily income on internet access, and find a significant amount of content in English and of cultural interest. However, people in Cairo (41,375 hosts in country) or Jakarta (89,340 hosts in country) spend a large portion of their daily income on internet access, but they find relatively less cultural content on hosts in their own country.

It is the author's opinion that the amount of internet hosts in the country will also have a direct impact on the sharing and exchange of data, information, and knowledge from their local knowledge system with the global knowledge system. If there are very few internet hosts in the country, the citizens of that particular country will only have a limited choice, and may only be able to access global information that might not be locally relevant, and may be in a language he/she cannot understand. If there are more local internet hosts, then the citizens will be able to access content that is locally relevant and, through this process, share locally created data, information, knowledge and experiences with the global knowledge system.

The third sub-indicator is information that is readily assimilated. In other words, information should be available in and through many information distribution channels. According to Webster (1999), this can be achieved through the use of media such as television, radio, newspapers and the internet, which enables the dissemination of information along the information superhighways. When referring to the internet as a distribution medium, this indicator also relates to the timeliness and availability of information discussed in the previous sub-indicator. The more internet host there are in a country,

the more information can be distributed and readily assimilated. In terms of the more traditional distribution channels, information can be distributed through the use of mass media sources such as non-printed distribution channels for example, television and radio, as well as printed distribution channels such as newspapers and other printed material. This sentiment was also re-iterated by Article 54 of the African Information Society Initiative (ECA, 1996) on the role of the media which states that: “In addition to being an essential means for information dissemination, the mass media plays a critical role in spreading awareness in Africa of the importance and benefits of the information revolution. Newspapers, radio and television provide an easy, accessible and cheap means of carrying information to the end user.” If many of these information distribution channels exist within a country then, in theory, it can be deduced that information within that country can readily be assimilated. Factors such as quality of education and literacy rates of the specific country must also be taken into consideration. Even if there are many existing printed information channels within the country, the citizens of the specific country will not be able to benefit from these information distribution channels if they are not literate and/or on a high enough education level to understand the information. Thus, by looking at the specific country’s media landscape, many deductions can be made relating to the assimilation of information. In the section to follow, the author will discuss the media landscape of both Norway and the USA.

The last sub-indicator of the usable content indicator of the social criterion of the information and knowledge society, is language. In such a society, information should be available to the citizens in a language they can understand (Britz *et al*, 2006). When it comes to language and access to the electronic content on the internet, the language distribution is disproportionately skewed. As can be seen in the table below, there are approximately 6, 912 living languages in the world (Gordon, 2005). Of these, more than 2000 languages are found on the African and Asian continents.

Table 4.21: Distribution of languages by area of origin[24]

Area		Living languages			Number of speakers			
		Count	*Percent*		*Count*	*Percent*	*Mean*	*Median*
Africa		2,092	30.3		675,887,158	11.8	323,082	25,391
Americas		1,002	14.5		47,559,381	0.8	47,464	2,000
Asia		2,269	32.8		3,489,897,147	61	1,538,077	10,171
Europe		239	3.5		1,504,393,183	26.3	6,294,532	220,000
Pacific		1,310	19		6,124,341	0.1	4,675	800
Totals		6,912	100		5,723,861,210	100	828,105	7,000

This distribution of languages is, however, not represented on the internet. As can be seen in the following table, the top ten languages of the internet are neither from Africa nor Asia.

Table 4.22: Top 10 Languages use on the Web[25]

Top Ten Languages Used in the Web
(Number of Internet Users by Language)

TOP TEN LANGUAGES IN THE INTERNET	% of all Internet Users	Internet Users by Language	Internet Penetration by Language	Language Growth in Internet (2000 - 2007)	2007 Estimated World Population for the Language
English	31.2 %	365,893,996	17.9 %	157.7 %	2,042,963,129
Chinese	15.7 %	184,001,513	13.6 %	469.6 %	1,351,737,925
Spanish	8.7 %	101,539,204	22.9 %	311.4 %	442,525,601
Japanese	7.4 %	86,300,000	67.1 %	83.3 %	128,646,345
French	5.0 %	59,207,849	15.3 %	385.4 %	387,820,873
German	5.0 %	58,981,592	61.1 %	112.9 %	96,488,326
Portuguese	4.0 %	47,326,760	20.2 %	524.7 %	234,099,347
Korean	2.9 %	34,120,000	45.6 %	79.2 %	74,811,368
Italian	2.7 %	31,481,928	52.9 %	138.5 %	59,546,696
Arabic	2.5 %	28,782,300	8.5 %	940.5 %	340,548,157
TOP TEN LANGUAGES	85.0 %	997,635,142	19.3 %	203.7 %	5,159,187,766
Rest of World Languages	15.0 %	175,474,783	12.4 %	440.3 %	1,415,478,651
WORLD TOTAL	100.0 %	1,173,109,925	17.8 %	225.0 %	6,574,666,417

[24] Information extrapolated from Gordon (2005)
[25] Information extrapolated from ITU (2007)

From this table, it can be seen that although English is the top language of the internet, only 17.9% of the estimated 2,042,963,129 people who speak English, use the internet.

According to Bool (2006), in 1998, 70% of internet websites were in English, followed by the German language at only 7%. Less than one percent of the websites were in Chinese. These statistics did improve marginally in 2000. By then, the distribution had changed. According to Ebbertz (2002) "only" 56% of the websites were in English. If one is to look at the distribution of Web pages per language, English still outweighs all the other languages by a huge margin. This can be seen in the following figure:

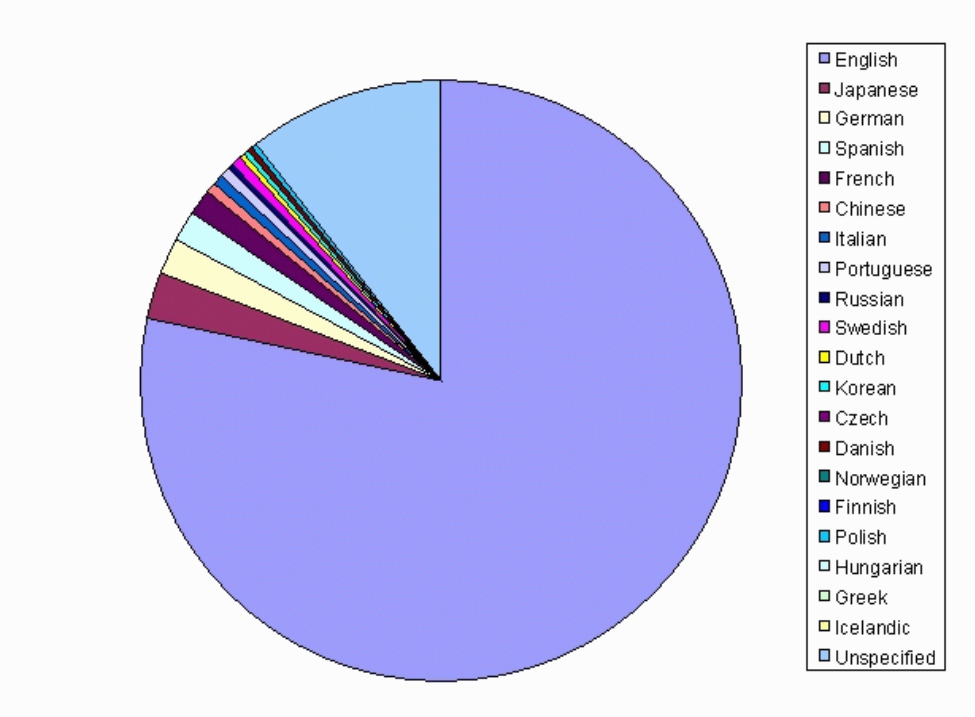


Figure 4.20: Web pages by language[26]

This figure remained constant in 2002. English websites still dominated the Web content with 56.4% of all websites being in English, followed again by German with 7.7%. The only true improvement in terms of language distribution was the percentage of Chinese websites. Where the figures for 2000 showed less than 1% of sites were in Chinese, it did improve to 2.4% by 2002 (Ebbertz, 2002). The uneven language distribution is evident from these

[26] Information extrapolated from Press (1999)

statistics. It is the author's opinion that this uneven language distribution on the internet will also play a big role in the exchange and sharing of data, information, and knowledge from the local knowledge system and the global knowledge system. If the local knowledge system of the citizens in the specific county is in English, then this uneven language distribution will not hinder the exchange process. However, if the local knowledge system of the citizens is in another language, then this uneven language distribution might intimidate the user and the exchange process will not take place. Thus, this will stop the flow of data, information, and knowledge from the local knowledge system to the global knowledge system. The flow from the global knowledge system to the local knowledge system might also be interrupted if the citizens in the specific country cannot understand the predominantly English information from the global information system. Here education level and literacy rates will also play a big role, as previously discussed.

From the above discussion, the author can conclude that there are numerous indicators that play a role in the fulfilling of the social criterion of the information and knowledge society. In the sections to follow, the following indicators and sub-indicators will be applied to Norway and the USA, to see if they comply with the social criterion of the information and knowledge society:

a) Health Prospects:
    i. Mortality rate & life expectancy;
    ii. Practising Physicians;
    iii. Health expenditure.

b) Education opportunities:
    i. Literacy rates and
    ii. Compulsory Education.

c) Public services:
    i. e-government and e-voting initiatives;
    ii. e-health initiatives;
    iii. e-learning initiatives.

d) Usable & affordable content:
    i. Affordability;
    ii. Timely and available;

iii. Readily accessible;

iv. Language.

Norway

a) Health Prospects

In terms of the first indicator of the social criterion of the information and knowledge society, the Norwegians have very good health prospects and have, from an international perspective, a very good national health plan (Norwegian Ministry of Health and Care Services). Over the last few decades, the Norwegian government has done a great deal to improve the overall health condition of all Norwegians, through the implementation of vaccination programs and by providing better access to medication. Through these and other initiatives, the life expectancy of Norwegians has improved by 27 years over the last century. In a survey conducted by the World Health Organization (WHO, 2006) on the way health care is run in Norway, it was found that 60% of all the respondents were satisfied with the health care they received, compared to only 14% who expressed dissatisfaction.

This satisfaction in the Norwegian health care plan is also reflected in the two sub-indicators. Firstly, in terms of low mortality rates, Norway has an extremely low mortality rate of only 9.37 deaths per 1,000 population (2007 est.) and an even lower infant mortality rate of only 3.64 per 1,000 population (2007 est.) These mortality rates over a period of 4 years can be seen in the following two tables:

Table 4.23: Norwegian Death rates, 2003 – 2007[27]

Year	Death rate	Rank	Percent Change	Date of Information
2003	9.72	79		2003 est.
2004	9.45	80	-2.78 %	2004 est.

[27] Information extrapolated from CIA World Factbook (2007b)

2005	9.45	81	0.00 %	2005 est.
2006	9.4	80	-0.53 %	2006 est.
2007	9.37	79	-0.32 %	2007 est.

Table 4.24: Norwegian Infant Death rates, 2003 – 2007[28]

Year	Infant mortality rate	Rank	Percent Change	Date of Information
2003	3.87	219		2003 est.
2004	3.7	218	-4.39 %	2004 est.
2005	3.7	218	0.00 %	2005 est.
2006	3.67	217	-0.81 %	2006 est.
2007	3.64	212	-0.82 %	2007 est.

When compared to other OECD countries, for example, Australia, Belgium, and France, Norway has the lowest infant mortality rate. This can be seen in the following table:

Table 4.25: Infant Mortality rates in OECD countries[29]

Infant mortality

Deaths per 1 000 live births

	1970	1980	1990	1995	2000	2001	2002	2003	2004
Australia	17.9	10.7	8.2	5.7	5.2	5.3	5.0	4.8	4.7
Austria	25.9	14.3	7.8	5.4	4.8	4.8	4.1	4.5	4.5
Belgium	21.1	12.1	6.5	5.9	4.8	4.5	4.4	4.3	4.3
Canada	18.8	10.4	6.8	6.0	5.3	5.2	5.4	5.3	..
Czech Republic	20.2	16.9	10.8	7.7	4.1	4.0	4.1	3.9	3.7
Denmark	14.2	8.4	7.5	5.1	5.3	4.9	4.4	4.4	4.4
Finland	13.2	7.6	5.6	3.9	3.8	3.2	3.0	3.1	3.3
France	18.2	10.0	7.3	4.9	4.4	4.5	4.1	4.0	3.9
Germany	22.5	12.4	7.0	5.3	4.4	4.3	4.2	4.2	4.1
Greece	29.6	17.9	9.7	8.1	5.4	5.1	5.1	4.0	4.1
Hungary	35.9	23.2	14.8	10.7	9.2	8.1	7.2	7.3	6.6
Iceland	13.3	7.8	5.8	6.0	3.0	2.7	2.3	2.4	2.8
Ireland	19.5	11.1	8.2	6.4	6.2	5.7	5.1	5.1	4.9
Italy	29.0	14.6	8.2	6.2	4.5	4.7	4.5	4.2	4.1
Japan	13.1	7.5	4.6	4.3	3.2	3.1	3.0	3.0	2.8
Korea	45.0	..	..	..	..	..	5.3	..	..
Luxembourg	25.0	11.4	7.3	5.6	5.1	5.8	5.1	4.9	3.9
Mexico	79.4	51.0	36.2	27.6	23.3	22.4	21.4	20.5	19.7
Netherlands	12.7	8.6	7.1	5.5	5.1	5.4	5.0	4.8	4.1
New Zealand	16.7	13.0	8.4	6.7	6.3	5.6	6.2	..	..
Norway	12.7	8.1	6.9	4.0	3.8	3.9	3.5	3.4	3.2
Poland	36.7	25.5	19.3	13.6	8.1	7.7	7.5	7.0	6.8
Portugal	55.5	24.2	11.0	7.5	5.5	5.0	5.0	4.1	4.0

[28] & [29] Information extrapolated from OECD (2007)

Slovak Republic	25.7	20.9	12.0	11.0	8.6	6.2	7.6	7.9	6.8
Spain	28.1	12.3	7.6	5.5	3.9	3.4	4.1	3.6	3.5
Sweden	11.0	6.9	6.0	4.1	3.4	3.7	3.3	3.1	3.1
Switzerland	15.1	9.1	6.8	5.0	4.9	5.0	5.0	4.3	4.2
Turkey	145.0	117.5	55.4	43.0	28.9	27.8	26.7	28.7	24.6
United Kingdom	18.5	12.1	7.9	6.2	5.6	5.5	5.2	5.3	5.1
United States	20.0	12.6	9.2	7.6	6.9	6.8	7.0	6.9	6.8
OECD average	28.1	17.9	11.0	8.4	6.7	6.4	6.2	6.0	5.7

When looking at the second part of the first sub-indicator, namely high life expectancy in Norway, it was found that life expectancy continues to increase for both men and women. In 2006, a newborn boy could expect to live to just over 78 years of age, whereas a newborn girl could expect to live slightly longer, to 82 years of age. This difference in life expectancy between men and women has fallen by one third in the last two decades, to only 4.5 years (Statistic Norway, 2006). This can be seen in the following figure:

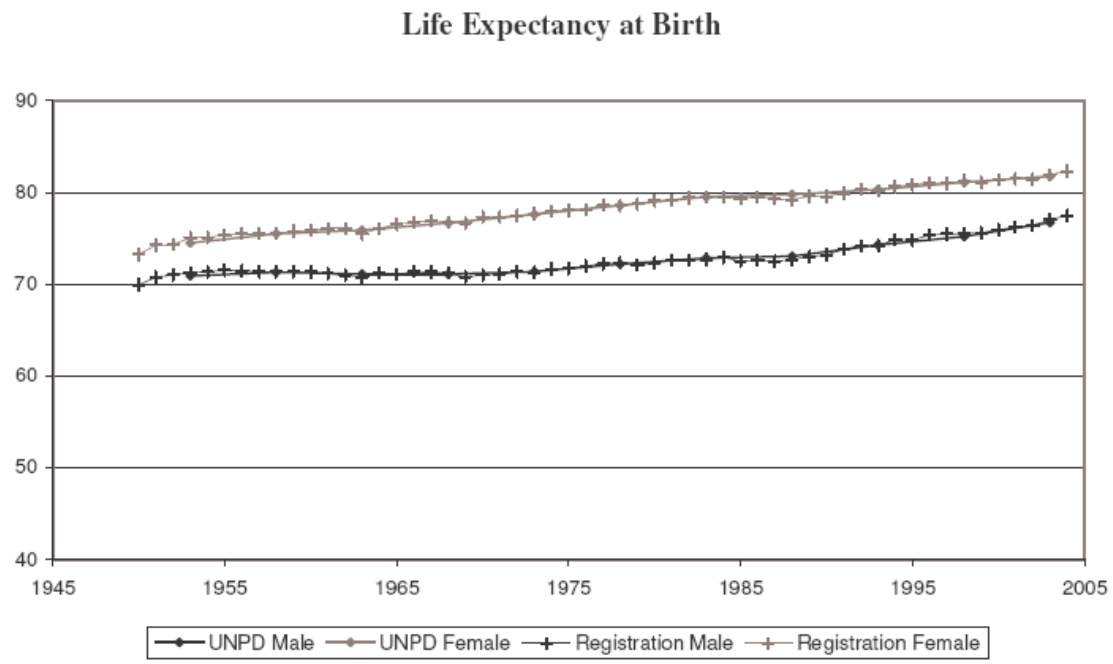


Figure 4.21: Norwegian life expectancy at Birth[30]

In terms of the second sub-indicator, namely the amount of practising physicians, it can be seen from Figure 15, that Norway has approximately 3.7 practicing physicians per 1000 citizens. This is higher than the OECD country average of 3 practising physicians, and the fourth highest of all OECD countries (OECD, 2007).

[30] Information extrapolated from World Mortality Report (United Nations, 2005)

The improvements in the Norwegian national health care plan are, further, due to a higher percentage of GDP expenditure on health, the third sub-indicator of this good health prospect indicator. As can be seen in the following table, 9.1% of the Norwegian GDP is spent on health issues. This places Norway in the top ten OECD countries in terms of health expenditure as a share of the total GDP.

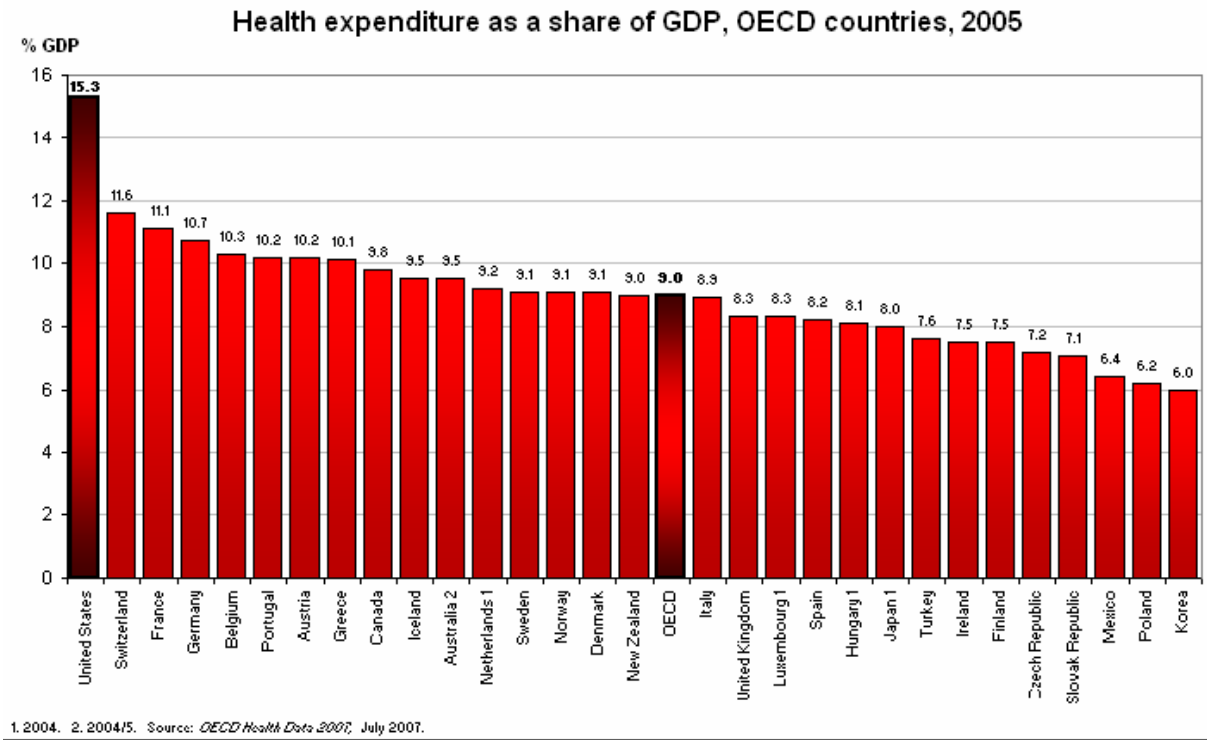


Figure 4.22: Health expenditure as a share of GDP[31]

Thus, the author can deduce from the above discussion and statistics, that citizens in Norway have a very good quality of life, which is reflected in the low mortality rate and high life expectancy. Furthermore, the Norwegian government is dedicated to improving the quality of healthcare services, which is reflected in the high percentage expenditure of the total GDP on health. This creates a favourable working environment for practising medical staff, which results in more practising physicians, who, in turn, are capable of seeing more patients, resulting in even higher satisfaction in the Norwegian

[31] Information extrapolated from OECD (2007)

health care plan. The Norwegian government is also dedicated to improving and modernising the health care sector even more by supporting various e-health initiatives. These initiatives will be discussed in greater detail later in this section. The author is therefore of opinion that the citizens of Norway will not be inhibited by health issues to partake within the interaction and exchange of their local data, information and knowledge with the global information system. This interaction and exchange of data, information and knowledge can in turn also improve the health condition of the citizens through the distribution of global health information and local Norwegian health remedies. In the following section, the author will discuss the education opportunities that are available to the Norwegian citizens.

b) Education opportunities

The second main indicator of the social criterion is good education opportunities. As discussed above, within an information and knowledge society, effective education and training systems are vital to ensure economic competitiveness and social inclusion. This sentiment is echoed by the Norwegian Government, in their total expenditure on all levels of education. As can be seen in the following table, in 2002 Norway spent the fourth most of all the OECD countries, spending 6.9% of the GDP on education.

Table 4.26: GDP expenditure on all levels of education, OECD countries[32]

	1995	**2002**
Turkey	2.3	3.8
Greece	3.2	4.1
Slovak Republic	4.7	4.2
Ireland	5.3	4.4
Czech Republic	5.4	4.4
Japan	4.6	4.7
Spain	5.4	4.9
Italy	..	4.9
Netherlands	4.9	5.1

[32] Information extrapolated from OECD (2006)

Germany	5.5	5.3
Austria	6.2	5.7
Portugal	5.3	5.8
United Kingdom	5.5	5.9
Australia	5.7	6.0
Finland	6.3	6.0
France	6.3	6.1
OECD total	**..**	**6.1**
Poland	..	6.1
Switzerland	..	6.2
Mexico	5.6	6.3
Belgium	..	6.4
New Zealand	..	6.8
Sweden	6.2	6.9
Norway	7.1	6.9
Korea	..	7.1
Denmark	6.3	7.1
Canada	7.0	..
United States	7.2	7.2
Iceland	..	7.4

This indicator of the social criterion is also interrelated to other sub-indicators and main indicators, such as the health sub-indicator and the economic and political indicators. These links can be seen in the speech of the Norwegian Minister of Education and Research on the importance of fair and inclusive education. According to Minister Øystein Djupedal (2007), education, knowledge, and skills contribute to inclusion in the workplace, to better economy and better health. Furthermore, education also ensures greater democracy and participation in society as well as a lower crime level.

In terms of the first sub-indicator of the good education opportunities indicator, high literacy rates, Norway claims to have a literacy rate of 100% (Britanica Online, NationMaster, and CIA Worldfact Book). This is mainly due to the fact that Norway, together with 18 other countries, has no measurable rates of illiteracy (UNDP, 2006).

According to The Education Mirror, 2006, published by the Norwegian Directorate for Education and Training, the education level in Norway lies, approximately, on the OECD average when it comes to the proportion of the population with upper secondary education, and well above the OECD average when it comes to the proportion of the population with higher education. According to UNESCO (2006), in Norway there are eleven years of compulsory education, spread over the primary and secondary level, which creates a climate for further education and life long learning. Alongside this, learning starts at a very young age. According to Statistics Norway (2007b), three out of four children aged 1-5 years attend kindergarten. This climate and culture of learning has resulted in more youths enrolling for a tertiary education. This can be seen in the following figure.

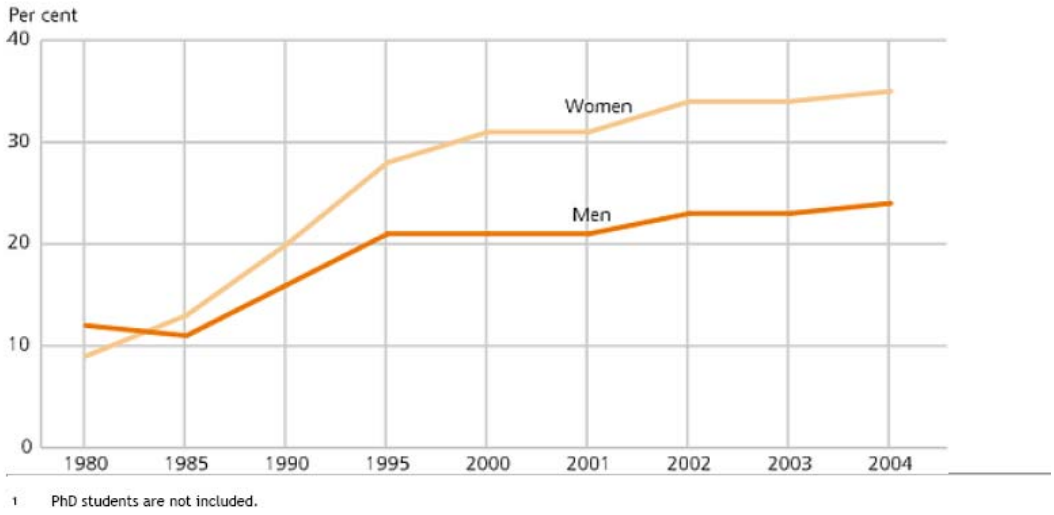


Figure 4.23: Percentage of men and women in tertiary education[33]

From these statistics, the author can deduce that citizens of Norway have access to good education opportunities, provided by the Norwegian government. This government is dedicated to adapted learning, a good learning environment, and the creation of a learning culture that is a prerequisite for the information and knowledge society. One of the key elements to obtain this is through the use of modern ICT, resulting in changes to the current educational system. Through the establishment of e-learning

[33] Information extrapolated from Statistics Norway (2007b)

initiatives, the Norwegian government hopes to harness the power of ICT in the educational sector. These initiatives, as well as other electronic public services, will be discussed in the following section. It is thus evident from the high literacy rate combined with the high amount of compulsory education that the Norwegian citizens are equipped with the necessary skills to partake within the interaction and exchange of data, information and knowledge from their local knowledge system and the global knowledge system. Due to their education, these citizens have the skills to harness the power of ICT to enable this interaction and exchange process as well as the intellectual capability to understand and contextualise the data, information and knowledge available within the global knowledge system. In the following section the author will discuss the modern public services that are available within Norway that can furthermore contribute to this interaction and exchange process.

c) Public services

As discussed above, well-developed public services are essential to ensure greater social inclusion in the information and knowledge society. To achieve this, the Norwegian government has invested in the establishment of a modern online government portal called eNorge. This ICT based program is aimed specifically at the municipality level as this is the government level that has the most direct contact with the citizens and businesses and is responsible for providing a variety of basic services. According to the Norwegian Ministry of Trade and Industry (2000), the Norwegian approach to information and communication technologies is based on the premise that all citizens should have the right to meaningful participation in the information and knowledge society. Through such ICT based programs like norge.no, a government website that is responsible for guidance in making it easier to reach public services and public information, the internet as a platform offers extraordinary opportunities for information exchange and sharing knowledge.

Furthermore, the Norwegian government has shown great progress with the dissemination and access to health information, through various e-health initiatives and by placing a great emphasis on the use of ICT in education has

supported various e-learning initiatives. These three sub-indicators of the well-developed online public services in Norway will now be discussed in greater detail.

i. E-government and e-voting initiatives

As mentioned above, Norway has an e-government programme called eNorway which is coordinated by the Norwegian Ministry of Modernisation. Through this e-government program, democracy is strengthened by improving two-way communication between the citizens and the Norwegian government. With the eNorway 2009 programme, the Norwegian Government wishes to create an information and knowledge society, in which everyone can participate and which exploits the potential of information technology (Norwegian Ministry of Modernisation, 2005). According to the Norwegian Government's policy for the information society (2005), eNorway 2009 has three target areas:

- The individual in the digital Norway;
- Innovation and growth in business and industry;
- A coordinated and user-adapted public sector.

Athow (2007) is of the opinion that the e-government program of Norway is the first Web 2.0 government in the world. The eNorway 2009 initiative will be deployed on a combination of Sun hardware and software technologies, powered by the Solaris 10 Operating System, the most advanced operating system on the planet. The complete end-to-end Sun solution allows the Norwegian government to drive innovation and provide an online platform for citizens to vote, pay taxes, obtain social security benefits, register and manage automobiles, communicate with public officials and conduct other civic initiatives and services (Athow, 2007).

The Norwegian government is of the opinion that when correctly applied, ICT improves the living conditions of the population in both their private and working lives (Norwegian Ministry of Modernisation, 2005). To help achieve this goal, eNorway 2009 will focus on multi-disciplinary initiatives and projects

that are all ICT based. One such project is norge.no. The Web portal www.norge.no was launched 24 January 2000 as part of a Government initiative in cooperation with the Norwegian Association of Local and Regional Authorities. The portal was designed to give citizens and public sector employees a comprehensive view of public administration in Norway and through doing this make government more transparent. norge.no is the Norwegian government website that is responsible for guidance in making it easier to reach public services and public information. On this site, users are provided with help to navigate, using an internet gateway and a service that can be accessed by phone, e-mail, internet chatrooms and SMS. norge.no is also responsible for encouraging implementation of government information policy concerning accessibility and universal design of online public services.

One of the services provided by the new eNorway 2009 program, is e-voting. In a comprehensive report entitled: “Electronic voting – challenges and opportunities” (2006), the Norwegian Ministry of Local Government and Regional Development investigated the advantages and disadvantages associated with electronic voting. In this report, e-voting was considered from two perspectives. The first perspective is a very restrictive one, namely that e-voting can only be considered in a controlled environment like a polling station. The second perspective is less restrictive and referred to as VOI or voting over the internet, that is, e-voting in an uncontrolled environment.

From the first perspective, experiments were run in three Norwegian municipalities; Oppdal, Bykle, and Larvik during the regular local and regional elections of 2003. An experiment was also run during the election for the local political administration in Svalbard on 26 and 27 October 2003. In all four municipalities, the voters were provided with the opportunity to cast their ballots through an electronic ballot box instead of casting a regular paper ballot in a traditional ballot box. The electronic ballot box was designed as a computer with a touch screen. The electronically submitted ballots were counted as regular ballots in the election. The entire voting district providing the electronic option had just one e-voting terminal each. All voters were given the option to cast an electronic vote. In the Svalbard election 91% of the

voters cast their votes electronically. In the municipality of Bykle, 53% opted for the e-voting mode. In Oppdal, 34% of the voters voted electronically and in the polling district of Larvik, Østre Halsen, 18% opted for the electronic mode (Norwegian Ministry of Local Government and Regional Development, 2006).

From these experiments (Norwegian Ministry of Local Government and Regional Development, 2006), the following important issues came to light. The most frequent reason given for choosing the electronic voting system was the interest in trying out something new, to participate in a new and exciting experiment. Reasons from voters who opted for the traditional paper ballot were the following:

- voters were opposed to the idea of e-voting;
- voters did not have the time;
- voters thought it would be complicated;
- voter responses such as, “lack of information,” “don’t understand computers.”

No experiments have been conducted in Norway to test the second perspective of e-voting: VOI. However, during the project period at the local elections in 2003 Norwegian, voters were asked their opinions on VOI if such a voting procedure had been provided. The following interesting facts came to light:

- Seven out of ten voters who chose the e-voting option in the municipal elections were favourable to voting over the internet if this opportunity had been available.
- More than 50% of those who cast their votes in accordance with traditional practice, were also positive to VOI if that option had been provided.
- Almost nine out of ten who took part in the project found it easy to vote electronically and just as many would use the same voting mode in the future, if it were provided.

Thus, it can be seen from this discussion, that e-government and e-voting initiatives have been implemented in Norway with great success, and that these initiatives will help stimulate the participation in the Norwegian political process. These initiatives harness the power and advantages of information technologies to help Norwegian citizens access and share more government data and information resulting in a more transparent government and so, strengthen Norwegian democracy. The author is of opinion that initiatives like these have a direct impact upon the interaction and exchange of data, information and knowledge from the Norwegian local knowledge system and the global knowledge system. Norwegian information in the local language of the citizens is made available in the global knowledge system via e-government portals on the internet such as eNorge. Through the utilisation of platforms such as the internet, more data, information, and knowledge can be accessed and shared. In turn this interaction and exchange process will aid Norway to comply with the other stated criteria of the information and knowledge society, and consequently become such a society.

ii. E-health initiatives

According to a report to EU Ministerial Conference (2003) "e-health is the single-most important revolution in healthcare since the advent of modern medicine, vaccines, or even public health measures like sanitation and clean water.[34]" The Norwegain government, who hosted the European Commission's third, high-level, e-health Conference in 2005, also shares this sentiment. At the conference, Norwegian Minister of Health and Care Services, Ansgar Gabrielsen, said that the government believes that e-health is the way to ensure major advances in the Health sector that will benefit the people of Norway and Europe. Citizens need healthcare and health services as well as a wide range of health information during their lifetime. This information can be disseminated through e-health initiatives, which the Norwegian Government has been supporting since 1997. In 1997, the first government action plan for e-health called "More health for each bIT," was issued. After the successful completion of this plan, the second plan, "Say

[34] From a report to EU Ministerial Conference (2003).

@h," was issued by the Norwegian government in 2001. The latest e-health plan of the government, "Te@mwork 2007," was drafted by the Directorate for Health and Social Affairs and was published in 2004. This national action plan gives an outline of government measure to promote greater electronic interaction in the health and social sectors.

A great deal of progress has already been made in Norway in terms of implementing e-health initiatives. Firstly, when looking at the infrastructure needed for such initiatives, Norway already has an existing dedicated healthcare network, which interconnects the five regional health networks. Currently, this network provides a number of basic services like eMail, web, catalogues and registries of personnel. In future, it is hoped that these services can be extended to include services such as telemedicine and Electronic Data Interchange. According to the new e-health plan, "Te@mwork 2007," the Norwegian government hopes to implement amongst other, the following activities in the nearby future (Te@mwork, 2007):

- The stimulation of broadband development between hospitals, and between hospitals and the primary health services;
- Implementation of a national e-government information portal serving all sectors, including health;
- The development of an eprescription service that will transfer electronic prescriptions to pharmacies from General Practitioners and hospitals.

The author is of the opinion that e-health initiatives can really be utilised to stimulate the interaction and exchange of data, information, and knowledge from the Norwegian local knowledge system to the global knowledge system. Through the utilisation of internet technologies, the Norwegian patient can post symptoms of his/her ailment on a forum or blog which, in turn, can be accessed by people in the global knowledge system. Through this interaction, possible diagnosis can be made that can be confirmed by visiting a clinic or general practitioner. When a diagnosis and treatment for the ailment has been suggested, the patient can find further information on the global knowledge system that will empower him/her to select the best treatment option for

his/her condition. Information from the Norwegian local knowledge system can also be obtained that might include local Norwegian remedies. By using this type of technology, the patient can also exchange information concerning his/her ailment and treatment on the global knowledge system that, in future can be accessed by other patients experiencing the same symptoms. In this way, electronic information exchange can truly empower Norwegians and be used successfully for social inclusion within the information and knowledge society.

iii. E-learning initiatives

According to the eNorge 2009 (eNorway 2009), the Norwegian Government's action plan to become a world-leading nation, the goal of the Government is for the Norwegian education system to be among the foremost in the world in educational use of ICT in teaching and learning. To achieve this, e-learning is developing rapidly in Norway. Due to Norway's scattered population and rugged climate and terrain, distance education has long been a necessity. This fact, combined with Norway's high technology penetration, as discussed under the technological criterion, makes Norway ideal for the implementation of e-learning initiatives. A very important part of this action plan is the program for digital skills 2004 – 2008. This program will ultimately prepare the Norwegian student for a future in e-learning. The programme entails the implementation of a new curricula for primary and secondary schools, where digital skills are placed as one of the five basic skills that should be integrated in all subjects. The goal of this program is to place digital skills central to education and training.

In a survey conducted by the NKI, the leading distance education institution in Norway, and Norway Opening Universities (NOU), four Norwegian megaproviders of e-learning were identified (Arneberg, 2006). Three of the four are private providers, with the one being a public university college. Both NOU and NKI are leaders in the field of distance education as well as e-learning in Norway. NOU is a national governmental agency for flexible and lifelong learning in Norway, and NKI is one of the largest distance education institutions in Northern Europe. As far back as 1987, NKI was one of the first

institutions in the world to offer their distance education courses online. The three private providers identified by the survey are:

- NKI Distance Education (NKI DE) (www.nki.no);
- NKS Distance Education (NKS DE) (www.nks.no);
- BI Distance Education (Norwegian School of Management) (www.bi.no).

All three of the above private institutions offer online courses within higher education, secondary level education and vocational training.

The fourth Norwegian megaprovider identified in the survey, is a public university college, Sør-Trøndelag University College (www.hist.no), which offers courses at higher education level alongside 148 online courses (Arneber, 2006).

It is the author's opinion that e-learning initiatives are central to the interaction and exchange of data, information, and knowledge between the Norwegian local knowledge system and the global knowledge system. Through the use of online distance education material, created by Norwegian institutions and in the native language of Norway, the Norwegian population can truly benefit from the advantages modern technology can offer in the educational sector. Through initiatives such as eNorge 2009, and the Digital skills program 2004 – 2008, the Norwegian population are skilled in the effective use of information and communication technologies, enabling them to partake in the sharing and exchange of their local data, information, and knowledge with the rest of the world in the global knowledge system. In the following section, the author will investigate whether this content, and other electronic content on the World Wide Web, is truly usable, in terms of affordability, accessibility, timeliness, and language.

d) Usable and affordable content

In terms of the last indicator of the social criterion, information must be truly usable in terms of its affordability, accessibility, timeliness, distribution, and

the language. When investigating the first sub-indicator, namely, affordability, it is clear from Table 4.12 (discussed under the spatial & technological criterion), that there is a direct correlation between the amount of money Norwegians earn, and the use of ICT. Thus, a correlation exists between the affordability of information and the technological criterion (as discussed in 4.5.2). For example, only 53% of people with a household income under 200 NOK have access to a computer, compared to nearly 98% of people earning 600 NOK or more. In the same way, there fewer people who have access to an ADSL or other xDSL connection, earning leas than 200 NOK than people earning 600 NOK or more. Thus, the more people earn, the more affordable access to ICT becomes. There is also, furthermore, a strong relation between the economic criterion (already discussed, 4.5.1) and this sub-indicator of affordability.

In terms of affordability of internet access, there are many internet cafes throughout Norway, and pricing varies from café to café. The average price for internet access per minute is approximately 1 NOK. When using the internet for longer periods such as an hour, this rate is reduced to approximately 40 NOK per hour (World66.com, 2007). According to the Norwegian Post and Telecommunications Authority, the current price for internet access (via a dial up connection) is approximately 139 NOK per month. In comparison to this, the Norwegian citizen can expect to pay nearly double for a broadband connection, which is priced at 233 NOK, but which is much faster than the dialup connection speed, running at 480kbps download speed and 192kbps upload speed. This price multiplies dramatically if a faster connection is required. For a 2000kb (2Mb) connection, the average Norwegian can expect to pay 1008 NOK per month. An updated list of all the service providers plus their current pricing for the various services can be obtained at: http://www.telepriser.no/.

From this pricing it can, thus, be inferred that for Norwegians who earn less than 200 or even 300 NOK per month, even a normal dial-up connection to the internet will be unaffordable and they will not be able to benefit from the above discussed initiatives such as e-health or e-learning. The only way they

be able to make use of above initiatives will be through the use of the various internet cafes across Norway, and with current pricing of 40 NOK per hour, even this will be too expensive in most cases. It is important, therefore, to reaffirm the Norwegian government's commitment to address the income inequalities that still exist within Norway, as was discussed under the economic criterion (see 4.5.1), as this income inequality will hinder Norwegians from benefiting from any ICT related initiatives.

As already mentioned, the affordability of information in terms of access can hinder the interaction and exchange of data, information, and knowledge between the Norwegian local knowledge system and the global knowledge system. Norwegian people earning less than 200 NOK, will be less inclined to share and exchange data, information, and knowledge as many of them will not be able to afford the technology and the access that such sharing will entail. For this reason, it is of the utmost importance that governments, like the Norwegian government, do everything in their power to empower their people to have adequate access to ICT through government initiatives such as eNorge 2009.

In terms of the second sub-indicator of the usable content indicator, information must be timely and available. This is a very difficult indicator to measure but, as discussed above, one method from which deductions can be made in terms of timeliness and availability of information, is to see how many internet hosts are available in the country. According to the ITU (2005), Norway had an estimated 305,107 hosts in the country. In terms of population figures, there were thus 674.41 hosts per 10,000 Norwegian citizens. Within five years, this figure had more than quadrupled. According to the CIA World Factbook (2007i) in 2006, there were 1,364,000 internet hosts in Norway, placing Norway 26th in the world in terms of the amount of hosts. All these hosts have electronic content that is timely and available to the Norwegian population. Unfortunately, all the content on these servers are is not, necessarily, local Norwegian content. Access to local content and local e-content will be discussed in the last criterion of the information and knowledge society, namely the knowledge criterion. However, this amount of hosts is a

very good indication that the Norwegian public will have access to available and timely information. In this way, the Norwegian citizens that have the technological means to access the internet and these hosts, will then be able to share and exchange data, information, and data with other Internet hosts in Norway as well as other hosts available on the internet. Through this interaction, a two-way exchange process can be established that will enable other people in the world to access Norwegian data, information, and knowledge that is available on these hosts, as well as access the global data, information and knowledge that is already available on these host.

When investigating the third sub-indicator of the usable content, the distribution of information, Norway has a very intricate mass media landscape consisting of various mass media distribution channels, for example newspapers and broadcasting. According to the European Journalism Centre, Norway has a very stable media landscape where the dominant printed distribution media, such as magazine and book publishing houses, and newspapers were established 75 to 150 years ago. In terms of the non-printed distribution channels, the public service broadcasting company is also approaching 75 years of age. Although Norsk rikskringkasting (NRK) has undergone dramatic changes in the broadcasting sector, they have been able to maintain their position as the supplier of the most popular radio and television channels in Norway. Currently there are 215 various newspapers in circulation. These newspapers are all actively used as an information distribution channel, proven by the fact that Norway's newspaper readership is the highest in the world (European Journalism Centre, 2007). This high readership can be attributed to Norway's 100% literacy rate, as previously discussed. When discussing readership, Table 4.26 below, supplies interesting information concerning readership time in Norway. According to Media Norway (2006), the average Norwegian spends at least 29 minutes per day reading newspapers. What is worrying, however, is that the amount of time spent reading newspapers has declined by 7 minutes a day between 1997 and 2006. This decline in reading time can be contributed to the introduction of new electronic media. As can be seen in Table 29, the reach of online newspapers in Norway has increased dramatically from 1996, from

less than 1% population reach to nearly 30% population reach over the last few years, explaining the decrease in the traditional newspapers reading time.

Table 4.27: Average amount of minutes spent reading newspapers per day, 9-79 year olds[35]

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
9-79 years	36	34	33	34	31	31	32	30	29	29

Table 4.28: Daily reach of online newspapers 1996 - 2006 (share of population)[36]

Paper	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
VG	0,5	1,2	2,7	5,3	8,3	10,3	12,3	15,6	19,1	24,5	28,4
Dagbladet	0,5	0,8	2,0	3,9	6,2	7,1	8,2	10,3	12,8	17,2	20,6
Aftenposten	0,3	0,6	1,3	2,2	3,0	3,5	4,3	5,4	6,5	7,6	9,3
Dagens Næringsliv	-	-	-	0,6	1,1	1,2	1,4	2,1	2,2	2,7	3,8
Bergens Tidende	0,0	0,1	0,1	0,3	0,6	0,9	1,3	1,6	2,0	2,6	3,3
Adresseavisen	0,1	0,1	0,1	0,2	0,4	0,5	0,9	1,2	1,6	2,1	2,8
Bergensavisen	0,1	0,1	0,2	0,3	0,7	0,8	1,0	1,1	1,3	1,8	2,2
Stavanger Aftenblad	0,1	0,1	0,2	0,3	0,5	0,7	0,8	1,0	1,2	1,5	1,8
Fædrelandsvennen	0,0	0,0	0,1	0,1	0,2	0,3	0,5	0,5	0,6	0,9	1,0
Drammens Tidende	-	-	-	-	-	-	-	-	0,7	0,8	0,9
Nettavisen	-	0,4	1,8	3,4	5,4	-	-	-	-	-	-

In terms of non-printed distribution media, television has been used very effectively as a distribution channel of information for various purposes, including entertainment, education, and marketing. In Norway, television has a very broad overall reach and reaches a great percentage of the Norwegian population. This can be seen in the following table (Media Norway, 2006):

Table 4.29: Average daily reach for the year 2006, distributed by all (share of population/per cent)[37]

All	NRK1	NRK2	TV2	TVN	TV3	Other	Total
12+ years	55.1	19.2	51.7	31.1	17.7	30.8	69

The television channels mentioned in above table, all have a nationwide reach, while another 10 channels only have a regional reach and a further 23

[35] Information extrapolated from Media Norway (2006)
[36] Information extrapolated from TNS Gallup Norway (2007)
[37] Information extrapolated from Media Norway (2006)

channels, a local reach. From this table it can be seen that NKR1 reaches more than half the Norwegian population. The same can be said of TV2. In total, nearly 70% of the Norwegian population is reached by the various national television stations (Media Norway, 2006).

From this discussion and statistics, the author can thus deduce that the Norwegian public has various information distribution channels, from the amount of internet hosts that makes electronic information available timeously, to numerous newspapers and television channels. These various distribution channels can effectively be used to distribute data, information, and knowledge to a Norwegian information and knowledge society. The question, however, is in what language this information will be. The author will discuss the issue of language in the following paragraph.

As mentioned previously, the fourth sub-indicator of the usable content indicator is language. Within the information and knowledge society, citizens need access to information that is in their own language so that the information is truly usable. Unfortunately, in terms of electronic information, language is not equally distributed on the internet, as previously discussed. The official spoken language of Norway is Norsk. This is a North Germanic language spoken primarily in Norway. In terms of the Norwegian written language, there are two official forms of *written* Norwegian, as established by law and governmental policy. The first is ***Bokmål*** which literally means 'book language' and secondly ***Nynorsk*** referred to as 'new Norwegian'. The main language for primary education in Norway is Bokmål, with about 86.2% of the pupils in the primary and lower secondary schools in Norway receiving education in the book language. Only approximately 13.8% receive education in Nynorsk. From upper secondary education, it is required that Norwegian pupils learn both. According to Kristoffersen (2000), out of the 433 municipalities in Norway, 161 have declared that they wish to communicate with the central authorities in Bokmål, 116 municipalities prefer Nynorsk and 156 municipalities remain neutral. From the amount of formal official government publications, only 8% were in Nynorsk in 2000, while the remainder 92% were in Bokmål. All the large national newspapers, as well as

many political journals are all also publish in Bokmål, indicating the preference of information service providers, (Kristoffersen, 2000).

However, this is problematic from an electronic information perspective. Although all the Norwegian government portals such as eNorge 2009, provide electronic information in Bokmål, very little electronic information within the global knowledge system is in either Bokmål or Nynorsk. Thus, for the purpose of the sharing and exchange of data, information, and knowledge, the Norwegian population would have to make use of English, as most of the existing electronic information on the World Wide Web is in this language, as discussed previously. Seeing that Bokmål, as well as Nynorsk is only spoken in Norway, any information exchange to the global knowledge system would also have to be in English so that it would be understandable to the rest of the global knowledge community. This can be very problematic and hinder the interaction and exchange process if the information is in a language foreign to the information user. To try to alleviate these language problems in electronic information distribution, cross language information retrieval (CLIR) systems are being developed. These systems will be discussed in the final chapter of this thesis, where the author will make recommendations.

It is, thus, evident from the lengthy discussion on the social criterion for the information and knowledge society, that citizens of Norway have a very good quality of life, which is reflected in the low mortality rate, high life expectancy, high education level and a literacy rate of 100%. This high education level makes it possible for the Norwegian public to harness the power of ICT in the public sector in public service initiatives such as e-governemnt, e-voting, e-health and e-learning. Through initiatives like these, data, information, and knowledge can be exchanged and electronic information be distributed through the million or so internet hosts residing within the country. In terms of affordability of information, a clear disparity is evident in terms of income inequality that will affect the affordability and access to electronic information. The official Bokmål of Norway as well as the Nynorsk language is not spoken outside of Norway, and this can pose problems for the information exchange process to the global knowledge system. Fortunately, some of these language

problems will be able to be overcome with the use of Cross Language Information Retrieval systems. It can, thus, be deduced that although some problems persist i.e. affordability and language, Norway completely complies with all the indicators of the social criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning various social issues within Norway and can be summarised as follows:

- Good health prospects expressed in low mortality rates, high life expectancy, a high amount of practising physicians and high expenditure on health;
- Good education opportunities expressed in high literacy rates and a high amount of years of compulsory education;
- Well developed modern public services, expressed in the existence of e-government, e-voting, e-health and e-learning initiatives;
- Usable & affordable content that is timely available, readily accessible and in a language the user can understand.

In the following paragraphs the author will investigate whether the USA complies with the same criterion.

USA

a) Health prospects

As discussed previously, the first indicator of the social criterion that has to be applied to the USA is good health prospects. According to the U.S. Department of Heath and Human Services (2006), 61% of adults over the age of 18 years reported excellent or very good health. Unfortunately, at closer inspection, although the 61% of adults think they are healthy, many of them are leading unhealthy lifestyles, which could affect their health in future. A National Health Interview Survey conducted by the Department in 2006, found that 62% of adults never participate in any form of vigorous exercise or physical activity. This lack of exercise leads to the following worrying

statistics: 35% of all American adults are overweight and 26% were classified as being obese. When these statistics are combined with the fact that 11% of the adults have some form of heart disease, 23% suffer from hypertension, and 21% are smokers, it is to be expected that the overall health of the American population is going to decrease in the years to come unless serious changes to their lifestyles are made.

In relation to the first sub-indicator, namely, mortality rates and life expectancy, despite being the richest nation in the world, the American statistics do not look so good. According to MacAskill (2007), the United States is starting to fall behind in the world with regard to ranking of life expectancy due to, amongst other factors, the ever-increasing rate of obesity. According to MacAskill (2007), the USA has dropped from 11th to 42nd place in 20 years. The life expectancy of American Males is 69.8 years, whereas America women live nearly ten years longer, with an average of 77.9. The statistics concerning infant mortality also do not look promising. In the United States, there are, approximately, 6.8 infant deaths per 1000 births, which is higher than many other countries. The author is of opinion that these health issues can affect the American citizen's ability to partake within the interaction and exchange process. As mentioned previously, citizens who are faced with serious health issues will be less inclined to interact and exchange their local data, information and knowledge with data, information and knowledge in the global knowledge system. However, if these citizens do partake within the interaction and exchange process, this process can aid the improvement of their overall health. Through accessing the global knowledge system, American citizen's suffering from serious health issues can obtain important global health information but also local health remedies that might assist them in improving their health.

In the following figure, the average life expectancy at birth, of all the OECD countries can be seen. It is clear from this table that the United States average life expectancy of 77.5 years is much lower than other OECD countries, ranking the USA ninth place from last; 22nd of all OECD countries.

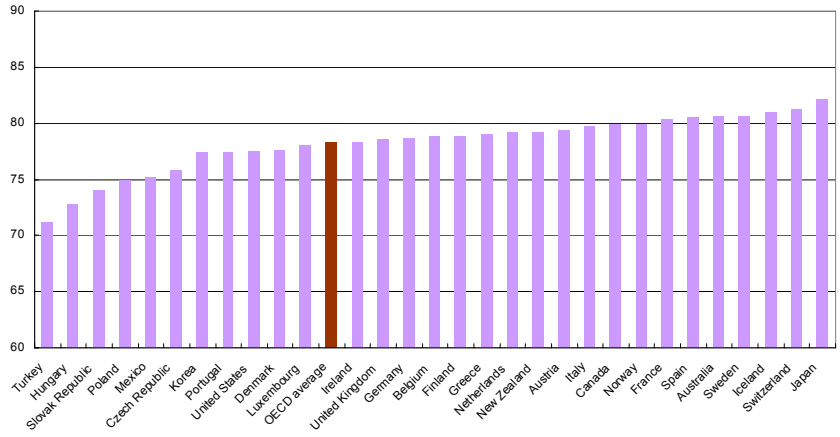


Figure 4.24: Life expectancy at birth – OECD countries 2004[38]

In Figure 4.25, the mortality rate of infants in the United States, namely 6.8 per 1000 births, which is the third highest of all OECD countries, can be seen.

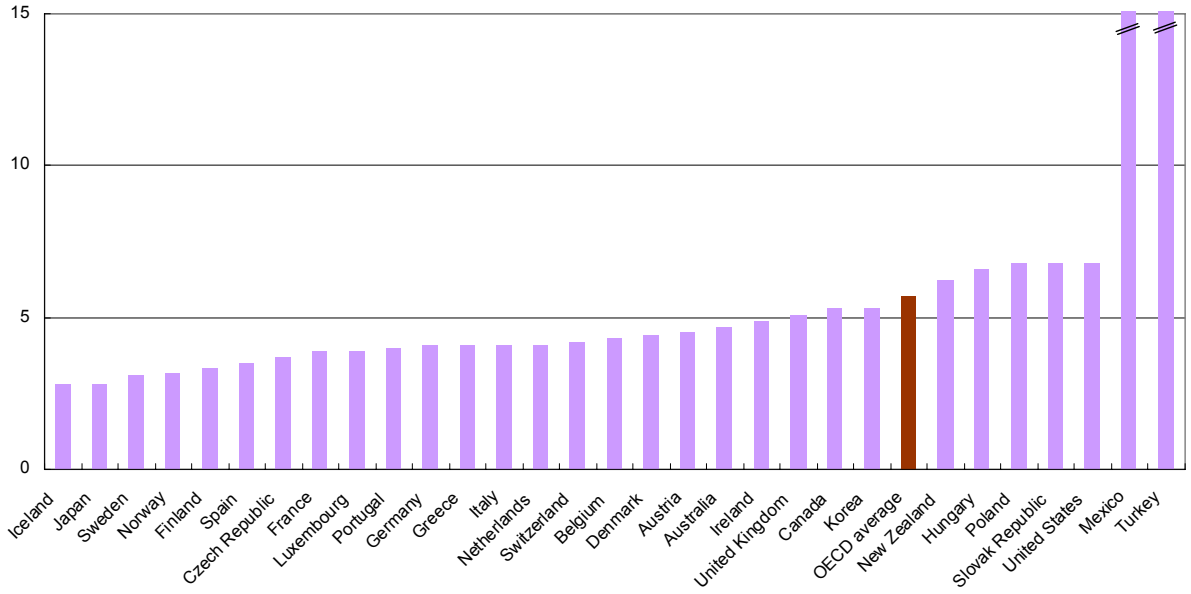


Figure 4.25: Infant mortality, deaths per 1 000 live births, 2004 or latest available year[39]

With regards to the second sub-indicator of the good health prospects indicator, namely the amount of practising physicians in the country, the low numbers practising in the USA can possibly be the cause of the worrisome statistics of the first sub-indicator. As previously discussed, the more

[38] Information extrapolated from OECD (2007)
[39] Information extrapolated from OECD (2007)

practising physicians there are in a country, the more patients can receive the needed medical care. However, in the USA, there are fewer practising physicians than many of the OECD countries. According to the OECD (2007) Health Data Report, the United States only had 2.4 practising physicians per 1,000 population in 2005, which is below the OECD average of 3.0 practising physicians per 1,000 citizens. In Figure 4.17, it can be seen that the USA is ranked eighth from last in terms of the small numbers of practising physicians. This statistic is strange when looking at the third sub-indicator, namely the health expenditure as a percentage of the total GDP of the country. According to the OECD (2007), the USA is the top health spending country of all OECD countries, with relation to the GDP; spending approximately 15.3% of the total GDP on health and health related matters. This can be seen in the following figure:

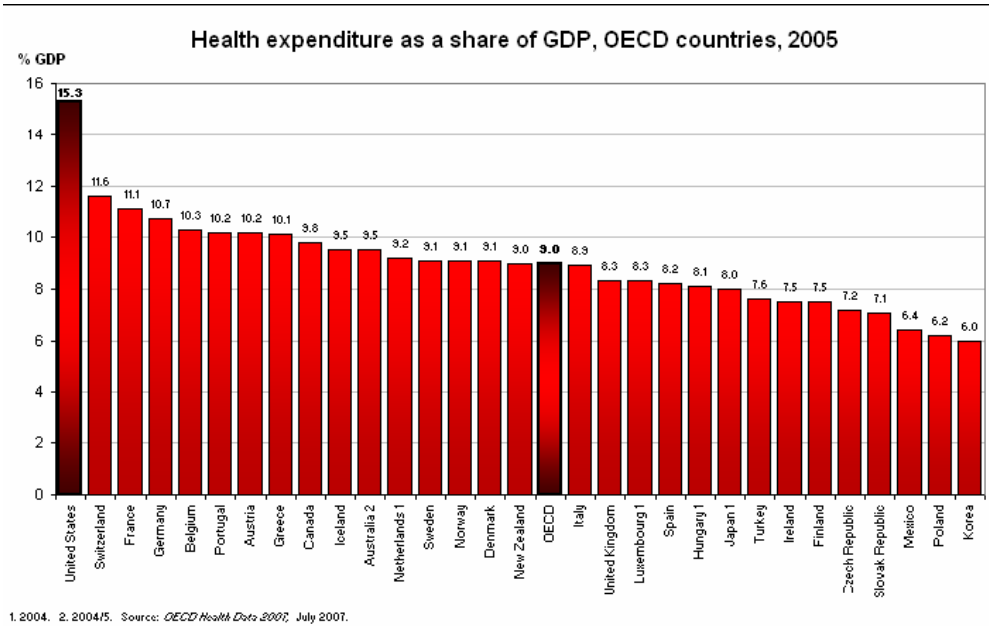


Figure 4.26: Health expenditure as a share of GDP, OECD countries 2005[40]

Thus, the author can deduce from the above discussion on the good health prospects of the American population, that the American Government is trying to rectify the decline in life expectancy and the increase in infant mortality, by allocating a greater share of the total GDP of the country towards health and health related issues. This, together with new cooperative efforts from

[40] Information extrapolated from OECD (2007)

industry, such as the Better Health Care Together initiative, will mobilise leaders from the business community (CEO's of Fortune 500 companies), national labour (Service Employees International Union) and civic leaders to help overhaul the nation's health care system (SEIU, 2007). It is the author's opinion that the improvement of the health care system will have an indirect impact upon the interaction and exchange of data, information and knowledge. As previously mentioned, citizens who are facing serious health issues will be inhibited by these issues to partake within the interaction and exchange process. By improving the overall health care system in the country, the mortality rate and life expectancy of American citizens will be positively affected which in turn will stimulate the interaction and exchange of data, information and knowledge.

However, the author is of the opinion that due to the low statistics for two out of the three of the sub-indicators; good health prospects, in terms of having a high mortality rate and low life expectancy; and the amount of practising physicians in the country, the USA only partially complies with this indicator of the social criterion. In the following section, the author will investigate the education opportunities within the USA to see if they comply with the second indicator of the social criteria.

b) Education opportunities

In 1993, when Bill Clinton came to office as President, the American government already understood that the next generation of schoolchildren would have to be better prepared and educated for the evolving demands of the new information and knowledge society. From that point onward, the government tried to strengthen education at every level and lead America towards an era of lifetime learning (US Department of Education, 2000).

Currently, the political climate under President Bush has its educational emphasis more on prevention of segregation and discrimination. This is achieved by improving the education of children on all levels by implementing education acts such as the *No Child Left Behind Act* of 2001. According to

President Bush (2007) in a speech asking congress to reauthorise this legislation again in 2007, too many children in America are still segregated by low expectations, illiteracy, and self-doubt, thus, children are still being left behind. Part of this act calls for Improving Literacy by Putting Reading First. This can be achieved through the focussing on reading in early grades as well as the establishment of Reading First programs in pre-schools. Thus with regard to the first sub-indicator of the good education prospects, namely high literacy rates, the USA has an estimated literacy rate of 99%, which is 1% less than that of Norway (CIA World Factbook, 2007b).

In a more comprehensive study conducted in 2003 by The National Assessment of Adult Literacy (NAAL), American adults aged 16 or older were assessed in three types of literacy (prose, document, and quantitative). With respect to all three categories of literacy, adults were categorised into four proficiency levels; below basic, basic, intermediate, and proficient. In the following table, it can be seen how the American adult population faired:

Table 4.30: Percentage of adults age 16 or older in each prose, document, and quantitative literacy achievement level, by selected characteristics: 2003

	Prose				Document				Quantitative			
Characteristic	Below Basic	Basic	Inter-mediate	Proficient	Below Basic	Basic	Inter-mediate	Proficient	Below Basic	Basic	Inter-mediate	Proficient
Total	14	29	44	13	12	22	53	13	22	33	33	13

In terms of an intermediate level of proficiency, the highest percentage of literacy was obtained in the document literacy category, which also had the highest percentage of below basic proficiency. Only 13% adults, approximately, were highly proficient in the prose, document and quantitative literacy categories.

In relation to the second sub-indicator, compulsory education, the USA has a longer compulsory education than that of Norway. According to UNESCO

(2006), American scholars currently undergo 12 compulsory years which is one year longer than that of Norway. As can be seen in the following table, the USA is ranked twelfth out of 171 countries that enforce compulsory education. Countries such as Netherlands, Belgium and Germany all have thirteen years of compulsory education. These statistics can be seen in the following table:

Table 4.31: Country ranking and the years of compulsory education[41]

Country Ranking	**Amount of compulsory years**
#1 Netherlands	13
#2 Belgium	13
#3 Germany	13
#4 Dominica	13
#5 Saint Kitts and Nevis	13
#6 Saint Lucia	13
#7 Barbados	12
#8 Brunei	12
#9 United Kingdom	12
#10 Antigua and Barbuda	12
#11 New Zealand	12
#12 United States	12
#13 Grenada	12
#14 Bahamas, The	12
#15 Bermuda	12

The author can, thus, infer from these statistics, that the education level in the USA has been improved in recent years with legislation such as the *No Child Left Behind Act* of 2001. Through the implementation of such acts, the American government is trying to ensure that the American population can truly be prepared for the challenges and demands of the information and knowledge society. In the following section the author will investigate whether the USA has truly harnessed the power of ICT to improve the public service

[41] Information extrapolated from NationMaster (2007b)

sector through the implementation of e-government, ehealth, and e-learning initiatives.

c) Public services

As mentioned previously, within the information and knowledge society, modern public services will be developed and a dynamic environment created through the widespread use of ICT. Within America, the government has various initiatives in the areas of e-government, e-voting, e-health as well as e-learning that will be discussed in the following section.

i. E-government and e-voting initiatives

As previously discussed in chapter 4, many governments are making an effort to ensure that their citizens have easier access to explicit government knowledge. The USA is an excellent example of one of these countries with a very extensive e-government programme. According to the Department of Agriculture, the US e-government is a USA Service mission that helps make the government more citizen-centric by providing citizens with easy access to accurate, consistent, and timely government information. To achieve this mission, it provides citizens information about and from all levels of government through an array of integrated information channels including:

- FirstGov.gov;
- telephone and email inquiry response from the GSA;
- National Contact Center;
- print materials distributed from Pueblo, Colorado.

Thus, in the USA a great deal of effort has been made to supply the citizens with free, timely political information to ensure participation in the political process. Therefore**,** it can be seen that the interaction and exchange of data, information, and knowledge between the global knowledge system, represented here by e-government initiatives on the internet, and the communities' local knowledge systems, is vital for ensuring the freedom of

political information that will stimulate more participation in the political process.

According to West (2006), in the Global e-government report of 2006, the USA is still far in the lead with government sites offering online services. In 2006, 71% of all US government websites offered online services, indicating a 15% increase from 2005. In the following table, these statistics can be seen:

Table 4.32: Percentage of government sites offering online services[42]

Percentage of Government Sites Offering Online Services by Region of World

	2001	2002	2003	2004	2005	2006
North America	28%	*41%*	*45%*	*53%*	*56%*	*71%*
Pacific Ocean Islands	19	*14*	*17*	*43*	*24*	*48*
Asia	12	*26*	*26*	*30*	*38*	*42*
Middle East	10	*15*	*24*	*19*	*13*	*31*
Western Europe	9	*10*	*17*	*29*	*20*	*34*
Eastern Europe	--	*2*	*6*	*8*	*4*	*12*
Central America	4	*4*	*9*	*17*	*15*	*11*
South America	3	*7*	*14*	*10*	*19*	*30*
Russia/Central Asia	2	*1*	*1*	*2*	*3*	*11*
Africa	2	2	5	8	7	9

One of the new initiatives building on the successful American e-government initiative is electronic voting, also referred to as e-voting. The author is of opinion that e-voting does not have a direct impact upon the interaction and exchange of data, information and knowledge from the local knowledge system and the global knowledge system. It is however still important to discuss e-voting as this is one of the services offered by e-government initiatives. As previously discussed, these e-government initiatives enable the interaction and exchange of local American political information via American e-government portals on the internet. This local information is thus made available in the global knowledge system, where it can be accessed and used, locally as well as globally. According to the United States Government Accountability Office (2004) e-voting systems play a vital role in elections in the United States. In terms of e-voting in the US, most votes are cast and counted by one of two types of e-voting systems: optical scan and Direct

[42] Information extrapolated from the Global E-government report (2006)

Recording Electronic (DRE). Optical scan voting systems use electronic technology to tabulate paper ballots. Although this technology has been in use for decades for other tasks such as scoring standardised tests, it was only applied to voting in the 1980s. In the 2000 Presidential Election, about 31% of registered voters registered their votes on optical scan systems. This increased to 35% of registered voters in the 2004 presidential election (United States Government Accountability Office, 2004).

The second type of e-voting system used in the USA is Direct Recording Electronic (DRE). Already introduced in the early 1970s, these systems capture votes electronically, without the use of paper ballots. In the 2000 election, about 12% of voters used this type of technology, and in the 2004 presidential elections, 29% of voters used this technology (United States Government Accountability Office, 2004).

Unfortunately, as with most technology, there are a number of teething problems experienced with these types of electronic voting. According to Stone (2006), more than 120 security threats to the three most commonly purchased electronic voting systems were pointed out in a study by the Brennan Center for Justice. Among the reports findings the following problems were highlighted:

- using corrupt software to switch votes from one candidate to another is the easiest way to attack all three systems. A would-be hacker would have to overcome many hurdles to do this, the report says, but none "is insurmountable";
- the most vulnerable voting machines use wireless components open to attack by "virtually any member of the public with some knowledge and a personal digital assistant." Only New York, Minnesota and California ban wireless components;
- even electronic systems that use voter-verified paper records are subject to attack unless they are regularly audited;
- most states have not implemented election procedures or countermeasures to detect software attacks.

These problems, and many more, were not solved before the Mid-Term elections of 2006, and the elections were marred by reports of e-voting failures and problems. In a report jointly prepared by VotersUnite.Org, VoteTrustUSA, Voter Action and Pollworkers for Democracy entitled, "E-Voting Failures in the 2006 Mid-Term Elections. A sampling of problems across the nation," (2007) a staggering 1022 reports of problems associated with electronic voting equipment from 314 counties in 36 states were reported. Of these, 760 were problems associated with the DRE voting systems. This can be seen in the following figure:

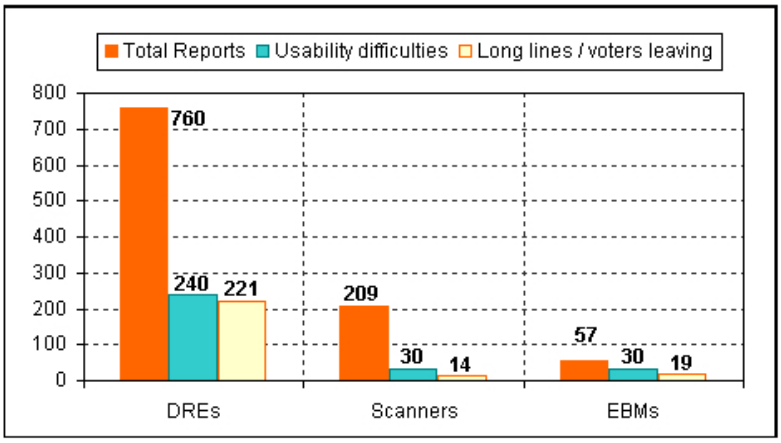


Figure 4.27: Total reports of e-voting problems in the 2006 mid term elections

When analyzed, these 1022 problem reports revealed such widespread election problems of so many different types that they cannot be ignored or considered abnormal. These problems included the following:

- election workers with little or no technical expertise;
- insufficient training of election workers;
- election workers who had virtually no field experience to set up, operate and troubleshoot complex electronic equipment;
- voters reporting confusion over how to use the equipment;
- voters having difficulty knowing what to do when it didn't work as they were told it would;
- voters concerned that their votes may have been counted incorrectly or not counted at all;

- voters reported standing in line for hours because the machines weren't working;
- voters who left because they were unable to wait.

To ensure the health of the USA democracy, these problems and inadequacies of the present e-voting systems must be recognised, and pro-active corrective measures must be adopted, before the next round of elections. In an effort to alleviate some of the problems associated with e-voting, the 2006 President's Budget proposed spending $17.6 million for a Commission to develop voluntary standards and initiate an accreditation program for electronic voting machines (Coleman & Fisher, 2005).

Thus, it can be seen from this discussion, that although there are some problems with e-voting initiatives in the US, the government is trying to ensure that this technology can successfully be used to provide its citizens with more and reliable methods of voting. In the end, it is hoped that these methods can abolish time and spatial problems experienced with traditional forms of voting. Through harnessing the potential power of ICT within the government and voting sector, the USA has ensured their social inclusion within the information and knowledge society.

ii. E-health initiatives

As discussed under the first indicator of the social criterion of the information and knowledge society, good health prospects, the USA government and industry are starting to work together to reform the national health plan. One of the initiatives earmarked to accomplish this is e-health that promises to improve healthcare services and delivery through greater accessibility, better quality, and improved efficiency. In this spirit of cooperation, the IEEE-USA supports the advancement of e-health and its potential of providing improved information flows (IEEE USA, 2005).

According to the US Department of Health and Human Services, major e-health goals have been initiated for improving the health care system in the

USA. Areas that have been improved include the improvement of patient safety, improvement of the interoperability of health information systems, and improvement in the capability for exchanging patient information. The USA also benefits from an extensive e-health and National Health Information infrastructure, which will make use of leading-edge networking technologies, such as broadband connections, Web services, mobile communications, and multimedia communications to provide secure and reliable transport of healthcare information. Brown (2005) is of the opinion that a lack of these type of technologies, especially broadband connections, can truly hamper telemedicine projects. Many potential telemedicine projects have failed because normal telephone lines to not offer adequate speed or bandwidth for such applications. For this reason, David McClure (2007), the President and Chief Executive Officer of the US internet Industry Association, supports this sentiment and states that there are six specific areas in e-health initiatives that can be improved with the use of a broadband connection. These are:

- **Electronic Medical Records.** Patient data has to be collected, stored and communicated over communication channels – high volume, high speed broadband connections will greatly improve this service.
- **Clinical e-health.** All types of physical and psychological patient treatment and monitoring that do not require a patient to travel to a medical person. For example, patient treatment can be improved with the use of videoconferencing facilities that require a broadband connection.
- **Evidence-Based Medicine**. Aimed primarily at practising physicians, this service delivers information so that the physician can determine whether a diagnosis is in line with current scientific research. Large quantities of information from global medical databases can be accessed and downloaded through the use of a broadband internet connection.
- **Consumer medical and health information.** Consumers/patients are able to access the internet to obtain health information from the global knowledge system and on-line discussion groups in blogs and chat rooms where data, information, knowledge, and experiences can be

shared. This access will be greatly improved through the use of a broadband internet connection.

- **Medical education.** Through the use of online medical education and other medical e-learning opportunities, medical personnel in remote areas of America can be targeted. Many of these e-learning systems require a high volume, high speed broadband internet connection.
- **Virtual healthcare teams.** Though the use of collaboration software, virtual teams of healthcare professionals can be created who can share data, information, knowledge, and experiences**.**

From this discussion, it is clear that there is a direct correlation between the successful implementation of e-health initiatives and the technological infrastructure of the specific country. Fortunately, the USA has a very sophisticated and extensive technological infrastructure, as discussed under the technological criterion (see 4.5.2), and most American citizens have access to the internet. In a study conducted by Pew Internet & American Life Project, concerning the "Demographics, Degrees of Internet Access, and Health," Fox (2006) documented the following interesting statistics, supporting the relation between electronic health information and the available technological infrastructure:

- 12% of American adults online (approximately 17 million American citizens) said the internet played a crucial or important role as they helped another person cope with a major illness;
- 7 million Americans feel that the internet helped them cope with a major illness;
- 36% of e-caregivers said the internet helped them find advice or support from other people;
- 34% of e-caregivers said the internet helped them find professional or expert services;
- 26% of e-caregivers said the internet helped them find information or compare options;
- 58% of e-caregivers said the most important source was something they found on the internet.

Thus, without an adequate technological infrastructure that enables a fast internet connection, all these millions of people would not have be able to benefit from the e-health initiatives on the internet that provide citizens with relevant electronic health information. Looked at from the perspective of this thesis, this correlation is of the utmost importance. Without the necessary technological infrastructure, American citizens would not be able to share and exchange data, information, knowledge, and experiences pertaining to health information from their local knowledge system with the global knowledge system. Through the use of broadband services, American citizens can easily upload their local medical knowledge and experiences into the global knowledge system, where other people struggling with similar problems might benefit from it. Through the establishment of this two-way information distribution channel, combined with the successful implementation of various e-health initiatives, the American national health care services can truly be reformed for the American citizens. In the following section, the author will investigate whether the same effects can be achieved by harnessing the power of ICT in the educational sector.

iii. E-learning initiatives

The third sub-indicator of the public services indicator is e-learning initiatives. As mentioned previously, e-learning refers to the use of ICT to enhance and/or support learning in education. This covers a wide range of systems, from students and scholars using e-mail and accessing course work online, while following a course on campus, to programmes offered entirely on the internet (OECD, 2005). According to the e-learning readiness ranking of the Economist Intelligence Unit Limited and the IBM Corporation, the USA is ranked second out of the world's 60 largest economies. These rankings can be seen in Figure 18, previously discussed. In this figure, it can be seen that the USA has stayed constant in its e-learning readiness in 2005 and 2006, whereas Norway, placed ninth in 2005, lost two positions and was ranked at eleventh in 2006. From these figures, it can also be deduced that the USA is more 'ready' and developed with regards to e-learning than Norway.

According to e-learning America (2007), despite a large amount of publicity surrounding this new teaching technique, there is little doubt that e-learning has not yet lived up to its full potential. Due to technological barriers such as lack of broadband access, many scholars, students, and individuals have not been exposed to this new learning process. This fact is supported by Hasson (2005), who reports that although nearly one million American federal workers have taken training courses in the utilization of e-learning, only 15% of the federal workforce is enrolled for any e-learning training courses. For this reason, the American government is encouraging the use of underused e-learning programs and tools such as the USA Learning Web portal.

In terms of school education, the US Department of Education published its National Education Technology Plan 2004, for the purpose of ensuring that American scholars are prepared for the challenges posed by the information and knowledge society. According to this plan, the American education system has to be reformed to achieve this goal. Over the past twenty years, the government has invested billions of dollars in education. Nonetheless, reading scores have remained relatively flat over the same period, despite the investment. However, the investment has ensured that virtually all the public schools in America have internet access. Unfortunately, even with this technology, in most schools it is being under utilised due to lack of understanding of how ICT can enrich the learning environment. In small districts, however, creative new ideas for the use of technology are emerging. Here are two examples:

- **Virginia**: The Virginia Department of Education and the Governor's offices created Virginia's Web-based Standards of Learning Initiative. This initiative's goal is to improve the Standards of Learning capabilities; instructional, remedial, and testing, of all high, middle, and elementary schools by 2009 (US Department of Education, 2004).
- **Louisiana**: In Louisiana an ICT system has been developed for schools in the K-12 district, called the On-Line Professional Development System. This system is designed to provide professional development for teachers, administrators, and school personnel. This

program includes online courses for graduate, community of learners networks, and workshops for specific educational needs (US Department of Education, 2004).

It is the author's opinion that initiatives like these in Virginia and Louisiana, are central to the interaction and exchange of data, information, and knowledge between the American local knowledge system and the global knowledge system. Through the use of such online distance education material, the American population can truly benefit from the advantages ICT can offer in the educational sector, and so, this public service be reformed. Through the high capital investment in the education sector by the American government, and programs such as the "e-rate" program, scholars can be skilled in the effective use of information and communication technologies. The e-rate program provides $2.25 billion per year to help schools and libraries become connected to the internet, thus, enabling scholars to partake in the interaction and exchange of their local data, information, and knowledge with the rest of the world in the global knowledge system. In the following section, the author will investigate whether the content in these e-learning programs, and other electronic content on the internet, is truly usable to the American public, in terms of affordability, accessibility, timeliness, and language.

d) Usable content

As has been previously discussed, people need usable information, if the quality of their lives within the information and knowledge society is to be enhanced. To be truly usable, people need firstly, to be able to afford the information. As in the case of Norway, income inequality in America plays a significant role in the affordability of technology that can facilitate access to information, such as a broadband connection. Concerning broadband adoption in America, the income of the population simply determines who can afford broadband at home and who cannot. In the following figure, it is clearly shown that in 2005 only 15% of households with an income under $30,000 have broadband in their homes compared to 57% who have broadband in

household and are earning $75,000 or more. In 2006, these percentages improved to 21% and 68% respectively.

Table 4.33: Broadband penetration in the USA

How Broadband is Spreading Through the Population

Changes in the percentage of each group who have broadband connections at home

	% with broadband at home (2005)	% with broadband at home (2006)	Percentage point increase	Percentage increase
Gender				
Male	31%	45%	14%	45%
Female	27	38	11	41
Age				
18-29	38	55	17	45
30-49	36	50	14	39
50-64	27	38	11	41
65+	8	13	5	63
Race / ethnicity				
White (not Hispanic)	31	42	11	35
Black (not Hispanic)	14	31	17	121
Hispanic (English speaking)	28	41	13	46
Educational attainment				
Less than high school	10	17	7	70
High school grad	20	31	11	55
Some college	35	47	12	34
College +	47	62	15	32
Household income				
Under $30K	15	21	6	40
$30K-50K	27	43	16	59
$50K-$75K	35	48	13	37
Over $75K	57	68	9	19
Community type				
Urban	31	44	13	42
Suburban	33	46	13	39
Rural	18	25	7	39

Sources: 2005 data comes from the Pew Internet Project's combined January-March tracking survey of 4,402 adults; 1,265 were home broadband users. 2006 data comes from the Pew Internet Project's February 15 through April 6 survey of 4,001 adults; 1,562 were home broadband users.

With regards to the monthly subscription fee for a DSL internet connection, or a Cable connection, the following figure indicates that the average American citizen will pay approximately $32 a month for a slower DSL connection, compared to $41 a month for a faster cable connection.

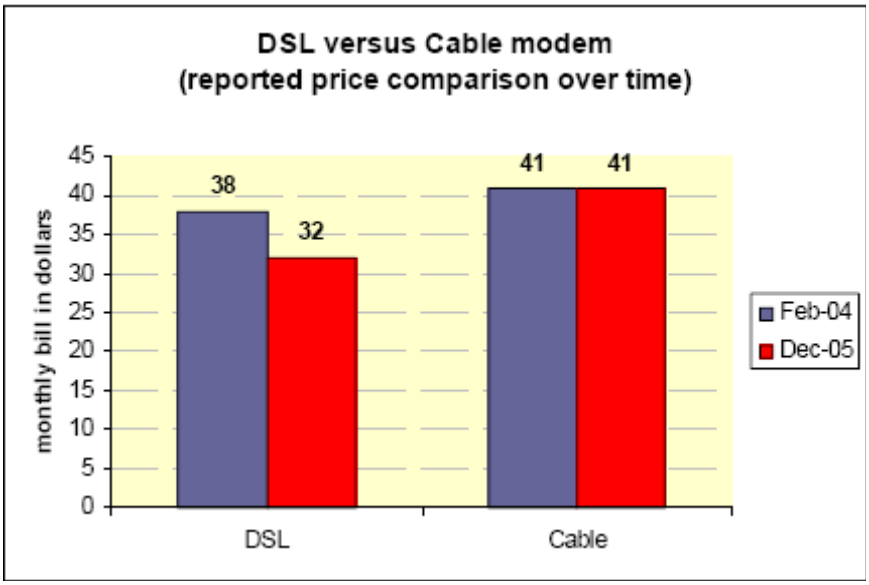


Figure 4.28: Monthly bill in dollars for a DSL of Cable connection[43]

These figures correlate with that of Bertolucci (2007). In the following table, a comparison of American prices from Bertolucci (2007) can be seen in terms of price, connection type, and speed of connection.

Table 4.34: Monthly fee in dollars various types of internet connection[44]

Connection Type	Download speed	Monthly subscription fee
Cable	3 mbps-30 mbps	$42.45
Dial-up	56 kbps	$22.00
DSL	768 kbps-7.1 mbps	$32.30
Fiber optic	6 mbps-50 mbps	$36.35
Fixed wireless	256 kbps-3 mbps	$43.80
Satellite	512 kbps-1.5 mbps	$63.10

From this table, it is clear that the slower type of internet connection, such as a dial-up connection, is relatively cheap, compared to a higher speed broadband connection such as the fixed wireless and Satellite connections. As in Norway, this is very problematic, as the slow dial-up connection will truly hamper the effective sharing and exchange of data, information, and

[43] Information extrapolated from the Pew Internet and American Life Project: Broadband adoption (2006)
[44] Information extrapolated from Bertolucci (2007)

knowledge, from the local knowledge system to the global knowledge system. For effective sharing and exchange to take place, citizens need access to high volume, high speed, broadband connections, but unfortunately, these type of connections are still very expensive, and will not be used unless the American government implements policies to ensure that all citizens benefit from affordable, high-speed internet access. However, the USA is the only industrialised nation without a national policy to promote high-speed broadband (Communication Workers of America, 2007). In a detailed report on the internet speed in all 50 states, the Communication Workers of America are of the opinion that there are 6 specific steps that the USA should take to ensure access to affordable, high speed internet for all. These are:

1. **Establish a national policy goal**.

   A national policy will ensure the establishment of an infrastructure capable of 10 Mbps download and at least 1 Mbps upload speed, by 2010.

2. **Improve data collection to assess the problem.**

   According to their report entitled “Speed Matters,” there is not enough information concerning the type, price and speed of internet connections within America. New data collection methods must be developed to enhance the data collection of the Federal Communications Commission (FCC) seeing that their method is flawed and inadequate.

3. **Create public-private partnerships to promote deployment.**

   Cooperation between the government, the state, the telecommunications provider, schools, and libraries, must be established. These consortia can create local technology plans indicating what technology is needed within that particular state.

4. **Preserve an open internet.**

   According to this report of the Communication Workers of America, the right of all Americans to upload what they want, when they want, onto the internet must be preserved. The author is of the opinion that this step is very important for the sharing and exchange of data, information, and knowledge from the local knowledge system to the global knowledge system. If access is restricted, it would imply that the

American population does not have the right to share information on particular topics in particular websites, which would hinder this process of exchange.

5. **Reform universal service.**
   Universal service must be reformed so that it subsidises not only voice telephony services but also supports affordable, high-speed internet for all.
6. **Safeguard consumers and workers.**
   By implementing a national policy, the American government can require public reporting of deployment, actual speed, and price of specific types of internet connection. This will ensure that the public is protected from unscrupulous internet service providers.

Thus, it can be deduced from this discussion that the USA has to establish national policies that will ensure affordable broadband for all. These policies will solve the problems associated with lack of internet connection due to income inequalities, which, in turn, will stimulate the interaction and exchange of data, information, and knowledge between the American local knowledge system and the global knowledge system. In the following paragraph, the author will investigate whether the information that can be obtained through such an affordable internet connection is timely and available.

As previously discussed, the amount of internet hosts within a country can be used as a measure for timeliness and availability of information, the second sub-indicator of usable content. The author can deduce that the more hosts there are within a country, the more information can be made available. This sub-indicator also relates to the knowledge criterion in that the amount of information available on the hosts within that specific country is a clear indication of the amount of local content that is available.

According to the ITU (2001), America had an estimated 106,193,339 hosts in the country. In terms of population figures, there were thus 3,724.86 hosts per 10 000 American citizens. Within four years, this figure had nearly doubled. According to the CIA World Factbook (2007i) in 2005, there were 195,139,000

internet hosts in America, placing America first in the world, in terms of number of internet hosts.

The author is of the opinion that the amount of internet hosts within America plays a significant role in the exchange process between the American local knowledge system and the global knowledge system. Because there are so many local internet hosts, it can be inferred that American citizens will be able to access more local e-content that is locally relevant and in a language they can relate to, than the Norwegian citizen, seeing that there are only 1,364,000 local hosts in Norway. The author can thus deduce from these internet host statistics, that the usable content within America is timely and available.

When investigating the third sub-indicator of the usable content, namely the distribution of information, the USA has a very rich and multifaceted media landscape. In terms of printed information distribution, there were 833 morning daily newspapers in circulation and 833 evening newspapers, (a total of 1437 various daily newspapers) in circulation in 2006 (Newspaper association of America, 2007). With regard to the readership of these various newspapers, the latest Newspaper Audience Database (NADbase) report shows that, approximately, three out of four of all adults (77%) read a newspaper at least once a week, and approximately 59% of adults read a newspaper daily (Newspaper Association of America. 2006). This is much lower than the readership statistics in Norway. As previously mentioned, Norway has the highest readership in the world, with the average Norwegian spent at least 29 minutes per day reading newspapers (Media Norway, 2006).

When looking at non-printed information distribution, such as televisions that can be used to disseminate information, there are approximately 219,000,000 televisions in the USA, placing the US second in the world rankings (NationMaster, 2007e). In the following table, this ranking can be seen, as well as the rest of the countries who make up the top ten countries in the world in terms of amount of televisions available.

Table 4.35: Top ten countries in the World, in terms of amount of televisions

Rank	Countries	Amount (top to bottom)
#1	China:	400,000,000
#2	United States:	219,000,000
#3	Japan:	86,500,000
#4	India:	63,000,000
#5	Russia:	60,500,000
#6	Germany:	51,400,000
#7	Brazil:	36,500,000
#8	France:	34,800,000
#9	United Kingdom:	30,500,000
#10	Italy:	30,300,000

As can be seen from the table above, the USA is ranked second, behind China. It is further interesting to note that Norway does not even feature within the top ten in the world, in relation to amount of televisions in the country. It can, thus, be deduced from this figure, that the USA is far ahead in using television as a successful method to disseminate information that can promote human development in areas such as health, education, social services, and commercial activity. However, when the amount of televisions within the country is seen from a *per capita* perspective, the USA drops one place to third in the world. This can be seen in the following table:

Table 4.36: Top ten countries in the World, in terms of amount of televisions per 1000 people[45]

Rank	Countries	Amount (top to bottom)
#1	Bermuda:	1,009.71 per 1,000 people
#2	Monaco:	771.391 per 1,000 people

[45] Information extrapolated from NationMaster (2007e)

#3	United States:	740.53 per 1,000 people
#4	Malta:	702.575 per 1,000 people
#5	Japan:	678.873 per 1,000 people
#6	Canada:	655.388 per 1,000 people
#7	Guam:	628.841 per 1,000 people
#8	Virgin Islands:	625.529 per 1,000 people
#9	Germany:	623.552 per 1,000 people
#10	Finland:	612.675 per 1,000 people

From this figure, it can be seen that there are approximately 740.53 televisions per 1,000 people. Only Bermuda, which occupies the first place in world ranking in terms of televisions *per capita*, actually has more televisions than it has people. This large amount of access to television also influences the amount of viewing time the average American spends watching television. In the figure below, it can be seen that America is far ahead in terms of viewing hours per week. From the amount of time the average American spends watching television, the author can deduce that television would be a very good medium to use for the successful distribution of information in a non-printed format.

Table 4.37: Top ten countries in the World, in terms of amount of television viewing hours, per person, per week[46]

Rank	Countries	Amount (top to bottom)
#1	United States:	28 hours per person per wee
#2	United Kingdom:	28 hours per person per wee
#3	Italy:	27 hours per person per wee
#4	France:	23 hours per person per wee
#5	Germany:	23 hours per person per wee

[46] Information extrapolated from NationMaster (2007e)

#6	Ireland:	23 hours per person per wee
#7	Australia:	22 hours per person per wee
#8	Netherlands:	20 hours per person per wee
#9	Denmark:	20 hours per person per wee
#10	Belgium:	19 hours per person per wee
#11	Finland:	18 hours per person per wee
#12	Norway:	18 hours per person per wee

However, television is not the only non-print media that has good penetration within America. In terms of radio, America is, once again, ranked first in the world. This can be seen in the following table:

Table 4.38: Top ten countries in the World, in terms of amount of radios[47]

Rank	Countries	Amount (top to bottom)
#1	United States:	575,000,000
#2	China:	417,000,000
#3	Japan:	120,500,000
#4	India:	116,000,000
#5	United Kingdom:	84,500,000
#6	Germany:	77,800,000
#7	Brazil:	71,000,000
#8	Russia:	61,500,000
#9	France:	55,300,000
#10	Italy:	50,500,000

In terms of radios *per capita*, America keeps its premier ranking with 1.994.31 radios per 1000 people, thus nearly two radios per person. In the second place, is Finland, followed closely by the United Kingdom and Gibraltar.

[47] Information extrapolated from NationMaster (2007d)

Table 4.39: Top ten countries in the World, in terms of amount of radios *per capita*[48]

Rank	Countries	Amount (top to bottom)
#1	United States:	1,944.31 per 1,000 people
#2	Finland:	1,474.25 per 1,000 people
#3	United Kingdom:	1,398.06 per 1,000 people
#4	Gibraltar:	1,326.93 per 1,000 people
#5	Guam:	1,311.07 per 1,000 people
#6	Australia:	1,269.29 per 1,000 people
#7	Bermuda:	1,254.49 per 1,000 people
#8	Denmark:	1,108.25 per 1,000 people
#9	Monaco:	1,049.09 per 1,000 people
#10	Netherlands Antilles:	986.552 per 1,000 people

As it was with television penetration, Norway is not even within the world top ten when it comes to radio. In fact, in terms of television penetration, Norway is only ranked 37th, with 441.977 televisions per 1,000 people. Thus, approximately only every second person has a television. The Norwegian radio penetration statistics look slightly better, and Norway is ranked 25th with 877.422 radios per 1,000 Norwegians. From these statistics, it can be seen that in terms of non-printed media, the USA is in the lead of Norway, and can, thus, more successfully apply them for effective information distribution.

From these statistics, it can be deduced that both Norway and the USA have social processes in place to ensure the dissemination of information to enhance the quality of life of the inhabitants and thus comply with the social criterion of an information and knowledge society. Thus, in Norway, information distribution through printed media will be more effective than in the USA. However, with regard to information distribution through non-printed media, for example radio and television, this will take place more effectively in the USA than in Norway. It is the authors opinion that these channels can thus

[48] Information extrapolated from NationMaster (2007d)

be used very effectively for the interaction and exchange of local data, information and knowledge and global information.

The fourth and last sub-indicator of the usable content indicator is language. As previously discussed, within the information and knowledge society, citizens need access to information that is in their own language so that this is information is truly usable. With regard to this sub-indicator, the USA is in the fortunate position that 56% of all websites are in English (Ebbertz, 2002), making the websites in a language that is easily understandable to them. Furthermore, English is the number one language of the internet, and 31.2% of all internet users are English speakers. In 2007 it was estimated that there were just over 2 billion people in the world who speak English, of whom 17.9% use the internet (ITU, 2008). These statistics can be seen in Table 23, discussed previously in this section.

Thus, it can be deduced from these statistics that the USA is in the favourable position that they do not have a language barrier hindering their access to 59% of all the websites on the internet. This is important for the interaction and exchange of data, information, and knowledge between the American local knowledge system and the global knowledge system. With no language problem to cope with, the American population will be more inclined to share and exchange their local knowledge (through the creation of local websites, and posting of information on blogs), with other people accessing the internet, thus establishing a one-way channel of information interaction and exchange. In term of accessing global information content, this content is usable to the American population as it is in a language they can easily understand, thus establishing successful two-way communication between their local knowledge system and the global knowledge system. The amount of local content created by the American population will be discussed in more detail under the knowledge criterion.

Thus, it is evident from the extensive discussion on the social criterion for the information and knowledge society, that America is very well positioned in terms of the education level, and literacy rates. However, with regard to a

good quality of life, due to factors such as obesity, the life expectancy of Americans is slowly declining and the mortality rate escalating. This situation will have to be rectified if the American population is to benefit from the advantages the information and knowledge society brings. One way in which to achieve this is by reshaping the American health sector by harnessing the power of ICT through the use of public service initiatives such as e-health. As discussed above, other public services such as e-government, e-voting, and e-learning are already being successfully implemented within America. Through initiatives like these, data, information, and knowledge can be exchanged and electronic information be distributed through the large number of internet hosts within the country. In terms of affordability of information, a clear disparity is evident in terms of income inequality that will affect the affordability and access to electronic information. However, this problem can be remedied by providing the American population with cheaper, possibly government-subsidised, broadband connections. The author can, thus, deduce that because some problems exist in terms of life expectancy, mortality rates as well as the relatively low amount of practising physicians within the country, America partially complies with the social criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning various social issues within the USA and can be summarised as follows:

- Poor health prospects expressed in high mortality rates, low life expectancy, and a relatively low amount of practising physicians within the country;
- Good education opportunities expressed in high literacy rates and a high amount of years of compulsory education;
- Well developed modern public services, expressed in the existence of e-government, e-voting, e-health and e-learning initiatives;
- Usable & affordable content that is timely available, readily accessible and in a language the user can understand.

In the following section, the cultural criterion of the information and knowledge society, and all its indicators and sub-indicators will be discussed, and applied to Norway and the USA.

4.5.5 Cultural criterion

As mentioned in chapter 3, of all the criteria discussed in this chapter, those which entail changes in cultural values are morals are the most difficult to identify. According to Nassimbeni (1998), the information and knowledge society will serve the cultural enrichment of all citizens through diversity of content, reflecting linguistics and cultural diversity. This sentiment is reiterated by UNESCO‘s declaration on preserving cultural diversity (UNESCO, 2001). This declaration was born from a roundtable discussion of the WSIS, which was intended to analyse cultural development issues within the information and knowledge society. The central issues identified were: the promotion of linguistic diversity on global information networks, the production of local and indigenous content on the internet, and universal access to cyberspace. From these central issues, possible indictors of the cultural criterion can be identified. Linguistic diversity, or the lack thereof, on the internet has already been discussed in the previous criterion under the usable content indicator. Here, it was concluded that the lack of language diversity on the internet, reflected by the high number of English websites, is a problem that needed attention. The production of local and indigenous content on the internet will be discussed under the following criterion, namely the knowledge criterion. Thus, the third central issue identified by the roundtable discussion, namely, universal access to cyberspace, can serve as the first indicator of the cultural criteria.

The author would like to extend this indicator to encompass universal access to electronic information in general. Although access to information in cyberspace is more important seen from the context of this thesis, attention needs to be given to access to information available in other formats. According to Lyman & Varian (2003), the amount of new information stored on paper, film, magnetic, and optical media has almost doubled in the last three

years. In 2002, the amount of new information in these formats grew to approximately five 'exabytes'. 92% of the new information was stored on magnetic media, mostly in hard disks.

However, how big is an exabyte? When digitized with full formatting, all the books in the Library of Congress, (approximately 17 million books), contain about 136 terabytes of information. In terms of exabytes, five exabytes of information is equivalent in size to the information contained in 37,000 new libraries the same size of the Library of Congress book collection (Lyman & Varian, 2003). The relation of exabyte to other data measurement units can be seen in the following table:

Table 4.40: Data Measurement chart

Quantities of bytes					
SI prefixes		**Historical use**		**Binary prefixes**	
Symbol (name)	**Value**	**Symbol**	**Value**	**Symbol (name)**	**Value**
kB (kilobyte)	$1000^1 = 10^3$	KB	$1024^1 = 2^{10}$	KiB (kibibyte)	2^{10}
MB (megabyte)	$1000^2 = 10^6$	MB	$1024^2 = 2^{20}$	MiB (mebibyte)	2^{20}
GB (gigabyte)	$1000^3 = 10^9$	GB	$1024^3 = 2^{30}$	GiB (gibibyte)	2^{30}
TB (terabyte)	$1000^4 = 10^{12}$	TB	$1024^4 = 2^{40}$	TiB (tebibyte)	2^{40}
PB (petabyte)	$1000^5 = 10^{15}$	PB	$1024^5 = 2^{50}$	PiB (pebibyte)	2^{50}
EB (**exabyte**)	$1000^6 = 10^{18}$	EB	$1024^6 = 2^{60}$	EiB (exbibyte)	2^{60}
ZB (zettabyte)	$1000^7 = 10^{21}$	ZB	$1024^7 = 2^{70}$	ZiB (zebibyte)	2^{70}
YB (yottabyte)	$1000^8 = 10^{24}$	YB	$1024^8 = 2^{80}$	YiB (yobibyte)	2^{80}

However, information is not static and is not just stored as a product, but also flows through various electronic channels. Lyman & Varian (2003) are of the opinion that the information that flowed through electronic channels for example telephone, radio, television, and the internet, contained almost 18 exabytes of new information in 2002, three and a half times more than was recorded in storage media. The breakdown of this 18 exabytes can be seen in the following table:

Table 4.41: Summary of electronic flows of new information in 2002 in terabytes.

Medium	2002 Terabytes
Radio	3,488
Television	68,955
Telephone	17,300,000
Internet	532,897
TOTAL	**17,905,340**

Source: How much information 2003

A very interesting fact that can be seen from this breakdown, is that the total volume of voice telephone traffic contributes to the highest amount of 'new' and unique information. The second largest volume of new information flows in the internet, meaning content that is available via the World Wide Web. However, there are various problems associated with the access to this information. According to Maxwell (2000), the main challenges related to extending universal access to information resources at a reasonable price are:

- General affordable worldwide access;
- Accessible hardware and software;
- Accessible Web and internet features;
- Availability of accessible internet access devices;
- Availability of accessible websites;
- Accessibility of multiple languages;
- Poor program design of software for users.

Most of these problems, mentioned above, have already been discussed. In terms of the first, fifth and sixth points: general affordable access, the availability of accessible websites, and the accessibility of multiple languages, have all already been discussed under the usable content indicator of the social criterion. Accessible hardware and software, and the availability of accessible internet access devices was discussed under the spatial & technological criteria, whilst also relating to the economic criterion, already discussed. Therefore, only points three and seven remain to be discussed. Both these points entail the programming of software and software features so

that they are accessible and thus usable to more people. Referring to these features as usability engineering, Nielsen (1993) is of the opinion that more attention needs to be given to this field of study, as user interfaces are now a much more important part of computer than they used to be. According to Nielsen (1993), the term 'user-friendly' is often used when referring to interfaces that are supposed to be more useable. This term is, however, not appropriate. The computer user does not need the computer to be 'friendly,' they just need access to a computer with an interface that will not impede its usability, hence the term 'usability engineering.' A further challenge to universal access to electronic information is the literacy rate and the education level of the user. These aspects can become an obstacle to universal access, and have already been discussed under the good education opportunities indicator of the social criterion. In the section to follow, the author will discuss the concept of universal access as one of the indicators of the cultural criterion. With regard to obtaining universal access, the Internet Society thinks that promoting telecentres; digital communication centres and internet cafes, in emerging economies around the world, is an important step in helping to achieve significant steps forward in universal access to internet and internet services (Maxwell, 2000). The establishment of such centres will be discussed in chapter 6 of this thesis, as a possible solution to overcoming the spatial and technological barriers of the digital divide.

The second indicator of the cultural criteria can be deduced from Europe's Information Society Thematic Portal (eEurope, 2007). According to their Culture and Society section: "Digital libraries make cultural resources more easily accessible, and open new ways for people to experience their cultural heritage…." ICT can play an important role in providing access to such culturally diverse content. Through the use of modern ICT, a nation's rich cultural heritage can be preserved through initiatives such as digital libraries. Digital libraries can be defined as, "a set of electronic resources and associated technical capabilities for creating, searching, and using information," (Borgman, 1999:234). Libraries like these, will be able to give the citizen online access to books, local content (in the form of historical records), archive films, and museum objects: in short, providing online access to a

nation's uniquely valuable cultural heritage (Reding, 2005). This heritage can be made more visible and accessible in the information and knowledge society, by making use of the internet to circulate this heritage and make it known in the global knowledge system. Thus, the second indicator of the cultural criterion is digital library initiatives.

The third indicator of the cultural criterion of the information and knowledge society is taken from the common vision of the information society created by the World Summit on the Information Society's (2003). In their declaration of principles, they state that particular attention must be given to the special situation of indigenous peoples, as well as to the preservation of their heritage and their cultural legacy. Hence, the third indicator of the cultural criterion is initiatives dedicated to indigenous people within the specific country, their rights and their knowledge.

As previously discussed in chapter 2, indigenous knowledge is not a new field, although, only recently, it has come under the spotlight with governments using it as a phrase with ideological connotations for political rallies. According to UNESCO (2003), indigenous knowledge (IK) is the local knowledge that is unique to a given culture or society. It is the basis for local-level decision-making in agriculture, health care, food preparation, education, natural resource management, and a host of other activities in rural communities. It is of the utmost importance that countries do everything in their power to protect and preserve this information, through the establishment of IK policies, initiatives, and programmes.

In 1998, the World Bank launched an Indigenous Knowledge Programme in response to the challenges posed by governments and civil society leaders. According to the World Bank, indigenous peoples and their knowledge are a significant and important portion of humanity. Their cultural heritage, their ways of life and their local knowledge are an invaluable treasure house that needs to be protected and preserved. In 2002, UNESCO launched their indigenous knowledge programme, entitled *Local and Indigenous Knowledge Systems in a Global Society (LINKS)*. This is an inter-mural, intersectoral

programme that brings together all five programme sectors of UNESCO in a collaborative effort on local and indigenous knowledge. The author will discuss initiatives and programmes like these as the third indicator of the cultural criterion.

Seen from an economic perspective, it is the author's opinion that the marketing of a country's cultural diversity and heritage can lead to the improvement of the citizens' quality of life through the creation of more job opportunities motivated by increased tourism opportunities. These tourism opportunities will also further stimulate the interaction and exchange of data, information, and knowledge from the local knowledge system with data, information, and knowledge in the global knowledge system. Through features like, for example, the creation of a local tourism webpage that markets the cultural treasures of a specific country or community, data, information, and knowledge can be shared with people accessing the page from the global knowledge system. In this way, other people can learn more concerning the local cultural heritage of a specific country.

According to the European Commission, the information and knowledge society is changing our lifestyles, from work, to business, administration, health, culture, education, and even tourism. In this society, work has changed to eWork, health to e-health, education to eEducation and even tourism has evolved into eTourism. eTourism is a new study area within the information and knowledge society which analyzes the way in which technology can transform key tourist activities (eEurope, 2007).

Advances in ICT has changed the entire tourist industry, with new business models emerging and new distribution channels that reinvent nearly all processes in tourism (Linaza, & García, 2006). The *Newsletter on innovation from the European Commission's Enterprise DG, Innovation and Technology Transfer (2005*) is of the opinion that the tourist industry is one of the world's biggest industries, and Europe is the leading player. This sentiment is supported, in part, by the First UNCTAD Asia-Pacific eTourism conference committee (UNCTAD, 2007), which states that tourism is an important

revenue generator for many developing countries and accounts for a growing part of the GDP of that country. For this reason, increasing tourism opportunities also relates to the economic criterion of the information and knowledge society, previously discussed. Thus, increased tourism opportunities that harness the power of ICT within the information and knowledge society, can be identified as the fourth indicator of the cultural criterion.

In the following section, the author will apply the following indicators of the cultural criterion of the information and knowledge society, to Norway and the USA respectively:

a) Universal access;
b) Digital libraries;
c) Indigenous people initiatives;
d) Tourism opportunities.

Norway

a) Universal access

Providing universal access to the Norwegian population has been a high priority for the government since 2000. At that time, the then Minister of Trade and Industry, Grete Knudsen, announced the launch of eNorway, the government's e-government portal. With the creation of this portal, it was the Norwegian Government's aim to lead the transitions of the Norwegian population to the information and knowledge society. According to Knudsen (Norwegian Ministry of Trade & Industry, 2000) universal access will involve all Norwegians: "We want to build the bridge that carries everyone over the knowledge gap and into the new economy – the new society. Norway is a large country with a small population. Everyone must join in. We need each other." To achieve this, three basic prerequisites needed receive attention: access, knowledge, and confidence. In terms of access, the Norwegian government put the following seven initiatives on the table to create universal accessibility through ICT:

- Make conditions suitable for schools to be open during the evenings, thus making computers available to more people;
- Encourage the creation of internet-based projects in order to impart local information;
- Initiate pilot projects with municipalities that want to make an extra commitment to ICT (such as Modalen local authority);
- Ensure access by establishing internet cafés in public arenas (for instance shopping centres, and libraries);
- Create confidence by combating illegal and harmful contents on the internet through participating in EU programmes;
- Assess how ICT can be used as a tool to promote a democratic dialogue and representative government;
- Provide a new mandate and contents for the work of the Technology Council (*Teknologirådet*).

State Secretary, Wenche Lyngholm (2007), opened the *International Conference on Technology for Participation and Accessible e-government Services (T4P)* with a keynote speech on eGovernance and eAccessibility in Norway. According to the Lyngholm, universal access in Norway has improved considerably the last few years when looking at the Norwegian broadband penetration statistics. This improvement can be seen in the following figure:

eAccessibility – access

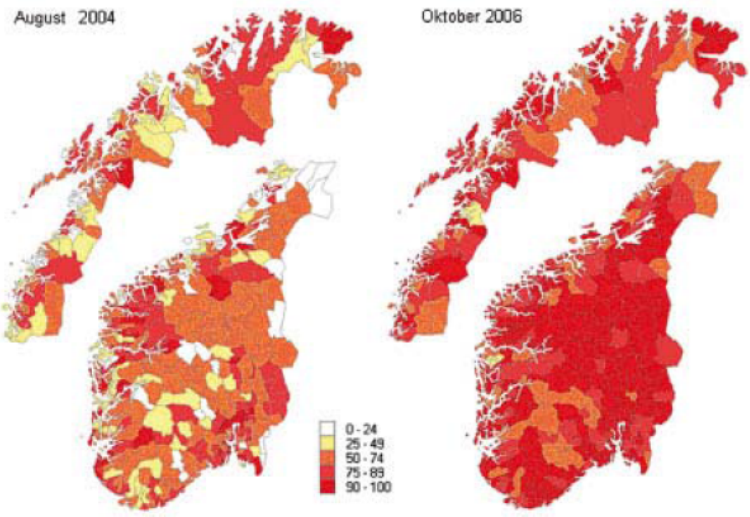


Figure 4.29: Norwegian broadband coverage 2004 and 2006

In this figure, it can be seen that broadband coverage in Norway was 95% by the end of October 2006. To reach universal access for all Norwegians, the last five percent will have to be achieved and this will be very difficult. But the Norwegian government is determined to reach their goal. To achieve this 100% universal access the government proposed a new focus area called universal design. According to this principle, universal design must be incorporated in legislation, regulations, and action plans to ensure that all ICT including websites and e-services should comply with this principle.

As can be seen from this initiative as well as Norway's ICT penetration, as discussed in the spatial & technological criteria, Norway is well on its way to achieving full universal access. This universal access will enable all Norwegians to access new online information sources such as digital libraries in which the country's cultural heritage and diversity can be preserved. Data, information, and knowledge from the Norwegian local knowledge system can, thus, be exchanged with other electronic sources from the global knowledge system; for example, data within digital libraries from across the world. In this way, cultural information can be interacted with and exchanged, due to the

power of modern ICT. In the following section, the author will discuss digital libraries within Norway.

b) Digital libraries

In November 2003, the Norwegian government launched the Norwegian Digital Library Initiative (NDLI), a 5-year national program, under the auspices of the *Norwegian Archive, Library, and Museum Authority.* What makes this initiative unique is the fact that the Norwegian Digital library encompasses the participation of all types of libraries, not just academic or research libraries, such as the Finish and Danish Digital Libraries (Van Nuys, 2005). The vision of the Norwegian Digital Library Initiative is to give the Norwegian citizen easy access to information and knowledge sources, as well as access to cultural experiences. According to Van Nuys (2005), the ambition of the library is to make more digital content available for users. This can be achieved by:

- defining better selection criteria and creating guidelines for the digitalization of existing knowledge-, cultural-, and experience resources;
- finding ways to negotiate cheaper and better licensing agreements for electronic resources such as databases, E-journals, and E-books;
- using systems that communicate via common standards, formats and protocols so that collections can be better organised;
- establish greater collaboration between those who produce content, metadata and services.

Van Nuys (2005) asks the question of who the users of the NDLI would be. According to Svanhild (2005), it is expected that the general public, students at all levels, teachers, as well as library, archive and museum professionals are just a few of the potential users that can be expected to use the NDLI on a daily basis. Svanhild (2005) bases this assumption on the current trends in Norway related to ICT, for example:

- The Ministry of Modernization is encouraging the use of digital content and modern public services by the Norwegian citizens. Current buzz words in the Norwegian media are concepts like, e-government, eCitizenship, and e-health.
- The Ministry of Education and Research is promoting digital competence at all educational levels through initiatives such as the Digital Skills 2004 – 2008 program, a very important part of the eNorway 2009 government action plan. These skills and the ability to select quality sources from the internet are an important issue for teachers and librarians.
- Currently 94% of the Norwegian population is willing to pay tax money for public library services – whether they actually use this type of library or not.

A further initiative relating to the NDLI and sponsored by the Norwegian government, is the CultureNet program, the official portal to Norwegian culture on the web. CultureNet Norway was launched in 1999, as a Norwegian multi-purpose gateway to cultural aspects such as cultural institutions and events. Services that can be accessed from this portal include an extensive database containing links to various Norwegian culture sites, a cultural calendar of events across the country and an online magazine about culture. In 2003, this initiative became part of the Norwegian Archive, Library, and Museum Authority (www.kulturenett.no).

From this discussion, it has become apparent that the Norwegian government has various initiatives that makes Norwegian cultural resources more easily accessible and creates new ways for people to experience Norwegian cultural heritage. This is very important seen from the perspectives of this thesis. Through initiatives like these, Norwegian cultural heritage and diversity will be preserved for generations to come, by making it accessible through access platforms such as the internet. In this way, data, information, and knowledge of the Norwegian population can be shared with other people accessing this information through the internet. The Norwegian population can, thus,

contribute their data, information, and knowledge to the rest of the global information system. Part of this heritage is the knowledge related to the indigenous people of Norway. In the following paragraph, the author will investigate whether there are any initiatives, programs or policies in place in Norway that will protect these indigenous people and their knowledge.

c) Indigenous knowledge initiatives

The Norwegian government has initiated various initiatives concerning indigenous people from as early as 1964, up to today. According to Solbakk (2006), the indigenous people of Norway are the Sámi. They have their own traditional areas, with a distinct language, culture, livelihood, and history. The Sámi are also indigenous to Finland, Russia, and Sweden. Currently there are approximately 40,000 Sámi in Norway, 20,000 in Sweden, 7,500 in Finland and 2,000 in Russia. Within Norway since 1964, the rights and protection of these indigenous people have been a priority of the Norwegian government, which established the Norwegian Sámi Council to address Sámi matters within Norway. This council was replaced by the Sámi Parliament in 1989. According to Wikipedia (Wikipedia, 2007c), The Sámi Parliament was opened on 9 October 1989, and is seated in Karasjok. It currently has 43 representatives, who are elected every four years, with the next election in 2009.

In 1983, the Norwegian Development Program for Indigenous Peoples was launched. This program was the first of its kind, and aimed to strengthen the ability and capacity of indigenous peoples, so that they can shape and control their own development (Kjørven, 2001). This step was followed by the amendment of the Norewegian constitution in 1988, when a new section was added to the constitution as section 1110A, with this wording:
"It is incumbent on the governmental authorities to take necessary steps to enable the Sámi population to safeguard and develop their language, their culture and their social life."

In 1990, the Sámi people were officially recognized as being indigenous to Norway in accordance with the principles of the International Labour Organization's Convention 169, concerning Indigenous and Tribal people, which Norway was the first to ratify (Clement, 2004). Education, research, and development in the field of Sámi research is also of high importance to the Norwegian government. In 2001, the Norwegian Research Council launched a 5-year programme in the field of Sámi research. One of the main goals of this programme is to develop the Sámi language as a language of science. According to the Minister of Education and Research, Ms Kristin Clemet (2004) one of the education areas the Norwegian government is very proud of is the Sámi University College in Kautokeino, which promotes and preserves Sámi language, culture and community life. This was founded in 1989, the same year as the Sámi parliament was convened. The University College is, furthermore, not only for the Sámi population of Norway, but also serves the Sámi in Finland, Sweden, and Russia. According to Kjørven (2001), the subsequent initiative of the Norwegian government was the establishment of a resource centre for the rights of indigenous peoples in northern Norway in 2002. The reason for the establishment of the centre was to raise awareness of aspects of human rights for indigenous peoples, not only in northern Norway, but also in the country as a whole as well as internationally. The centre should supply information to schools, institutions, and organizations on topics relating to indigenous peoples (Kjørven, 2001).

Not withstanding their own initiatives and policies concerning indigenous people, Norway is also recognized as a leader in the fight for the rights of indigenous people of the world. Norway is the only country in the world that has a special administrative structure, staff, and budget dedicated exclusively to supporting indigenous peoples in developing countries, through the Norwegian Program for Indigenous Peoples (NPIP) (Duadelin, 1999) and was also the first country to ratify the UN Declaration on the Right of Indigenous People (MADRE, 2007).

The author is of the opinion that the initiatives, programmes, and policies concerning the indigenous people and their knowledge, can play an important

role in the interaction and exchange of data, information, and knowledge between the local or indigenous knowledge system and the global knowledge system. Through initiatives like the Sámi University College, the Sámi language and culture is recognized as being important from an education and scientific perspective. By recognising the educational and scientific value of the Sámi culture, the Sámi population will be less intimidated by the Norwegian culture and language and will be more inclined to share their unique language, experiences, and culture with the rest of the Norwegian population and even the world. This local or indigenous knowledge can then be accessed through the internet and initiatives such as, for example, the e-health initiatives, where local or indigenous Sámi remedies, and knowledge might prove to be very beneficial.

Thus, the author can deduce from the above initiatives, policies, and regulations that the Norwegian government is at the forefront of recognising and preserving the special value that indigenous people and their knowledge hold for the country as a whole. One of the values on which the Norwegian government can capitalize, is the role the indigenous people can play in tourism. In the following section, the author will investigate the role tourism can play in the marketing of the cultural heritage and diversity of the Norwegian population including that of the Sámi population.

d) Tourism opportunities

In October 2005, a Norwegian Government Declaration identified tourism within Norway as one of five areas where Norway has distinct opportunities. Culture and cultural heritage are very important parts of Norway's offerings but it is not always emphasized in general tourist information. This situation can be rectified by harnessing the power of ICT in this sector, through the establishment of eTourism initiatives and initiatives such as CultureNet, discussed above. In 2006, there was a 3% increase in foreign tourist arrivals, with tourist numbers reaching 3,004,000 by the end of 2006. Improving this figure even more and promoting tourism within Norway is very high on the

government list of priorities, since tourism contributes significantly to the countries GDP, as can be seen in Table 4.35 below.

According to figures from Statistics Norway (2007d), the total value of the income from tourism and tourism-related industries was NOK 7.4 billion higher in 2005 than in 2004. In volume, this is a 5% increase. Hotels and restaurants are the largest industry and account for 33% of the total income. The value of the tourism industry in Norway can be seen in the following table:

Table 4.42: Value added in tourism industries at basic prices. Current prices. 1996-2005. NOK million

	2001	**2002**	**2003**	**2004**	**2005***
Hotels and restaurants	19 237	20 724	19 865	21 119	21 843
Transport via railways, tramway and suburban transport	2 297	2 011	1 922	2 271	2 439
Scheduled motor bus transportation and taxi operation	7 989	8 091	8 441	8 700	8 918
Ocean and coastal water passenger transport abroad	1 345	1 025	637	412	406
Inland water transport	2 164	2 480	2 408	2 345	1 463
Air transport	6 136	7 425	7 014	7 055	7 034
Activities of travel agencies etc.	2 453	1 822	1 896	1 996	2 212
Rental of transport equipment	1 495	2 190	1 967	1 676	1 879
Sporting and other recreational activities	629	684	720	761	849
Value added in tourism industries	54 210	57 487	56 316	57 879	59 668
Gross domestic product	1 536 887	1 532 307	1 593 826	1 743 041	1 939 217
Tourism industries' share of GDP. Per cent	3.5	3.8	3.5	3.3	3.1

As can be seen from this table, tourism industries accounted for 3.1% of the Gross Domestic Product (GDP) in 2005. This is slightly lower than in previous years. It is the author's opinion that the Norwegian government must take steps to rectify this decrease. Increasing the amount that the tourism industry contributes to the Norwegian GDP will have a trickle-down effect on other economic indicators such as the employment rate of the country. As can be

seen in Table 39 below, the tourism industries' share of the total employment in Norway has stayed relatively constant at 6.8% and 6.9% between 2001 and 2005. If this share can be increased, the quality of life of the Norwegian population, as discussed in the economic criterion, will also increase and the poverty rate will decrease.

Table 4.43: Employment in tourism industries. Full-time equivalent persons (1000), employees and selfemployed. 1996-2005

	2001	**2002**	**2003**	**2004**	**2005***
Hotels and restaurants	55.8	55.5	54.1	53.6	53.8
Transport via railways, tramway and suburban transport	8.3	8.1	7.5	7.4	7.2
Scheduled motor bus transportation and taxi operation	21.1	21.3	20.7	20.6	21.2
Ocean and coastal water passenger transport abroad	2.1	2.1	2.1	2	2
Inland water transport	7.4	8	8.1	7.6	7.5
Air transport	12.8	11.7	11.4	11.3	11
Activities of travel agencies etc.	4.9	4.7	4.6	4.4	4.4
Rental of transport equipment	4.9	4.7	4.6	4.4	4.6
Motion picture and other entertainment, news agencies and cultural services	18.9	21.5	20.8	21	21.7
Sporting and other recreational activities	1.4	1.2	1.4	1.7	1.7
Total employment in tourism industries	137.6	138.7	135.1	134.0	135.1
Total employment	1 980.8	1 982.8	1 960.1	1 962.0	1 983.6
Tourism industries' share of total employment	6.9	7	6.9	6.8	6.8

Furthermore, the author is of the opinion that the marketing of the rich cultural heritage and diversity of both the Norwegian and the indigenous peoples, through the power of ICT, can increase the tourist-industry's share of the total employment. By utilising government initiatives such as CultureNet, where the internet is harnessed as a distribution channel for the marketing of the cultural riches, more tourists can be attracted to the country. The indigenous people of Norway, namely the Sámi population, can also play an important role in tourism by sharing their indigenous stories, experiences, and culture,

and thus attract more tourists. Through this process, tourism can play an important role in the preservation of Norway's cultural heritage and also ensure that the indigenous people and their knowledge does not vanish into the global information and knowledge society. Tourism also plays an important role seen from the perspective of this thesis. Through the interaction and exchange of data, information, and knowledge between the Norwegian local knowledge system and the global knowledge system, information regarding cultural issues can be exchanged. Through initiatives such as CultureNet, this process will lead to other cultures of the world becoming more aware of the Norwegian culture. The author can, thus, deduce that Norway completely complies with the cultural criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning various cultural issues within Norway and can be summarised as follows:

- High universal access;
- Access to various digital libraries;
- Existence of indigenous people initiatives and
- Increased tourism opportunities.

In the following section, the author will investigate whether the USA has similar initiatives, policies, and regulations in place to ensure that the American cultural heritage is preserved for the generations to come.

USA

a) Universal access

In the USA, as in Norway, universal access has nearly been achieved. The Bush government is so confident in this matter that the website and office created by the Clinton administration to deal especially with issues relating to the digital divide, www.digitaldivide.org has gone offline. Furthermore, the downloads of the all the reports from *Falling Through The Net: Towards Digital Inclusion,* which concentrate on "access to technology tools," and

measuring the extent of digital inclusion, have been replaced and superseded by the 2004, *A Nation Online: Entering the Broadband Age* report from the NTIA (Arnold, 2006). Not withstanding the Bush administration's confidence, there are still some American citizens who do not have access to technology or cyberspace. This is mainly due to the income inequality within the country. This can be seen in the following table of the US Census Bureau (2003):

Table 4.44: Households with internet and personal computer access: 2003

Characteristic	Total households	Computer in household			Internet access		
		Number	Percent		Number	Percent	
			Estimate	90-percent confidence interval		Estimate	90-percent confidence interval
FAMILY INCOME (annual)							
Total families	**76,617**	**53,292**	**69.6**	**69.2–70.0**	**47,536**	**62.0**	**61.6–62.4**
Less than $25,000	13,905	5,706	41.0	40.0–42.0	4,276	30.7	29.8–31.6
$25,000–$49,999	18,281	12,232	66.9	66.1–67.7	10,468	57.3	56.4–58.2
$50,000–$74,999	12,979	10,858	83.7	82.9–84.5	10,117	77.9	77.0–78.8
$75,000–$99,999	7,918	7,112	89.8	89.0–90.6	6,796	85.8	84.9–86.7
$100,000 or more	9,292	8,795	94.7	94.2–95.2	8,564	92.2	91.6–92.8
Not reported	14,242	8,589	60.3	59.3–61.3	7,315	51.4	50.4–52.4

As can be seen from this table, only 41% of US citizens earning less than $25,000 annually have access to a personal computer in their household, compared to nearly 95% earning $100, 000 or more who have access to a personal computer. This discrepancy in computer access, in terms of income inequality, can also be seen in the internet access statistic. Only 30% of US citizens earning less than $25,000 have internet access from home, compared to the 92% who earn more than $100,000. Thus, it can be inferred from these statistics that universal access is still a problem for the lesser earning US citizens.

Furthermore, according to a Horrigan & Smith (2007) of PEW Internet and American Life Project, only 47% of all adult Americans had a broadband connection at home as of early 2007, an increase of 5% from early 2006. Thus, 53% still do not have access to the internet, due to technological and economic barriers. Thus, they would struggle to have access to cyberspace without such a high speed, high volume internet connection. It can be inferred that universal access to cyberspace from home is still a problem for many US citizens. It is the author's opinion that this lack of universal access from home

will hamper the American interaction and exchange of data information and knowledge from their local knowledge system with the global knowledge system. Many citizens who do not have access to the internet from home, have the option of using the Internet connection at any of the 16,000 plus public libraries in the U.S. According to Bertot & McClure (1997) only 20.9% of public libraries in the United States had some type of connection to the Internet. By 2000, this amount had increased to 95% of all libraries (including those in rural areas and public libraries) having a connection to the internet. Of course, this is also not the only place US citizens can access the internet. There are also telecentres, various digital community centres and cyber cafés where citizens can obtain access. According to Globalcomputing.com (2007), there are approximately 111 internet and cyber cafés within America, where citizens can obtain access to the internet. However, due to the inconvenience of travelling to a library, internet café, or telecentre to obtain access, many US citizens will limit their interaction, which will hamper the two-way exchange process.

Thus, the author can infer that, although universal accessibility to personal computers and the internet has not been attained from home, universal access in the country as a whole is very good, with numerous places such as libraries, telecenters and digital community centres providing access. The author is of the opinion that universal access will enable all American citizens to access new online information sources such as digital libraries, in which the country's cultural heritage and diversity can be preserved. From the perspective of this study, this is important, seeing that data, information, and knowledge can be exchanged with other electronic sources within the global knowledge system; for example, digital libraries from across the world. In this way, cultural information can be interacted with and exchanged, across platforms such as the internet. In the following section, the author will investigate these digital libraries within the USA.

b) Digital libraries

Lynch (2005) is of opinion that digital library initiatives within America have experienced a golden era over the last decade. Although always very poorly defined, digital libraries have always attracted dreamers, visionaries, and entrepreneurs, as well as a diversity of social scientists, lawyers, scientists, and technicians. Furthermore, digital libraries have had a rich and diverse history, and can be traced back to the early 1960s when the technical and engineering basis for digital libraries already existed. However, it is only from 1994, that digital libraries started drawing the attention of the American government.

According to Lynch (2005), it was in 1994 that digital library research got substantial programmatic funding from the major research funding agencies in the United States. These funding agencies include: the National Science Foundation, DARPA, NASA, the National Library of Medicine, National Institutes of Health, the Library of Congress, the National Endowment for the Humanities, as well as the Institute of Museum and Library Studies. During the period 1994 – 2004, the American government, in collaboration with some of the above mentioned funding agencies, initiated two major digital library initiatives, the original Digital Library Initiative and the follow up to this initiative referred to as DL2. Owing to these decisions by the American government, the research field of digital libraries was legitimised.

It is also important to note that the government-led initiatives were not the only digital library initiatives initiated during this time. There was a significant amount of digital library activity happening in the 1990s, led by commercial, higher education, and cultural memory sectors. A very good example of a commercially oriented digital library project started in the early 1990s when the MEDLINE medical database was made available to the public, via the internet (Ram *et al*, 1999).

Unfortunately, since 2005 there has been very little substantial programmatic US government funding of digital libraries research. This is mainly due to two

reasons. Firstly, the novelty of constructing digital libraries as a research end has run its course and, secondly, it is difficult to establish new research initiatives due to a shift in funding priorities. Although very little government funding is being directed to the creation of new digital libraries in the US, there are a significant number of existing libraries that can be utilized to access the diverse culture of the American public. One good example of such a digital library is the Library of Congress's American Memory project. This digital library provides open access, utilising the internet as an access platform, to written and spoken words, sound recordings, still and moving images, prints, maps, and sheet music that all document the American culture and experience (http://memory.loc.gov).

From the above discussion, it can be inferred that the American government has initiated various digital library projects that provide access to the American cultural heritage. These digital library projects and initiatives make resources more easily accessible and create new ways for people to experience American culture. This is very important seen from the perspective of this thesis. By making this information accessible through access platforms, such as the internet, initiatives like these will preserve American cultural heritage and diversity. In this way, data, information, and knowledge of the American population can be shared with other people accessing this information through the internet. Thus, the American population can contribute their data, information, and knowledge to the rest of the global information system. Included within this information, is information pertaining to the knowledge of the American indigenous peoples. In the following paragraph, the author will investigate whether there are any initiatives, programs, or policies in place in America that will protect these indigenous people and their knowledge, and preserve it for the generations to come.

c) Indigenous knowledge initiatives

Robert Hagen (2007), the U.S. Advisor on the Declaration on the Rights of Indigenous Peoples, is of the opinion that the US government promotes the rights of indigenous people within the US with vigorous efforts. Indigenous

Indian tribes in the United States are recognised as political entities with inherent powers of self-government under US domestic law. Furthermore, the federal government has a government-to-government relationship with Indian tribes. With regard to domestic regulation and policies, the US government promotes: “tribal self-government over a broad range of internal and local affairs, including determination of membership, culture, language, religion, education, information, social welfare, maintenance of community safety, family relations, economic activities, lands and resources management, environment and entry by non-members, as well as ways and means for financing these autonomous functions,” (Hagen, 2007:1).

However, according to Fishel & Howard (2006), in a report concerning the compliance of the United States government with the international convention on the elimination of all forms of racial discrimination, the USA does not respect the rights of indigenous people. In fact, Fishel & Howard (2006) maintain that the US government is in violation of many of the recommendations of the International Convention on the Elimination of All Forms of Racial Discrimination (CERD). One example of this potential violations is the issue between the US government and the Western Shoshone with regard to protection of their people, their land and their resources. In an urgent action procedure in March 2006, CERD directed the US Government to initiate an immediate dialogue with the Western Shoshone people and to immediately cease, desist and freeze from any further actions that threaten to harm the Western Shoshone people, their lands and resources. Not withstanding this action, the US Government failed to respond, and, instead, continued to allow destructive activities on Western Shoshone lands. This included the expansion of an open pit cyanide heap; leach mining; plans to store nuclear waste at Yucca Mountain, and military testing on Western Shoshone land.

The report mentioned above, points out various human rights violations where the US Government did not respect the rights of indigenous people living within the US borders. Most indigenous peoples in the US still live under the threat of having their lands taken, leased, or despoiled by the government

without their free, prior, and informed consent. Their means of livelihood, including their own means of subsistence, can be taken away; they can be forcibly relocated; their resources can be contaminated and they can be deprived of their languages, their culture, and their spiritual traditions (Fishel & Howard, 2006). This situation has also come to a head over the voting record of the US regarding the ratification of a UN declaration affirming the rights of native peoples worldwide. According to Holmwood & Writer (2007) of Newsvine, the declaration is not legally binding, but it affirms the equality of the world's 370 million indigenous peoples. The declaration established standards to help combat the discrimination and marginalisation of indigenous people and eliminates human right violations against them. Furthermore, the declaration affirms the rights of indigenous people to maintain their own institutions, cultures, and spiritual traditions. The United States, Canada, Australia, and New Zealand were the only countries that voted against the declaration, whilst 11 nations abstained. Holmwood & Writer (2007) are of the opinion that the countries that voted against the declaration said they wanted to work toward a solution, but that key parts of the UN declaration would give indigenous peoples too many rights and clash with existing national laws.

The author is of the opinion that due to the disparity concerning laws, regulations, policies, and initiatives regarding indigenous people and indigenous knowledge initiatives within the US, they do not comply with this indicator of the cultural criterion. Although the existing initiatives, such as the recognition of the Indian tribal government, can play an important role in the interaction and exchange of data, information, and knowledge between the local or indigenous knowledge system and the global knowledge system, more initiatives, like these, need to be implemented, to secure the rights of indigenous people and their knowledge within the country. From the perspective of this thesis, activities such as the Federal Government working together with the Indian tribal governments, can be utilized to recognize the culture and importance of indigenous people within the USA. This can play an important role in the interaction and exchange process of the tribal data, information, and knowledge from their information system with data, information, and knowledge from within the global knowledge system.

Through this process, the data, information, knowledge, experiences, and culture of the Indian people can be shared with the rest of the American population and even the world, which could lead to increased mutual respect between these peoples. This local or indigenous knowledge can then be accessed through the internet, and the indigenous people can take a full part in initiatives such as e-health and e-learning, where their Indian tribal remedies and knowledge might prove to be beneficial in the information and knowledge society.

Thus, the author can deduce that these regulations concerning indigenous people help to preserve the special value that indigenous people and their knowledge hold for the country as a whole, and contribute to the social cohesion within the information and knowledge society. One of the values on which the American government can capitalize, is the role the indigenous people can play in tourism. In the following section, the author will investigate the role tourism can play in the marketing of the cultural heritage and diversity of the American population, including that of the indigenous population.

d) Increased tourism opportunities

According to the World Travel & Tourism Council (2007a), the USA contributes almost one-third of the world's total Travel & Tourism GDP, a world market share of 23.9%, making the USA the leader in terms of tourism. As can be seen in the following figure, the total demand for travel and tourism in the US is $1,689,309 which is nearly three times the demand of Japan, currently ranked second.

WTTC LEAGUE TABLE EXTRACT
Travel & Tourism Total Demand
(2007, US$ mn)

1	United States	1,689,309.0
2	Japan	523,015.2
3	Germany	483,598.6
5	United Kingdom	377,122.1
6	France	366,927.9
7	Spain	300,099.0
8	Italy	271,972.6
9	Canada	201,971.9
11	Australia	121,972.1
23	Greece	51,762.9

Figure 4.30: World travel & tourism demand, 2007

With regard to tourism contribution to the GDP of the US, in 2007 the tourism and travel industry is expected to contribute 3.8% to GDP (US$524.5bn). Unfortunately, as can be seen in the following figure, the travel and tourism industry's contribution to total GDP has been decreasing since 1998, and is not expected to increase in the years to come (World Travel & Tourism Council, 2007a).

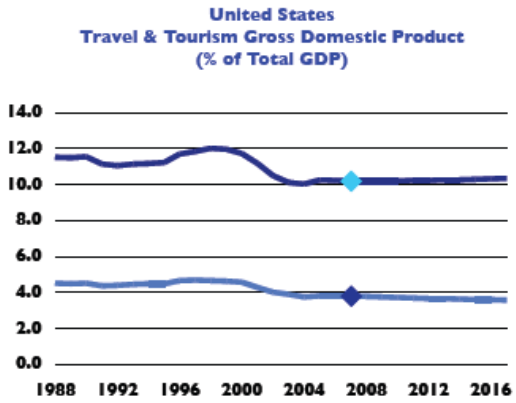


Figure 4.31: US travel & tourism contribution to total GDP

In terms of real employment within economy, the US travel & tourism economy is expected to generate 15,040,000 jobs in 2007, which constitutes 10.3% of the total US employment. Tourism, therefore, accounts for one out of every 9.7 jobs. As can be seen in the following figure, the total amount of travel & tourism economy employment has been on a downward trend

between 2002 and 2004, with a slight increase during 2005 and 2006, although the expected figure for 2007 has decreased again (World travel & tourism Council, 2007a).

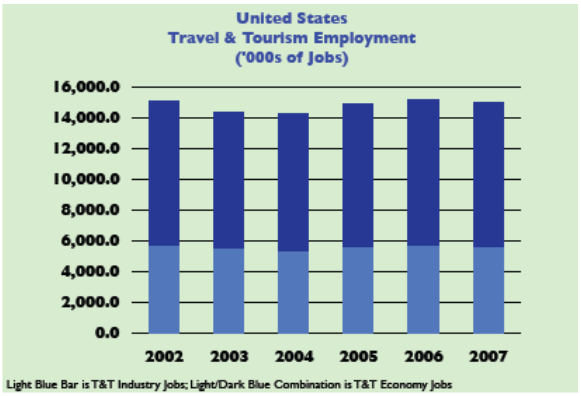


Figure 4.32: US employment in the travel & tourism economy

The author is of the opinion that the United States Government will be able to rectify this situation by recognising and preserving the special value that indigenous people and their knowledge hold for the tourism industry within the US as a whole. This value has already been capitalized on by commercial companies such as The People's Path (www.thepeoplespath.net), and Go Native America (www.gonativeamerica.com). Go Native America was one of the first to pioneer Indigenous tourism in the US. Furthermore, Go Native America engages only indigenous people to guide the tourists, thus, providing indigenous people with a platform to define themselves according to traditional beliefs and cultural imperatives, and preserving cultural diversity within the US. By recognising the value of the American indigenous people, total employment can be increased by the marketing the rich cultural heritage and diversity of both the American and the indigenous people, through the power of ICT. By harnessing the internet as a distribution channel for the marketing of the cultural riches, more tourists can be attracted to the country.

The indigenous people of America, for example the American Indian population, can also play an important role in tourism through the sharing of their indigenous stories, experiences, and culture. In this way, more tourists would be attracted. Thus, increased tourism opportunities can play an important role in the preservation of America's cultural heritage and also

ensure that the indigenous people and their knowledge does not become assimilated and lost within the global information and knowledge society. These increased tourism opportunities also play an important role in the interaction and exchange of data, information, and knowledge from the American local knowledge system with the global knowledge system. Through tourism web-pages and initiatives, the interaction and exchange of data, information, and knowledge of the American local knowledge system will be shared with the global knowledge system. In this way, cultural issues can be exchanged. This process, in turn, will lead to other people and cultures becoming more aware of the American and the indigenous Indian culture and, thus, ensure that these cultures are preserved for the following generations.

From this discussion, the author can deduce that the USA only partially complies with the cultural criterion of the information and knowledge society. Although the USA complies with three out of the four indicators, questions still hang over the recognition of the rights of indigenous people and their knowledge within the USA. The authors' deduction is based upon the comprehensive discussion concerning various cultural issues within the USA and can be summarised as follows:

- High universal access;
- Access to various digital libraries;
- Poor recognition of indigenous people initiatives and
- Increased tourism opportunities.

The issues regarding the position of indigenous people within the USA will have to be clarified before the USA will fully comply with this criterion.

In the following section, the author will investigate whether the country's physical infrastructure can support tourism, as well as the physical products and services that can result from the interaction and exchange process.

4.5.6 Physical infrastructure criterion

According to Britz *et al* (2006), many policy makers forget that the information and knowledge society is still underpinned by a reliable, and highly sophisticated physical infrastructure comprising of motor vehicles, trucks roads, airports, railways and warehouses. As with the social criterion, this infrastructure and deliverability is often overlooked and underemphasised. Without a reliable infrastructure, the dematerialised economy of the information and knowledge society would be of little use. As previously mentioned in chapter 3, information regarding a cure for a deadly disease would be of little use to a country or community if there were no roads for the particular vaccine to be delivered by, or any airports or harbours into which the vaccine could be imported. This physical infrastructure is important within the information and knowledge society as it is used for the movement of people and goods among the sources of production and consumption. According to Foley (2005), physical infrastructure is also directly related economic development and very important to foreign investors. For example, if a country has magnificent copper or gold deposits, there will be a high level of interest in from foreign investors. However, if there are no means of transportation i.e. roads or railways to get the copper or gold out, the project may not be economically viable. From the viewpoint of Britz *et al* (2006), possible indictors of the physical infrastructure criterion can be identified. Firstly, the amount of motor vehicles available within the country for transportation of passengers is important, as this is also an indication of the quality of life and poverty rate in the specific country. These indicators have already been discussed under the economic criterion of the information and knowledge society (see 4.5.1). If the quality of life is high and the poverty rate is low, it would imply that citizens of the country would be able to afford to purchase more motor vehicles, and would there be a larger number of motor vehicles *per capita* within the country.

The second indicator of the physical infrastructure criterion is also related to the amount of motor vehicles within the country, namely the amount of road that is available and, crucially, the condition of these roads. If there are

significant lengths of accessible roads within the country, then it can be inferred that the land area of the specific country is adequately covered in terms of road distribution. This indicator is also related to the economic criterion with regard to the overall economic strength of the country. The author can infer that if the country's economic status in terms of GDP is good then there will be lengths of road that are all in a very good condition because the country will have available money to invest in this infrastructure.

Furthermore, the amount of airports within the information and knowledge society is also very important from a physical infrastructure perspective, and can be identified as the third indicator of the physical infrastructure criterion. According to the Wisconsin Bureau of Aeronautics (2004), local airports are vitally important as they provide important community services such as emergency medical flights, law enforcement, agricultural spraying, and pilot training. As with available roads, the availability of airports is important, as seen from the perspective of an investor. Investors will be keener to invest within a specific country or community if they can easily reach their destination, and air transportation is one of the fastest forms of transportation available today. In addition, the availability of airports is very important seen from a tourism perspective. As previously discussed in the cultural criterion, tourism has long been recognised as an important economic engine. The President of the Airports Council International-North America (ACI-NA) is Greg Principato. He is of the opinion that tourism promotion is vitally important for the economic growth of a country for two reasons. Firstly, it brings the direct benefit of spending by foreign visitors to the country. Secondly, it also is an important tool for the marketing of a nation as a good place to conduct business and as a good place to live. According to Principato (2005), throughout history, strong economies have been built on the best form of transportation available – today, air transportation is the most efficient, and effective transportation means ever devised. "Airports, and travel and tourism, are more than partners for growth. Airports are the critical element in the basic infrastructure that supports global business today - the main cog in the production line of the global economy," (Principato, 2005:1).

A cheaper form of transportation, when compared to air transportation, is railway. According to the World Congress on Railway Research (WCRR, 2006), a second golden age for railways is already dawning. In the White Paper on European transport policy (2006), the railway sector was identified as the market with the greatest potential for growth over long distances. Unfortunately, EU member states have not maintained the current railway infrastructure. A sign of this decline in rail transport can be seen in the number of railway lines that have been closed over the past three decades. An average of 600 km of railway lines have been closed each year in Europe, while, at the same time, the motorway road network was increasing by approximately 1,200 km a year. This situation will have to be rectified if the renewal of the railway system in Europe is to be the key to achieving modal rebalance.

Finally, warehouses and warehouse infrastructure can be identified as an indicator of the physical infrastructure criterion. According to the Department of Revenue Services of Washington State (1996), the storage and shipment of goods is a vital part of the economy. In a report concerning the importance of warehouses within Washington State, the Revenue Service identified the following reasons why warehouses are important to the economy:

- Trade - Without efficient warehouses and warehouse facilities it would be very difficult to store and export goods produced within the country.
- Storage/Distribution of Goods - Warehouses are utilised by retailers, wholesalers as well as manufacturers for the goods that they buy, sell and to store raw materials and finished products.
- Expansion of local markets - By using various warehouse facilities in different parts of the country, firms can expand beyond their own local markets.
- Small Firms - The use of general warehouses gives small firms the opportunity to grow without the large capital investment of building their own warehouses.

Thus, the author can infer from these reasons, that warehouses form an integral part of the economy and have a direct influence on the trade, import, export, and distribution of goods. In addition, it is important to note that the physical infrastructure criterion does not have a direct impact on the interaction and exchange of data, information, and knowledge from the country's local knowledge system with data, information, and knowledge in the global knowledge system. This criterion is, however, still important as it has a direct impact on some of the other criteria of an information and knowledge society, that in turn have a bearing on the interaction and exchange process.

For example, as previously mentioned, the physical infrastructure can influence the economic criterion of the information and knowledge society as the import and export of goods will have some bearing on the GDP of the country, as well as the quality of life in the country. These indicators have already been discussed under the economic criterion. Furthermore, the physical infrastructure will also encroach upon the tourism of a specific country. If there is an adequate physical infrastructure, more tourists will be able to reach their destination and spend their money, which, in turn, has a direct impact on the GDP of the country. On the other hand, if there is a lack in physical infrastructure such as inadequate transport and roads, fewer tourists will visit the country, resulting in a lower overall contribution to the GDP, which, in turn, has a negative domino effect on the quality of life and the ability of citizens to partake in the interaction and exchange process.

In the following section, the author will apply the following indicators of the physical infrastructure criteria of the information and knowledge society, to Norway and the USA respectively:

a) Number of motor vehicles.
b) Accessible roads.
c) Number of airports.
d) Railway.
e) Number of warehouses.

Norway

According to Brunvoll & Monsrud (2006), transport and communication is an essential service in a modern information and knowledge society. To achieve this service within Norway, transport is dependent on a considerable infrastructure such as roads, rails, airports, as well as adequate warehouse space for the storing of goods. The quality of the Norwegian physical transportation infrastructure is relatively good, however, Norway's high mountains and deeply cut valleys and fjords, combined with a severe northern climate, make transportation within the country very difficult during the winter months. In the South of Norway, transportation is mainly via the railroads while most of the northern regions are only accessible by ship, car, or aircraft (National Economies Encyclopaedia, 2007). Within Norway, the physical infrastructure is necessary to ensure that citizens have transport over the majority of the country. In the following figure, it can be seen that road and railway transport, only cover a very small area of land within Norway when compared to other EU countries. In 2005, the total land area covered by roads, railways and airports was only 1,797 km^2 of the total land area of 385,155 km^2 (0.46%) As can be seen in the figure, this is much less than for example Belgium or the Netherlands, but slightly more than Spain and Sweden (Brunvoll & Monsrud, 2006).

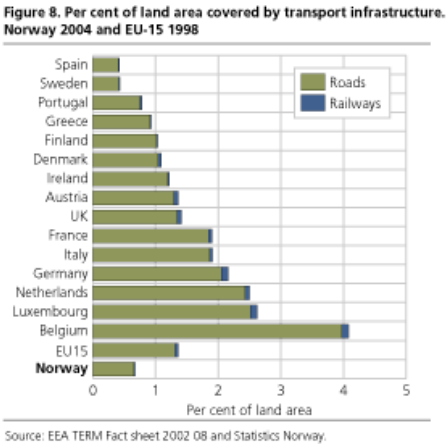


Figure 4.33: percentage of land area covered by transport infrastructure

a) Motor vehicles

In Norway, travelling via motor vehicle is very important with the average Norwegian travelling more than 30km per day. Compared to other European countries, Norway is not far behind France, who has the highest passenger transport demand, and the longest daily *per capita* distance driven with passenger cars, namely 34 km per day. These figures as well as the figures for other selected countries can be seen in the following figure:

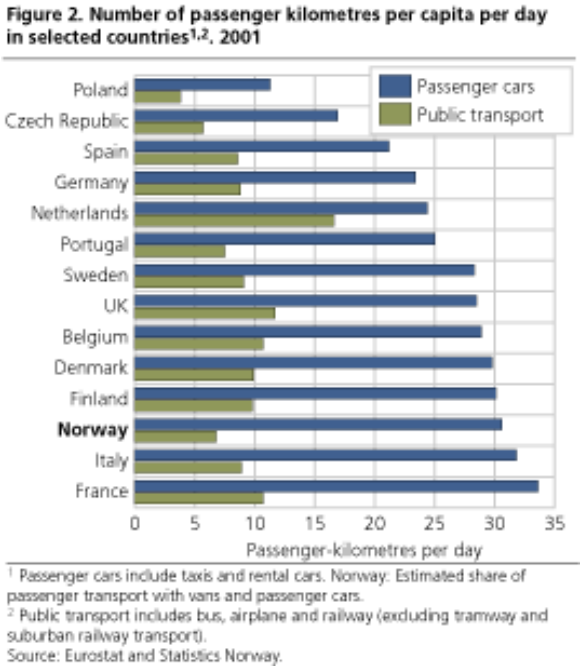


Figure 4.34: Number of kilometres, *per capita*/per day in selected countries.[49]

This high level of demand for transport is not completely reflected in the number of registered motor vehicles within Norway. In the following table, it can be seen that the number of motor vehicles in Norway has increased over the last few years, indicating an improvement in the overall GDP of the country. This corresponds with the information relating to Norway's GDP as previously discussed under the economic criterion, namely that Norway has been experiencing a high GDP the last few years and, in 2006, was rated as having the second highest GDP in the world.

[49] Information extrapolated from Brunvoll & Monsrud (2006)

Table 4.45: Registered private cars 1998-2003

Private cars					
1998	**1999**	**2000**	**2001**	**2002**	**2003**
1 786 404	1 813 642	1 851 929	1 872 862	1 899 767	1 933 660

When comparing this number of vehicles with the number of inhabitants within Norway, the number of passenger cars per 1000 citizens, is just over 400. Compared to other countries, Norway thus has one of the lowest numbers of cars per 1000 inhabitants, with only Poland, Denmark, the Czech Republic, Portugal and Netherlands having fewer. This can be seen in the following figure:

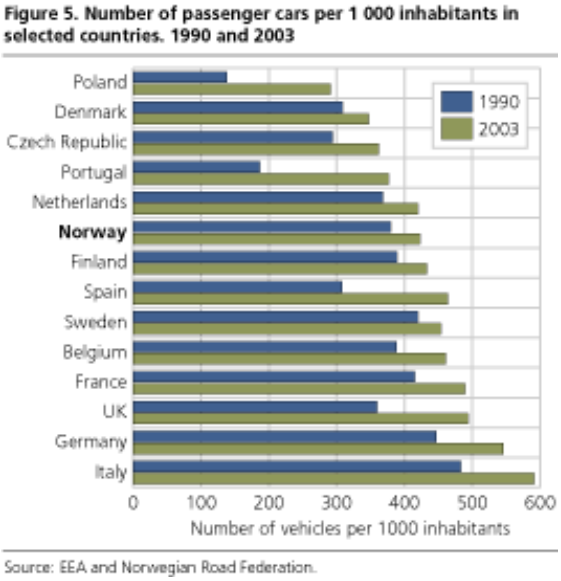


Figure 4.35: Number of passenger cars per 1000 inhabitants

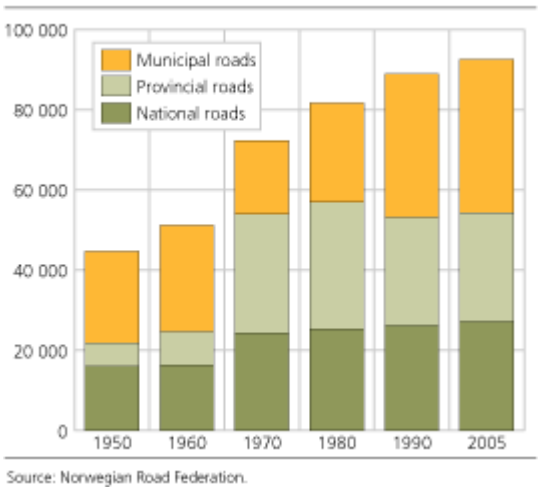
The author is of the opinion that this low number of passenger cars per 1000 citizens in Norway is not, necessarily, an indication of an unsatisfactory quality of life, but can be attributed to the topology and the climate of the country; the high mountains, deeply cut valleys and fjords, and the severe northern climate. These conditions, together with the lack of accessible roads that will be discussed in the following indicator, make travelling by motor vehicle nearly impossible. Undoubtedly, this will have an impact upon the Norwegian Tourism industry, since a large percentage of the country is only accessibly by ship, rail, or air. Special attention will have to be given to the marketing of

these regions in terms of the accessibility for tourists, if the Norwegian Government is to capitalize on this indicator to help them progress to become an information and knowledge society. These factors will also impede upon the length of accessible road in the country, which will be discussed in the following section.

b) Accessible roads

According to Brunvoll & Monsrud (2006), in 2005, the total length of public roads in Norway was, approximately, 92,500 km. This figure has more than doubled since 1950. The 92,500 km includes national, provincial and municipal roads. In addition to this, there are also 74,400 km of private roads within Norway, and only around 200 km of motorways, which is the smallest amount among the Nordic countries. These figures, as well as the improvement in road length over the past 5 decades, can be seen in the following figure:

Figure 7. Length of public roads in Norway. km



Source: Norwegian Road Federation.

Figure 4.36: Length of public roads in Norway

As mentioned above, this relatively small length of road can be attributed to the geographic profile of the country. Most of the 92,500 km of road is concentrated near the populated areas around Oslo in the South. The Norwegian government will have to rely upon other transport indicators to help them become an information and knowledge society as the short length of

road will not stimulate an increase in tourism, thus GDP, in the country. In support of this road infrastructure there is a further 4,023km of railway system, again concentrated in the south of the country, connecting Oslo with the larger towns, notably Bergen and Stavanger, and leading to neighboring Sweden (National Economies Encyclopaedia, 2007). The railway system in Norway will be discussed as the fourth indicator of the physical infrastructure criterion, later in this section.

c) Number of airports

As previously mentioned, a high number of airports within an information and knowledge society are the main cogs in the production line of the global economy. This is also relevant for Norway. Due to the rugged terrain in Norway, air transport is very popular. According to Liv Signe Navarsete, Norwegian Minister of Transport and Communications (2007), there are 50 airports within Norway with scheduled traffic. Within Europe, only the UK and France have more airports than Norway. In terms of the number of airports per inhabitants, Norway is ranked second in Europe after Iceland. The Minister is of the opinion that air transport plays a more important role in the transport system in Norway than in most other European countries. Mainly, this is due to Norway's challenging topography, which makes transport by land or sea very cumbersome and extremely time consuming. Consequently, air transport is, in many cases, the only realistic method of transport within Norway. The domestic air transportation statistics support this sentiment. On average, Norwegian citizens complete ate least 2.3 domestic flights per year; the highest average in Europe, where usually citizens, on average, carry out less than half a trip per year. Furthermore, air transport is very important for trade and commerce within Norway, which, in turn, has a direct impact upon the overall GDP of the country. In the remote northern and western parts of the country, air transport is also used for reaching public services such as education, or medical treatment in hospital, or by specialists.

Thus, it can be inferred from this discussion that good access to air transport is vitally important for maintaining the general level of welfare in some parts of

Norway, as well as for maintaining a stable and strong economy. Hence, although the number of airports within Norway does not directly impact upon the interaction and exchange of data, information, and knowledge, it does have an influence on both the economic criterion, in terms of GDP and quality of life, and the cultural criterion, in terms of stimulating tourism.

d) Railway

In contrast to the relatively short length of public road, and the difficulties of travelling by road, travelling via railway is very important in Norway. According to Statistics Norway (2007c), almost 56 million passengers travelled by railway on Norwegian territory in 2006. The total length of the rail network in Norway is approximately 4,000 km. It is very interesting to note that, unlike the rest of Europe, there are no high-speed lines in Norway. Not even the Gardermoen Airport Express Train with a maximum speed of 210 km/h falls into this category. As can be seen in the following table, of the 4,000 km of railway track, only 2,500 km is electrified:

Table 4.46: Total length of railway track in Norway, 2006

	Length of line at the end of the year		**Length of track at the end of the year**
	Total	**Single track**	**Running track**
Total	4 077	3 868	4 286
Electrified	2 518	2 309	2 727
Not electrified	1 559	1 559	1 559

The author is of the opinion that Norway has done excellently in having succeeded in utilising and marketing this form of transport to attract further tourism to the parts of the country that are not easily accessible by motor vehicle, and thus succeeded in harnessing this mode of transportation to help Norway become an information and knowledge society. Due to Norway's

extensive railway system and beautiful scenery, Norway has become a very popular destination for round trips by train. Tourism webpages on Norway are full of special packages including scenic routes via train. For example, the Flaam Railway is marketed extensively as one of Norway's most popular tourist attractions. This railway line of the adhesion type is the steepest in the whole world, making Flaam one of the most popular tourist destinations in Norway (Norway Guide, 2007).

Thus, it can be inferred from tourist attractions like these that the long length of railway in Norway, contributes significantly to the Norwegian tourism industry, which, in turn, contributes to the growth in the overall GDP of the country. Owing to the creation of more job opportunities through tourism, the poverty rate in Norway is decreased and the standard of living, increased. Hence, the physical infrastructure criterion has a direct impact upon the indicators of the economic criterion of the information and knowledge society, previously discussed (see 4.5.1). In the following section, the author will discuss the importance of warehouse in the physical infrastructure of an information and knowledge society, and investigate whether Norway complies with this.

e) Warehouses

As mentioned above, a high number of warehouses form an integral part of the information and knowledge society's economy and have a direct influence on the trade, import, export, and distribution of goods. In the following table, the total warehouse floor space, between 2000 and 2006 is shown. The amount of available floor space fell between 2005 and 2006 to a level of approximately 677,000m² (Statistics Norway, 2007a).

Table 4.47: Buildings completed, utility floor space, non-residential building: 2000-2006. (In 1,000m²)

Year	Industrial building and warehouse	Agricultural and fishery building	Office and business building	Prison, building for emergency preparedness etc.
2006	677	305	766	8
2005	797	494	693	17
2004	555	484	665	7
2003	556	438	743	14
2002	743	465	911	13
2001	734	427	702	4
2000	818	393	1 016	16

However, this decrease is not as problematic as it appears. When looking at the following table, Table 4.48, indicating the floor space of warehouses and other industrial buildings where the building thereof has been started but not yet completed, it can be seen that the situation regarding warehouses and other industrial buildings has been rectified, and more warehouses were begun in 2006, but not yet completed.

Table 4.48: Buildings started, utility floor space, non-residential building. 2000-2006. (1,000 m²)

Year	Industial building and warehouse	Agricultural and fishery building	Office and business building	Prison, building for emergency preparedness etc.
2006	942	478	1 111	28
2005	818	557	929	14
2004	671	591	721	8
2003	600	486	679	19
2002	754	471	641	6
2001	703	441	823	7
2000	823	406	917	19

From these statistics from Statistics Norway (2007a), the author can infer that more industrial buildings and warehouses, have been started in 2006, to rectify the decrease in total floor space as indicated in Table 4.47. Thus, Norway is progressively working to ensure that there is adequate warehouse floor space to store and export goods within the country, to store raw materials for manufacturers as well as finished products for retailers and wholesalers. In this way, utilising the warehouse facilities within different parts of Norway local markets can expand and it is possible to expand the market beyond their local reach. Consequently, this will have a direct impact on the economy of Norway, and thus upon the indicators of the economic criterion previously discussed (see 4.5.1).

From this discussion regarding Norway's physical infrastructure the author can, therefore, conclude that although motor vehicle transport by road is not as prevalent as in other European countries, this is due to the topography of the country and not due to poor economic growth or a resulting poor quality of life. However, the small amount of motor vehicles per 1,000 inhabitants, combined with the relatively short length of road available, will have an impact upon other criteria, such as the economic and cultural criteria. For this reason, the author is of the opinion that Norway does not comply with these two indicators of the physical infrastructure criterion. With regard to rail and air transport, Norway has an adequate physical infrastructure that can be utilized for the import or export of goods, as well as by foreign investors or tourists who wish to visit the country. These activities, which are stimulated by the adequate physical infrastructure, will, in turn, have an impact upon the economic and cultural criterion of the information and knowledge society. Therefore, it can be deduced that Norway partially complies with the physical infrastructure criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning the physical infrastructure available within Norway and can be summarised as follows:

- Low number of motor vehicles;
- Low amount of accessible roads;

- High number of airports;
- Low amount of railways;
- High number of warehouses.

In the following section, the author will investigate whether the USA complies with this criterion.

USA

Although America has a very sophisticated physical infrastructure with millions of motor vehicles, enormous lengths of roads and railways, and the largest number of airports in the world, this infrastructure is not being properly maintained. According to Sarah Williams Goldhagen (2007), a reporter for The New Republic, this lack of maintenance has resulted in the two physical infrastructure-related accidents that took place within fourteen days of each other in September 2007: a bridge collapse and a steam-pipe explosion. The main reason for the deterioration of the physical infrastructure is the decline in federal spending as a percentage of GDP from, approximately, 0.93% of GDP to 0.54% of GDP (Goldhagen, 2007). This situation will have to be rectified by the American government to prevent accidents like this happening in the future. In the following section, the author will discuss this sophisticated physical infrastructure.

a) Motor vehicles

Since 1960, the number of passenger vehicles within the USA has steadily risen, and since 1972 has exceeded the number of licensed drivers. According to the European Union (2006), the US has the most passenger vehicles per 1,000 inhabitants weighed against the EU countries. Compared to 759 cars per 1,000 inhabitants in the USA in 2003, the average amount of cars in the EU was 472 cars per 1,000 inhabitants in 2004. According to the US Census Bureau (2006), the total amount of registered vehicles in the US in 2004 was approximately 237,243,000. Considering that the population of the

United States in 2004 was 293,655,404, this accounts for one passenger vehicles for every 0.8 persons in the United States, meaning that there are approximately 807 passenger vehicles for every 1,000 Americans. As can be seen in the following table, this number greatly outweighs the amount of passenger vehicles per 1000 inhabitants in Europe (European Union, 2006).

Table 4.49: Number of cars per 1 000 inhabitants in EU in 2004

Number of cars per 1 000 inhabitants		
	1990	**2004**
Belgium	387	467
Czech Republic	234	373
Denmark	309	354
Germany	445	546
Estonia	154	350
Greece	170	348
Spain	309	454
France	414	491
Ireland	226	385
Italy	483	581
Cyprus	304	448
Latvia	106	297
Lithuania	133	384
Luxembourg	477	659
Hungary	187	280
Malta	298	525
Netherlands	367	429
Austria	388	501
Poland	138	314
Portugal	258	572
Slovenia	289	456
Slovakia	166	222
Finland	388	448
Sweden	419	456
United Kingdom	359	463
Iceland	468	599

Lichtenstein	594	692
Norway	380	429
Switzerland	442	514

From this table it can be seen that in 2004, the US had approximately 148 passenger vehicles more, per 1000 inhabitants than Luxembourg, the highest-ranking European country in terms of the number of passenger vehicles per 1000 inhabitants. Thus, the US has the largest passenger vehicle market of any country, which is not surprising considering that the US has the largest Gross Domestic Product of any country in the world. As previously discussed under the economic criterion, a high GDP will, in turn, influence the other indicators of the economic criterion such as quality of life and poverty rate. In the US where the quality of life is high and the poverty rate is low, citizens will be able to afford to purchase more motor vehicles, ensuring that the US continues to have the largest passenger vehicle market.

b) Accessible roads

As can be expected from the amount of motor vehicles within the USA, the road infrastructure in the US is very extensive. According to the North American Transportation Statistics Database, the total road length in America was 6,432,739 km in 2004. As can be seen in the following table, the road length has not increased dramatically since 2000. With regard to the surface of these roads, more than 4 million km is paved, equating to nearly two thirds of the total road length, and leaving only one third of the total road length is unpaved.

Table 4.50: Total US road length, 2000 – 2004[50]

Hierarchies	**2000**	**2001**	**2002**	**2003**	**2004**
SYSTEM LENGTH					
Road	6,356,000.00	6,376,000.00	6,405,000.00	6,421,247.00	6,432,739.00
Paved	4,025,000.00	4,060,000.00	4,147,000.00	4,205,431.00	4,150,520.00

[50] Information extrapolated from the North American Transportation Database (US Department of Transportation, 2007)

Major road system	699,000.00	700,000.00	701,000.00	⌜706,505.0	714,760.00
Less than four lanes	520,000.00	519,000.00	516,000.00	520,935.00	529,835.00
Four or more lanes	179,000.00	181,000.00	184,000.00	⌜185,570.0	184,925.00
Local	3,326,000.00	3,361,000.00	3,446,000.00	3,497,458.00	3,433,892.00
Unpaved	2,331,000.00	2,315,000.00	2,258,000.00	2,215,816.00	2,282,218.00

Thus, the author can infer from these statistics that the land area in the US is adequately covered in terms of road distribution. As mentioned previously, this indicator is also related to the other criteria of the information and knowledge society, namely the economic and cultural criteria. With regard to the economic criterion, this length of accessible road can further stimulate economic development, as it is very important for foreign investors to be able to reach their destinations, as well as have the infrastructure to import or export resources or products. In terms of the cultural criterion, these accessible roads and adequate passenger transport will ensure that the US stays a favourite tourism destination, which, in turn, will have an impact upon the economic criterion, as a result of tourism's contribution to the GDP. A further indictor that will influence the tourism in the country is the amount of airports, which will be discussed in the following paragraph.

c) Number of airports

As mentioned above, the number of airports directly influences tourism, which, in turn, directly has an impact upon the development and growth of the country's economy. According to the North American Transportation Statistics Database, there were 13,715 airports in the US in 2004. This amount increased to 14,858 airports in 2006. As can be seen in Table 4.45, the USA has the most airports in the world, and has more than triple the amount of airports than Brazil, ranked second (CIA World Factbook, 2007e).

Table 4.51: Number of airports, 2000 – 2004, North American Transportation Statistics Database (US Department of Transportation, 2007)

	2000	2001	2002	2003	2004
Number of airports	13,675.00	13,658.00	13,775.00	⌜13,985.0	13,715.00

Table 4.52: Top Ten Countries of the world, in terms of amount of airports.

Rank	Country	Airports
1	United States	14,858
2	Brazil	4,276
3	Mexico	1,839
4	Russia	1,623
5	Argentina	1,381
6	Canada	1,337
7	Bolivia	1,084
8	Colombia	984
9	Paraguay	881
10	South Africa	731

Thus, the author can infer from this world ranking, that the USA has an adequate number of airports to stimulate tourism and economic development. Through the use of airports, investors can easily reach their destinations and air transport can be utilized to provide necessary community services such as emergency medical flights and law enforcement. Together with this air travel infrastructure, railways are another form of transportation that can be used for passenger or cargo transportation. The railway infrastructure of the US will be discussed in the following paragraph.

d) Railroads

According to NationMaster (2007f), the USA is also ranked number one in the world in terms of length of railway track. In the table below it is indicated that in 2005, there was approximately 226,612 km of railway track in the US. This

is just slightly less than the entire length of railway track within the European Union, totalling 236,656 km in 2006.

Table 4.53: Top Ten Countries of the world, in terms of length of railroad.

Rank	Country	Railways (km)	Date of Information
1	World	1,370,782	2006
2	European Union	236,656	2006
3	United States	226,612	2005
4	Russia	87,157	2006
5	China	75,438	2005
6	India	63,221	2006
7	Germany	48,215	2006
8	Canada	48,068	2006
9	Australia	38,550	2006
10	Argentina	31,902	2006

This length of railroad is necessary as travelling by rail is on the preferred methods of transport used by American citizens. One of the main reasons for this is that in cities where large rail transport is not available, approximately 18% of the American citizens household expenditure is spent directly on transport fares. According to Littman (2006) rail transit, especially large-scale rail transit, reduces these costs. In cities where this mode of transportation is available, only 12% of the household expenditure is spent on transport fares. As can be seen in the following table, the annual *per capita* consumer spending on large rail transportation systems are much less than small rail or bus transportation.

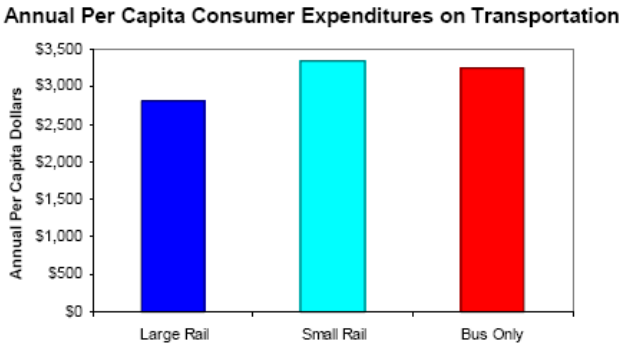


Figure 4.37: Annual USA *per capita* consumer expenditures on transportation.

The author is of the opinion that the USA has succeeded excellently is utilising and marketing this form of transport to reduce the cost of transportation for the American citizen, which would have a bearing upon the economic criterion, the quality of life, and the poverty rate among American citizens. These indicators have already been discussed (see 5.5.1). Furthermore, this mode of transport will successfully attract further tourism to the parts of the country which are accessible by railway, due to its cost and availability, which, in turn, will further influence the economic and cultural criteria. In addition to tourists just using the railroads as a mode of transportation to reach their tourism destinations, the USA has also capitalised on the heritage tourism market, by renovating some of the vintage railway track, engines and passenger cars. One of many such examples is in Arizona. Here, the Verde Canyon Railroad is itself utilised as a tourism attraction. This length of railroad is Arizona's longest-running nature show, where vintage rail engines travel past the scenic, crimson cliffs, past ancient Indian ruins, and through a 680 foot, man-made tunnel (SeeAmerica.org).

Thus, the author can infer from tourist attractions like these that the length of railway in the USA, contributes significantly to the American tourism industry, which, in turn, contributes to the growth in the overall GDP of the country. Owing to the creation of more job opportunities through tourism, the poverty rate in the USA is decreased and the standard of living increased. Hence, the physical infrastructure criterion directly influences the indicators of the economic and cultural criteria of the information and knowledge society. In the following section, the author will discuss the high amount of warehouses as

the last criteria of the physical infrastructure criterion of the information and knowledge society.

e) Warehouses

As mentioned previously, within an information and knowledge society a high number of warehouses form an integral part of the economy and directly influence the trade, import, export, and distribution of goods and products. In the USA, warehouses are seen in this light and form an important part of the American business sector. The American Economic Census collects information regarding this sector, from national to the local level, every five years. The next Economic Census will take place at the end of 2007 when forms will be sent to more than 4 million businesses. Information regarding this census will only be published and made available during 2009 and 2010. Thus, the most recent information regarding this sector pertains to warehouse and warehouse infrastructure from 2002 and was published by the Census Bureau in 2004. In the following table, this information can be seen:

Table 4.54: Comparative USA warehouse and storage data, 1997 and 2002.

Kind of business		Establishments (number)
Warehousing and storage	2002..	12 637
	1997..	6 497
Warehousing and storage	2002..	12 637
	1997..	6 497
General warehousing and storage	2002..	8 194
	1997..	3 921
General warehousing and storage	2002..	8 194
	1997..	3 921
Refrigerated warehousing and storage	2002..	1 255
	1997..	877
Refrigerated warehousing and storage	2002..	1 255
	1997..	877
Farm product warehousing and storage	2002..	716
	1997..	486
Farm product warehousing and storage	2002..	716
	1997..	486
Other warehousing and storage	2002..	2 472
	1997..	1 213
Other warehousing and storage	2002..	2 472
	1997..	1 213
Household goods warehousing and storage	2002..	720
	1997..	317
Specialized goods warehousing and storage	2002..	1 752
	1997..	896

As can be seen from this table, the number of warehouses and storage facilities within the USA nearly doubled from 1997 to 2002, to 12,637. Thus, the USA has adequate warehouses to utilise for the export of goods from within the country, to store raw materials for manufactures as well as finished products for retailers and wholesalers. These warehouses ensure that local markets can be expanded to various parts of the USA, and by utilising the long length of rail, discussed under the previous indicator, transport of these products via rail will not be problematic. Accordingly, this will have a direct impact on the economy of America and, thus, upon the indicators of the economic criterion previously discussed (see 4.5.1).

From this discussion regarding the USA's physical infrastructure, the author can, therefore, conclude that a very sophisticated transportation system exists, consisting of road, rail, and air transport. This transport system, together with the amount of warehouses and storage facilities available, will ensure that the USA can partake in economic activities such as the import or export of goods, foreign investment, and tourism. These economic activities are stimulated by the adequate physical infrastructure and will, in turn, have an impact upon the economic and cultural criterion of the information and knowledge society. Therefore, it can be deduced that the USA completely complies with the physical infrastructure criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning the physical infrastructure available within the USA and can be summarised as follows:

- High number of motor vehicles;
- High amount of accessible roads;
- High number of airports;
- High amount of railways;
- High number of warehouses.

In the following section, the author will investigate the last criterion of the information and knowledge society, namely the knowledge criterion and apply the identified indicators upon Norway and the USA respectively.

4.5.7 Knowledge criterion

In the Okinawa Charter on the Global Information Society (2000), the G8 members renewed their commitment to include everybody within this society so that all can share in the benefits. Accordingly, the principle of inclusion states that: "everyone, everywhere should be enabled to participate in, and no one should be excluded from, the benefits of the global information society. The resilience of this society depends on democratic values that foster human development such as the free flow of information and knowledge, mutual tolerance, and respect for diversity."

Thus, a flow of information from the global information system to the community or country must be established and maintained for the community or country to benefit from the advantages of becoming an information and knowledge society. The author is of the opinion that the interaction and exchange of data, information, and knowledge from the community or country's local knowledge system, with data, information, and knowledge from the global knowledge system is, thus, necessary for the community or country to become an information and knowledge society. Through this two-way communication process, local knowledge from the community or country is shared with the global knowledge system, where people accessing this information can learn more concerning the local community or country's culture, heritage or religion. In this way, the local knowledge of the community or country can be preserved for generations to come, and mutual tolerance and respect for diversity can be stimulated.

In the same way, the local community or country can access global knowledge from the global knowledge system and, by translating, analysing, and contextualising this knowledge, can utilise it to stimulate the development.

As already discussed in the chapter 2 (see 2.4.2), the relationship between information and development is a crucial one. Developed countries and communities use information to further their development. In order to make use of existing global knowledge, communities need sophisticated skills that

enable them to analyse, translate, and synthesise global knowledge and then blend it with local knowledge in order to create new forms of local content (IKWW, 2002). From this, the author can infer that literacy, in terms of both information and computer literacy, is a prerequisite for this interaction and exchange process to take place, and can be identified as the first indicator of this criterion. Although literacy has already been discussed under the good quality education opportunities indicator of the social criterion, the author will investigate information and computer literacy.

Furthermore, the interaction and exchange of data, information, and knowledge also relies on an efficient ICT infrastructure through which information can be easily and readily disseminated. Thus, a sophisticated ICT infrastructure can be identified as the second indicator. As this indicator has already been discussed under the spatial and technological criteria, (see 4.5.2) the author will pay no further attention to it.

In addition to the skills and the sophisticated ICT infrastructure that is needed for this interaction and exchange process to take place, there needs to be information that can be exchanged. Hence, the creation of local content and local e-content can be identified as the third indicator of the knowledge criterion. According to UNESCO, stimulating the development of, and access to, diverse content is crucial for the development of information and knowledge societies. To help achieve this goal, UNESCO initiated the Program for Creative Content in 2002. The importance of local content was also addressed as one of the key principles of the WSIS Declaration of Principles, (WSIS, 2003). According to this principle: “The creation, dissemination and preservation of content in diverse languages and formats must be accorded high priority in building an inclusive information society, paying particular attention to the diversity of supply of creative work and due recognition of the rights of authors and artists.” Thus, communities and countries must be encouraged to create local content and e-content in diverse languages if they want to become information and knowledge societies.

In the following section, the author will apply the following indicators of the knowledge criterion of the information and knowledge society, to Norway and the USA respectively:

a) Computer and information literacy skills;
b) ICT infrastructure;
c) Creation of local content/e-content.

Norway

a) Computer and information literacy skills

As has been previously discussed, Norway places very high importance on information and computer literacy. By targeting the individual through the eNorway 2009 program, the Norwegian Government wishes to create an information and knowledge society, in which everyone can participate and which exploits the potential of information technology (Norwegian Ministry of Modernisation, 2005). With regard to computer literacy, the Norwegian government has taken action within the education system to ensure that scholars become digitally literate. Thus, great emphasis is placed on digital and computer literacy at primary and secondary education level. In 2004, the Ministry of Education and Research issued a White paper, “Kultur for læring,” (“Culture for learning”) that highlighted the importance of digital literacy through the implementation of the Programme for Digital Literacy (2004-2008) at all levels of the educational system. In this White paper, digital literacy is defined as consisting of both ICT skills and information literacy. The program entails the implementation of a new primary and secondary school curricula, where computer literacy is placed as one of the five basic skills that should be integrated in all subjects. The goal of this program is to place digital skills and computer literacy central to education and training.

Unlike computer literacy initiatives, unique information literacy initiatives and programs in Europe have only been initiated in recent years (Virkus, 2003). In Norway, information literacy developments can be linked with tertiary education and many such initiatives can be found in medical and business

schools with the increasing emphasis being on problem-based learning. A good example of such an information literacy initiative comes from the University of Oslo. Bjorndal, *et al.* (1999), discussed the cooperation project between the University of Oslo's medical faculty, and the State Institute for Public Health. This initiative entailed the training of medical students in the use of electronic tools and critical evaluation of information. In the same light, the Agder University College, a tertiary education institute, offers an online course in "Information Literacy," a new course in Norway.

At a national level, the first international conference, *Creating Knowledge*, was held in 1999 in Malmö to address information literacy concerns in higher education. This was followed by two subsequent conferences, *Creating Knowledge II* in Malmö in 2001 and *Creating Knowledge III*, held in Iceland in September, 2003. In the future, the conference will be held every second year in one of the Nordic countries (Schröder, 2002).

However, it is not only at primary, secondary, and tertiary levels where attention is given to information and computer literacy. According to Heide Grande Røys (2006-2007), the Norwegian minister responsible for digital inclusion, information technology (IT) skills can also give older people another way to participate in the life of the Norwegian community. To achieve this, Seniornet was launched in July 2006. Seniornet, in partnership with the Norwegian pensioners association, promotes digital literacy among seniors by training them in the use of internet and personal computer use. During the first year of this initiative, Seniornet trained 1,000 people. By utilising the help of Microsoft Unlimited Potential funding as well as software donations, Seniornet will deliver a "train the trainer" programme that will facilitate the creation of 25 clubs in Norway in 2007. It is hoped that this initiative will benefit 5,000 seniors by empowering them to actively participate in the information and knowledge society (EMEA Press Centre, 2007).

Thus, the author can infer from all these computer and information literacy initiatives and programs at primary, secondary, tertiary, national and senior citizen levels that Norway complies with this indicator of the knowledge

criterion of the information and knowledge society. This is very important to the central problem statement of this thesis as these computer and information literacy skills enable the Norwegian citizens to effectively partake in the interaction and exchange of data, information and knowledge from their local knowledge system with the global knowledge system. These skills furthermore enable the Norwegian citizens to analyse, interpret and contextualise global data, information and knowledge so that it is relevant to their local situation. In the following section, the author will discuss whether Norway has the needed ICT infrastructure to become an information and knowledge society.

b) ICT infrastructure

As previously discussed, Norway has a very adequate ICT infrastructure (see 4.5.2) that would enable Norwegians to access and exchange data, information and knowledge from their local knowledge system, with information in the global knowledge system. To summarize the detailed discussion on Norway's ICT infrastructure, in Norway:

- 75% of all Norwegian households have access to a personal computer;
- 44% have access to a laptop;
- 57% have access to a desktop computer;
- 5% have access to a handheld computer;
- 69% of all households in Norway, have access to the internet;
- 81% of the population has used the internet during recent months;
- 59% use the internet every workday;
- 48% of the Norwegian population had ADSL by the second quarter of 2006.

The author can deduce from these statistics showing high computer and internet access, high broadband access, and high telecommunication penetration that Norway complies with the sophisticated ICT infrastructure indicator of the knowledge criterion of the information and knowledge society. As previously discussed, this sophisticated ICT infrastructure is adequate to

enable the interaction and exchange of data, information and knowledge from their local knowledge system and the global knowledge system. In the following section, the author will investigate whether there is Norwegian local content available that can be distributed with the use of this sophisticated ICT infrastructure.

c) Creation of local content

In Norway, the creation of local content has been on the agenda of the Norwegian government since 1996. In a report from the State Secretary Committee for IT, entitled “The Norwegian Way to the Information Society - Bit by Bit” (Norwegian Ministry of Transport and Communication, 1996), it is emphasised that too little of the content that is communicated via ICT-based media and communication systems has a basis in local Norwegian culture and society. The report noted that the production of Norwegian content must be stimulated and must be a task worthy of priority by both the public and the private sectors. To achieve this, two new government policies were created. According to Policy 3.6.1, Norwegian user interfaces in the Norwegian language must be made available in digital media and communications systems. Norwegian users must have access to software that has been adapted especially for Norwegian conditions. User interfaces of international software must be available in the Norwegian language in accordance with common Norwegian definitions norms. With regard to information systems, efforts must be made to ensure that Norwegian information products and systems must be available in the Norwegian language. The Sámi language must also be given satisfactory consideration. In this regard, significant progress has been made. The software giant Microsoft agreed in 2003 to translate their popular Office software into Nynorsk (New Norse). However, the new language version did not come about without a fight. Noregs Mållag (the Language Organisation of Norway) organised most of Norway‘s secondary schools to threaten to boycott all Microsoft software if they failed to come up with a Nynorsk version of Office.

With regard to Norwegian information systems, in 2007, the new e-government Web portal, government.no, was launched. For the first time, all ministries of the Norwegian government have front pages in the Sámi language, the two official Norwegian languages (Bokmål and Nynorsk), as well as English. All basic information is available in each language. With regard to the Sámi language and the media in Norway, according to Ms Kristin Clemet, Minister of Education and Research (2004), extraordinary developments have been made in the field of radio and TV in recent years, where the Sámi Radio, has considerably extended its programming. This has been followed up by a very positive development in the written media as well. According to the second policy created, Policy 3.6.2, the authorities should focus on the production of Norwegian content. To increase the proportion of material available in the Norwegian language in digital form, role players such as publishers, authors, researchers, and educational institutions must cooperate with a view to making Norwegian material available. With this issue too, progress has been made. In 2001, the Norwegian Research Council launched a 5-year Sámi research program. This program aims to contribute to capacity building and recruitment, alongside special attention being given to the development of the Sámi language as a language of science. In terms of local content in the education sector, the Sámi University College in Kautokeino was founded in 1989 to meet the needs for higher education and research of Sámi society. The instruction is mainly given in the Sámi language (Clemet, 2004).

Thus, the author can infer that creation of Norwegian local content is dependent on active contribution by the Norwegian Government to increase the proportion of material in the Norwegian language that is available on the information networks such as eNorge. This particularly applies to educational material that is currently available in the traditional Sámi language as well as the two official languages of Norway. From these government policies and initiatives concerning the creation of local content, it can be deduced that Norway complies with this indicator of the knowledge criteria.

It is the author's opinion that Norway can successfully partake in the interaction and exchange process between their local knowledge system and the global knowledge system. Currently there are many initiatives in place at primary, secondary, tertiary and national levels to ensure the participation of the Norwegian population in the information and knowledge society by providing the necessary computer and information literacy skills. With these skills, the Norwegian population can transfer their own local knowledge to the global knowledge system by participating in internet forums, blogs and by creating their own Web pages. In this way, local Norwegian data, information, and knowledge is made available using the internet as exchange platform. It was also shown that Norway has the needed ICT infrastructure in terms of having access to personal computers and the Internet to be able to perform this exchange process with ease. It is, furthermore, also necessary for the Norwegian population to be able to access locally created information from information systems, such as e-government systems and the Internet, in their own local language. In this regard, many government initiatives are underway to ensure that information is made available in the official and traditional languages of Norway. Hence, the author can deduce that Norway completely complies with the knowledge criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion above, and can be summarised as follows:

- High level of computer and information literacy skills;
- Sophisticated ICT infrastructure;
- Creation of local content/e-content.

In the following section, the author will investigate whether the USA is in the same favourable position.

USA

a) Information and computer literacy

In the USA, there have been significant initiatives in the country with regard to information and computer literacy. According to Virkus (2003), the progress in the information literacy field can be seen through the establishment of the following:

- the United States National Forum on Information Literacy was established in 1989;
- the Institute for Information Literacy was established in 1998;
- the US Department of Education included information literacy in its national education technology plan as one of five goals in December 2000.

In 1989, the National Forum on Information Literacy (NFIL) was created in response to the recommendations of the American Library Association's Presidential Committee on Information Literacy. Leaders from the education, library, and business sectors realized that American society needed specialized skills to survive the challenges that would emergence from the Information Age. According to NFIL's website, the forum is a "coalition of over 75 education, business, and governmental organizations working to promote international and national awareness of the need for Information Literacy and encouraging activities leading to its acquisition. Forum members promote Information Literacy nationally, internationally, and within their own programs," (http://www.infolit.org/index.html).

Further progress in the field of information literacy was made with the emergence of the US higher education standards. These stemmed from work done by the American Library Association on information literacy. The standards were endorsed by the American Association for Higher Education in 1999 and were reviewed by the ACRL Standards Committee and approved by the Board of Directors of the Association of College and Research Libraries

(ACRL) in 2000. In 2004, the Council of Independent Colleges also approved and endorsed these standards. According to these standards, which focus on defining key areas of desirable behaviour in the information literate student, an information literate student:

- Determines the nature and extent of the information needed;
- Accesses needed information effectively and efficiently;
- Evaluates information and its sources critically and incorporates selected information into his or her knowledge base and value system;
- Uses information effectively to accomplish a specific purpose;
- Understands many of the economic, legal, and social issues surrounding the use of information and accesses and uses information ethically and legally.

In tertiary sectors, the topic of information literacy was also receiving a great deal of attention. In 1993, the California State University System (CSU) was the first tertiary institution that added Information Literacy to its strategic planning document, *Transforming CSU Libraries for the 21st Century: a Strategic Plan of the CSU Council of Library Directors*, *(CSU, 1994).* This move by the largest public university in the US made a great impact upon the adoption of information literacy by other higher education providers (UNESCO, 2007a).

Thus, although information literacy was receiving much attention, computer literacy skills were only adopted into curricula around the turn of the century. In 2001, international efforts to expand the concept of information literacy to include ICT skills came together at the World Summit on the Information Society (WSIS) and the International ICT Literacy Panel was formed. Their report, *Digital transformation: A framework for ICT literacy* (ICT Literacy Panel, 2001), discussed the issues concerning what the higher education sector had to do to accomplish greater ICT proficiencies. From this report the National Higher Education ICT Initiative was born. The goal of this initiative was to conceive, design, and build an innovative, web-based assessment that would measure the ICT skills of college and university students. The first such assessment was created in 2005, referred to as the *Information and*

Communication Technology Literacy Assessment instrument (ETS/ICT) and went through extensive beta testing in 2004. In 2005 more than 3000 students tested the assessment. In 2007, this test was replaced by the new *iSkills*™ assessment. Currently, this method of assessing the ICT literacy of tertiary level students is being used to great success, by the California State University, University of Wisconsin, North Carolina School of the Arts, Purdue University, and Richard Stockton College of New Jersey (Ets.org, 2007).

Thus, it can be inferred from all these information and computer literacy initiatives and programs that the USA can be regarded as a leader in the field of information and computer literacy, and accordingly complies with this indicator of the knowledge criterion of the information and knowledge society. In the following section, the author will discuss whether the USA has the required ICT infrastructure to become an information and knowledge society.

b) Sophisticated ICT infrastructure

As previously discussed under the spatial & technological criteria of the information and knowledge society (see 4.5.2) America has an underlying secure ICT infrastructure that will ensure that they benefit from the advantages of the information and knowledge society. This can be seen from the following statistics:

- 61.8% of all American households have their own computer;
- 86% of Americans aged between 3-17 have access to a personal computer at home, work, or school;
- 64% of Americans aged 18 and over have access to a personal computer at home, work, or school;
- 73% of American households have access to the internet;
- 47% of all adult Americans have a broadband connection at home as of early 2007.

As can be inferred from these statistics, American citizens have the technological infrastructure to ensure user access to the internet and, through

this platform, the exchange of data, information, and knowledge. By utilising available technologies such as broadband penetration, high speed, big volume interaction and exchange can take place, enabling the USA to benefit from the advantages of an information and knowledge society.

Thus, the author can deduce from these figures and statistics that the USA has an efficient and effective ICT infrastructure that definitely complies with the sophisticated ICT infrastructure indicator of the knowledge criterion of an information and knowledge society. In the following section, the author will discuss whether the American population can, through this sophisticated ICT infrastructure, access local content.

c) Creation of local content

With regard to the creation of local content, the American population is very active in this field. According to Horrigan (2006), 35% of American internet users posted online content in 2005. This online content falls into various categories listed in the table below.

Table 4.55: USA user generated online content

User-generated online content						
	All internet users	All home users	Broadband at home	Dial-up at home	Millions of Americans with home internet access who do activity	Millions with internet access only at places other than home or work
Create or work on your own online journal or blog	8%	8%	11%	4%	9 million	2 million
Create or work on your own webpage	14	15	17	11	18 million	2 million
Create or work on webpages or blogs for others including friends, groups you belong to, or work	13	13	16	9	16 million	2 million
Share something online that you created yourself, such as your own artwork, photos, stories, or videos	26	28	32	20	32 million	4 million
Percent who have done at least one the above "content" activities	35	36	42	27	43 million	5 million
Source: Pew Internet & American Life Project December 2005 survey. Margin of error for internet users is ±2%.						

From this table it can be seen that 42% of users with a broadband connection at home have created some form of local online content, whether creating a blog or a webpage. In comparison to this, only 27% of American internet users

who have a dial-up connection at home have performed the same activities. This statistic supports the high ICT infrastructure indictor of the knowledge criterion. The suggestion is clear; that the availability of a high-speed connection might draw some users to create content on the internet. A further interesting fact to come from this Pew Internet Project (Horrigan, 2006) is that race, educational attainment, and household income do not play such a big role in the creation of local content. In the following table, the difference between the races of creators is 10%, which really is not significant. Similarly, there is only a 9% difference between content creators who have various levels of education. Even with regard to income, there is no clear correlation between content creators and specific level of household income. These factors can be seen in the following table:

Table 4.56: Profile of USA online content creators

A Portrait of Those Who Post Content Online	
The percentage of internet users in each group who have done at least one of the following online: shared something they created themselves like a story or a video, created their own webpage, worked on others' webpages, or created a blog.	% who are content creators
Gender	
Men	37%
Women	32%
Age	
18-29	43%
30-49	36%
50-64	29%
65+	18%
Race / ethnicity	
White (not Hispanic)	32%
Black (not Hispanic)	39%
Hispanic (English speaking)	42%
Educational attainment	
Less than high school	32%
High school grad	28%
Some college	37%
College +	38%

Household income	
Under $30K	32%
$30K-$50K	32%
$50K-$75K	33%
Over $75K	41%
Community type	
Urban	39%
Suburban	34%
Rural	27%

With regard to the creation and distribution of content for the indigenous population in the USA, many initiatives and programs have been initiated the past few years. One of the most important of these initiatives comes from the activities of the American Native Press Archive, which also includes a digital library owing to the support of the Sequoyah Research Center. This centre supports the activities of the American Native Press Archives by providing physical space, technology and website management, grant writing and other public and private funding efforts, administrative functions, and related activities. According to their website, the American Native Press Archives began in 1983 as a clearinghouse for information on American Indian and Alaska Native newspapers and periodicals. In recent years, the mission of the archives has changed from an information exchange to a research facility. This facility collects and archives the products of the Native press and materials related to Native press history. In addition, the archive also collects and documents the works of Native writers and creates digital editions of writers' works; thus, the creation of local Native e-content. It stands today as one of the world's largest repositories of Native thought (American Native Press Archives, 2007).

Furthermore, in terms of local language distribution, the USA has several Navajo-language radio stations, as well as a television station dedicated to the Navajo language. According to McGroarty (2002), the Navajo Nation is the largest indigenous nation in the US, and has a population of over 200,000 of which about half speak Navajo. To cater to language needs of these indigenous people, several Navajo-language radio stations have emerged in the US, both public and private, as well as regular programming on local

Christian radio. A Navajo television station (NNTV 5) produces around 4-5 hours of local Navajo-language content per week, ranging from current events to live broadcasts of the Navajo Nation Tribal Council sessions (McGroarty, 2002). This indigenous nation is also embracing the internet to improve social services and protect their culture. In 2003, the Navajo Nation brought wireless Internet to their reservation (which has a population of 2,500) via a satellite connection. This internet connection has made the people less dependent on the central Navajo government and more efficient (Cullen, 2005).

It is the author's opinion that initiatives like these are very important, seen from the perspective of this study. By utilising the satellite internet connection, the Navajo population can start creating their own online content by creating Web pages and blogs. In this manner, local Navajo content can be made available on the global knowledge system utilising the internet as platform for other Navajo-speaking people to access. This internet connection furthermore bridges the digital divide in the Navajo population and enables them to access the information that is available in the global knowledge system.

Thus, it has been shown that the USA can successfully partake in the interaction and exchange process between their local knowledge systems and the global knowledge system. Currently, there are many programs and initiatives in place to insure the participation of the American population in the information and knowledge society by providing the necessary computer and information literacy skills. By utilising these skills, the American population can transfer their own local knowledge to the global knowledge system by participating in internet forums and blogs, and by creating their own Web pages (as can be seen in Table 4.49). In this way, local American data, information, and knowledge is made available using the internet as an exchange platform.

It was also shown that the USA has the required ICT infrastructure in terms of having access to personal computers and the internet to be able to perform this exchange process with ease. Part of this exchange process entails accessing local American information online. This information is much easier

to access and much more usable to the American population as most of the information available on the internet is already in their local language, namely English. As previously discussed under the language indicator of the Social criterion within the information and knowledge society (see 4.5.4), citizens need access to information that is in their own language so that this is information is truly usable. In this regard, the USA is in the fortunate position that 56% of all websites are in English (Ebbertz, 2002), thus in a language that is easily understandable to them.

As far as the American indigenous population are concerned, initiatives are underway to ensure that they, too, will be able to access locally relevant information in a language they can easily understand. As the USA complies with all three the indicators of the knowledge criterion, the author can deduce that the USA complies with knowledge criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion above, and can be summarised as follows:

- High level of computer and information literacy skills;
- Sophisticated ICT infrastructure;
- Creation of local content/e-content.

From this lengthy discussion, it can thus be seen that both Norway and the USA, which are classified as being developed countries, complies completely with most of the criteria for an information and knowledge society, and only partially complies to one or two of the other stipulated criteria. Hence, the author can deduce that both Norway and the USA can be classified as being information and knowledge societies, and will thus benefit from all the advantages that this society results in. However, this is not the case in developing countries, as the author will discuss in the following chapter. In the following section this discussion is summarised.

Table 4.57: Summary of the compliance to the stated criteria – Norway, USA.

Criteria	Does not comply at all	Slightly complies	Partially complies	Complies completely
Economic				Norway USA
Spatial & Technological				Norway USA
Political				Norway USA
Social			USA	Norway
Cultural			USA	Norway
Physical infrastructure			Norway	USA
Knowledge				Norway USA

4.6 CONCLUSION

This chapter discussed globalisation as the process that allows the possible interaction and exchange of information between local knowledge systems and the global knowledge system in developed communities. Firstly, the concept “developed” was defined. This was followed by a discussion on the concept of globalisation. The process of globalisation was discussed and attention was given to the dimensions of globalisation as well as the characteristics of globalisation. The most important characteristic of globalisation, added by the author, is the inclusion of the developed country or community within the information and knowledge society due to the sharing of knowledge and ideas. This is enabled by the constant interaction and exchange of data, information, and knowledge between the developed country or community’s local knowledge system and the global knowledge system. The developed countries and communities can then take advantage

of all the advantages and benefits that arise from becoming an information and knowledge society, as discussed in chapter 3.

To investigate whether developed countries are included within the information and knowledge society, the criteria for such a society, as described in chapter 3, were elaborated upon, and the indicators, which that go to make the criteria, identified. These indicators were then applied to two developed countries: Norway and the USA. The criteria applied to the chosen countries were: economic, spatial and technological, political, social, cultural, physical infrastructure, and knowledge criteria. The chapter was concluded with a summary of all the criteria, where it was indicated which criteria the specific countries complied to or not. The author concluded that both Norway (ranked first, according to the Human Development Index) and the USA complies completely to most of these criteria and partially with the others. From this, the author deduced that both Norway and the USA can be classified as being information and knowledge societies.

In the following chapter, the author will discuss developing communities and the lack of interaction and exchange of information and knowledge between their local knowledge systems and the global knowledge system. Due to a lack of interaction and exchange between these systems, the identified criteria of an information and knowledge society cannot be stimulated, resulting in the developing country not complying too many of the stated criteria. In turn, this prohibits developing communities from becoming information and knowledge societies.

PART III: PRACTICAL APPLICATION (Part 2)

CHAPTER 5

CRITICAL EVALUATION OF NIGER AND SOUTH AFRICA AS INFORMATION AND KNOWLEDGE SOCIETIES

5.1 INTRODUCTION

It cannot be denied that developing countries are still not very far down the path towards becoming information and knowledge societies, due to a number of factors. These factors include financial, language, social and technological barriers. These barriers will be addressed later in this chapter. As will be argued in this chapter, all these barriers impede these countries' ability to share their own indigenous or local knowledge with the rest of the world, whilst also impinging on the countries' ability to receive, understand, and contextualise information from the global knowledge system (GKS). This prevents the interaction and exchange of data, information, and knowledge between the countries' local knowledge system (LKS) and the global knowledge system. The limited or even non-interaction between the GKS and the countries' LKS will have to be rectified, so that the developing country can progress towards the information and knowledge society and share in all the advantages thereof, as discussed in chapter 3.

In this chapter, the author will firstly define the concepts 'developing' as well as 'least developed'. Furthermore, this chapter will investigate whether developing countries can truly benefit from globalisation, as this process is characterised by the possible benefits available to countries that participate. This process is, however, reliant upon a sophisticated ICT infrastructure that usually is inefficient or non-existent within developing countries. This inefficient ICT infrastructure is commonly referred to as the 'digital divide' and can be viewed as a challenge faced by many developing countries and communities. This challenge, which has received much publicity, was already

mentioned in chapter 3, and will be addressed in greater detail in this chapter. One of the main consequences of the digital divide is that it deters developing countries from becoming true information and knowledge societies. This deterrence and reasons for it will be discussed by applying the indicators of the criteria of the information and knowledge society, as identified in chapter 4 (see 4.5) to two developing countries. For this purpose, the author will refer to Niger and South Africa, and investigate with which, if any, of these indicators they comply.

The chapter will be concluded with a discussion relating to the barriers that the developing country has to overcome in order to become an information and knowledge society. It will be shown that these developing countries do not comply with a number of the previously stated criteria. The criteria with which the developing countries do not comply, become barriers that inhibit their becoming information and knowledge societies. For these developing countries to become information and knowledge societies in the future, the attention of governments and the private sector will have to be directed at overcoming these barriers so that the developing countries are not further marginalized by the rest of the developed world and can share in all the advantages of being an information and knowledge society.

5.2 CONCEPTS DEFINED: DEVELOPING AND LEAST DEVELOPED COUNTRIES

5.2.1 Developing countries/communities

As the main focus of this chapter concerns the possibility of developing countries becoming information and knowledge societies, the author will first define what is meant by the concepts ‘developing’ and ‘least developed’. Similar to the concept ‘developed’ that was defined and discussed in chapter 4 (see 4.2), there are also as many synonyms for the concept of a ‘developing’ country or community. Synonyms found in literature include, ‘third world’, ‘south’, ‘developing economies’, as well as ‘low income economies’. Using the *per capita* development instrument of the World Bank (2006c),

countries with low or middle levels of *per capita* income are classified as being 'developing'. Approximately 80% of the population of the world lives in developing countries, which number more than 100. Many developing countries have deep and extensive poverty and are, therefore, more vulnerable to economic shocks. A developing country also has an undeveloped industrial base, and a Human Development Index score of moderate to low (UNCTAD, 2005).

According to the United Nations Cyberschoolbus Program (2007), developing countries are usually importers, rather than developers, of innovations in science and technology. The author is of the opinion that this is due to the fact that there is hardly any interaction and exchange of information between the developing country or community's local knowledge systems and the global knowledge system. As was shown in chapter 4, developed countries can harness the power of ICT and access information from e-learning systems and digital libraries to support their development process. Through the interaction with this global information available via these initiatives, developed countries can stimulate their development and become innovators of science and technology. In developing countries, however, this is not the case. As will be discussed later in this chapter, developing countries do not have the sophisticated ICT infrastructure or skills to access and utilize initiatives like these. On the World Bank (2006c) list of economies, there are 53 countries listed as being 'low income economies' and can, thus, be classified as 'developing'. These include Afghanistan, India, Nigeria, Pakistan, Kenya, Uganda, Vietnam, and Zimbabwe.

Referring to the Human Development Index (HDI) method, developing countries are all countries scoring between 0.50 and 0.79 on the HDI. Countries in this band are considered to have achieved "medium human development." The highest ranked country in this grouping is Venezuela, which has a HDI of 0.784, and is ranked 72nd out of 177 countries. The lowest ranking in this group is Swaziland with an HDI of 0.500: a rank of 146th out of 177 countries. The countries ranked below Swaziland are all

considered to have “low human development” and these will be discussed in the following section describing the least developed countries (LDC’s).

For the purpose of this thesis, the author will define ‘developing countries or communities’ as follows:
“Developing countries are countries with underdeveloped economies that often experience extreme poverty and where there is little or no interaction and exchange of information and knowledge between their local knowledge systems and the global knowledge system. These are countries in which there is moderate to low life expectancy at birth, low adult literacy and school enrolment, and whose standard of living is between $746 and $2,975 *per capita*.”

In the following section, the author will discuss least developed countries or communities, where the standard of living is below $750 *per capita*.

5.2.2 Least developed countries or communities

According to the Centre of World Indigenous Studies (2004), least developed countries (LDCs) are often referred to as Fourth World countries and, according to the UN, have the lowest socio-economic development and the lowest HDI rankings**.** For a country to be classified as a LDC, the following criteria have to be met, as set out by the United Nations’ Economic and Social Council (2006):

- based on an average of 3 years, a low-income criterion and a Gross Nations Income (GNI) of $750 or less;
- based upon indicators of nutrition, health, education and adult literacy, a very low score on the Human Assets Index (HAI), and
- economic vulnerability (based on instability of agricultural production, instability of exports of goods and services, economic importance of non-traditional activities, merchandise export concentration, the handicap of economic smallness, and the percentage of population displaced by natural disasters).

In the following table, a list of all the LDC's as classified by the UN (2004) can be seen:

Table 5.1: UN list of all the LDCs

1	Afghanistan	26	Madagascar
2	Angola	27	Malawi
3	Bangladesh	28	Maldives
4	Benin	29	Mali
5	Bhutan	30	Mauritania
6	Burkina Faso	31	Mozambique
7	Burundi	32	Myanmar
8	Cambodia	33	Nepal
9	Cape Verde	34	Niger
10	Central African Republic	35	Rwanda
11	Chad	36	Samoa
12	Comoros	37	São Tomé and Principe
13	Democratic Republic of the Congo	38	Senegal
14	Djibouti	39	Sierra Leone
15	Equatorial Guinea	40	Solomon Islands
16	Eritrea	41	Somalia
17	Ethiopia	42	Sudan
18	Gambia	43	Timor-Lesté
19	Guinea	44	Togo
20	Guinea-Bissau	45	Tuvalu
21	Haiti	46	Uganda
22	Kiribati	47	United Republic of Tanzania
23	Lao People's Democratic Republic	48	Vanuatu
24	Lesotho	49	Yemen
25	Liberia	50	Zambia

Referring to the Human Development Index (UNDP, 2006) method, least developing countries are the countries that score below 0.50 on the HDI and these countries are considered to have achieved "low human development." The lowest of these are Mali, Sierra Leone, and Niger. These countries are ranked 175th, 176th and 177th respectively, with HDI scores of 0.338, 0.335, and 0.311. Developing and least developing countries are faced with numerous problems, for example extreme poverty, lack of physical infrastructure, and lack of ICT infrastructure, that impede their progression towards becoming an information and knowledge society. These problems and barriers will be discussed later in this chapter, and possible solutions and suggestions to overcoming and solving these problems discussed in chapter 7, the final chapter of this thesis.

In the following section, attention will be given to globalisation and the author will investigate whether developing countries can truly benefit from this process.

5.3 GLOBALISATION – BENEFITS TO DEVELOPING COUNTRIES?

As discussed in chapter 4 (see 4.4.3) there are numerous characteristics of globalisation that advantage developed countries (Desai, 2001), but are developing countries in a position to truly benefit from these characteristics? To refresh the readers' memory, the characteristics are:

a) a sophisticated ICT infrastructure which takes away the limits of time and space and, thus, allows for possible action at a distance in real time which is usually very short;
b) speedy transfer of capital through this sophisticated ICT infrastructure, resulting in the deregulation of capital markets;
c) active foreign exchange (also known as "forex" or "FX") market with supporting financial markets with new products (e.g. derivatives, options) which allows speculators to take positions in any currency around the world where there are potential profit opportunities;
d) greater geographical spread and increased mobility of fixed investment;

e) rapid and linked reactions as between different financial markets which work round the world round the clock, as well as between financial markets and foreign exchange markets;
f) the emergence of a global media network linked with a global communications network;
g) the fashioning of a global consumer culture and a global music/film/TV culture benefiting from all the above, especially [a] and [f];
h) increased but, as yet, imperfect and legally impeded mobility of labour;
i) greater awareness, though, as yet, not very effective redress of human rights violations, ecological disasters, famines and refugee problems, benefiting from [a] and [f];
j) speeding up of technological change leading to increased concentration of capital via mergers and takeovers but at the same time increased competition between the surviving large companies;
k) countries becoming information and knowledge societies through the sharing of data, information, and knowledge. (own addition)

It can be construed from these characteristics, that they are all dependent upon a sophisticated ICT infrastructure. Thus, such an ICT infrastructure is a necessity to allow the process of globalisation. For example, the speedy transfer of capital cannot take place without such an infrastructure; neither can the rapid and linked reactions between different financial markets take place without the supporting ICT infrastructure. The emergence of a global media network and the fashioning of a global consumer culture are all reliant upon this infrastructure. Even the creation of greater awareness of human rights violations, ecological disasters, famines and refugee problems, are conditional on the existence of an effective ICT infrastructure. Furthermore, the sharing of data, information, and knowledge cannot take place without a sophisticated ICT infrastructure, as the interaction and exchange of data, information, and knowledge is reliant on ICT and the country's ICT infrastructure.

Unfortunately, it is this infrastructure that is lacking or non-existent in developing countries (as will be shown in the case of Niger, and even South Africa, later in this chapter). Thus, a deficient ICT infrastructure results in

citizens not having access to this technology and/or citizens who cannot use this technology for one reason or another. This ensures that developing countries are excluded from the globalisation process and cannot benefit from the advantages posed by this process. This view is also supported by the UN's second committee (Economic and Financial), who stressed the key role of information and communication technology in addressing the benefits of globalisation. At this Second Committee meeting, the representative of Japan said that the driving force behind globalisation was information technology and a sophisticated ICT infrastructure. There was consensus among all stakeholders at the meeting that ICT could provide a key instrument for accelerating global development and international cooperation through the process of globalisation. Developing countries have great potential to compete successfully in this new global market created by globalisation, if they embrace the ICT revolution promptly and actively. However, if developing countries cannot bridge the digital divide, they will face new barriers and the risk of not just being marginalized, but completely bypassed. The meeting, furthermore, concluded that the formidable and urgent challenge before developing countries' governments and the development community is to bridge the divide and connect the remainder of the world's population, whose livelihoods can be enhanced by the process of globalisation through the effective use of information and communication technology (UN, 2000).

Thus, it can be inferred from this discussion, that the digital divide is a primary obstacle in the path of developing countries wanting to benefit from the process of globalisation and become information and knowledge societies. This phenomenon was briefly addressed in chapter 3 (see 3.6.3), but will now be discussed in greater detail.

5.4 THE DIGITAL DIVIDE

5.4.1 Origin of the 'digital divide'

The term, "digital divide" was first coined in the 1990's by Larry Irving, Assistant Secretary for Communications and Information Administrator,

National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce. Irving used this term in a series of reports for the NTIA, entitled 'Falling Through the Net', which focused attention on, "the existing gap in access to information services between those who can afford to purchase the computer hardware and software necessary to participate in the global information network, and low-income families and communities that cannot," (Dragulanescu, 2002, Fienberg, 2002).

According to Shade (2002), the term, "digital divide" reached popularity in the mid-1990s as a way to explain the various differences between the people who had access to the internet and those who did not. Since then, although the scope of the concept has expanded, the term has become a very 'hot topic' and a great deal is being said and written about it. Van Dijk and Hacker (2003) offer an interesting viewpoint to the origin of the concept, 'digital divide'. According to the authors, the extent and the nature of this divide depends on the kind of access defined. If the digital divide is, for instance, defined as the *possession* of hardware which could be bridged by simply giving people computers, then a growing divide among different categories of income, employment, education, age, and ethnicity can, according to official American and Dutch statistics, be proven to have existed from the 1980s (Van Dijk & Hacker, 2003).

This viewpoint of Van Dijk & Hacker (2003) is supported by Benjamin & Dahms (1999), who argue that the development of the internet and access to the internet has not been the first time an electronic communication technology has caused access problems and, thus, contributed to the so-called digital divide. The first reliable way of transporting information faster than a person could travel, had a great impact on business and warfare in the 19th century, and definitely benefited those who had access and knowledge to use this technology – the first trans-Atlantic telegraph. This telegraph cable (laid in 1858) was primarily used to support the existing capitals and imperial power structures (Benjamin & Dahms, 1999). Thus, the author is of the opinion that the trans-Atlantic telegraph cable that caused access problems could be hailed as the beginning of the digital divide. Although technology has

evolved, the basic principal behind the digital divide, namely an existing technology that some segments of the population cannot use (due to whatever reason) can, thus, be traced back to the late 1850's.

5.4.2 Defining the digital divide – the dimensions of the digital divide

The use of term, 'digital divide' has also resulted in various synonyms being coined, all with varying points of focus. For example, in the past, there was much debate about the growing gap between the 'information rich' and the 'information poor', the so-called "information gap" (Holderness, 1996; Quinion 2003), the 'information haves' versus the 'information have nots', and even Tofler's so-called 'fast' economies, versus the 'slow' economies (Thapisa & Birabwa, 1998). These terms emphasise the info-structure of a country or lack thereof. This info-structure refers to the actual information content that people have access to via the use of information communication technology. Although these terms are still used by authors, the focus has shifted more to the use of the term digital divide, which has, as previously mentioned, become a very 'hot topic' (Lor, 2003). According to Lor (2003), a great deal is being said and written about the 'digital divide'. Conferences and seminars are held on this topic and even websites have been set up to deal with discussions concerning it (e.g, Bridges.org, 2002; Digital Divide network, 2002; Digital opportunity channel, 2003; DigitalDivide.org, 2003). When using the term 'digital divide' the focus is more on the country's IT infrastructure or lack thereof. In this context, infrastructure refers to the physical cables, connections, computers, and servers that enable people to have access to online information via Web pages, and online databases.

However, this focus shift from the information content to the country's IT infrastructure or lack thereof is problematic. Viewed from this IT infrastructure context it is very easy to assume that this 'divide' or 'gap' is just a technological one, which can be overcome with a certain amount of ease. Lor (2003) argues correctly that the info-structure and IT infrastructure are not the only dimensions of the digital divide. To clarify these dimensions Lor (2003), based on the work of Rao (2000), suggests the use of the eight C's of success

in the internet economy. The following can be viewed as more dimensions of the 'digital divide':

- Connectivity (access to computers, telephone lines, and internet connections);
- Content (number of websites in the country, local relevance of content, and languages);
- Community (inclusiveness in respect of sections of the community);
- Commerce (e.g. development of infrastructure for e-commerce);
- Capacity (of the workforce, capacity to harness the internet, and development of cyberlaw);
- Culture (government attitudes to telecommunications, Internet awareness of decision-makers and bureaucrats, business culture, and entrepreneurial culture);
- Cooperation (between government, the private sector, academia, and civil society, locally, nationally and regionally) and
- Capital (investment climates hospitable to economically self-sustaining internet initiatives).

Thus, a "digital divide" would mean a shortage, lack or even problems encountered with any of the eight dimensions listed above, i.e. a shortage of capital, or cooperation. Although lack of connectivity or adequate infrastructure is the most used dimension, attention must be given to the other, more social, aspects of the digital divide. The author is of the opinion that these "Eight Cs" of Internet Economy success can be used to fully classify what is meant by the digital divide and, therefore, also present a framework to understand and address the different barriers to overcoming the digital divide. This classification will look as follows:

Table 5.2: Classification of the barriers of the digital divide

Problems encountered with **connectivity**	=	Spatial & technological barriers

	=	Physical infrastructure barriers
Problems encountered with **content**	=	Social barriers
	=	Knowledge barriers
Problems encountered with **community**		
Problems encountered with **capacity**	=	Social barriers
Problems encountered with **cooperation**	=	Political Barriers
Problems encountered with **culture**	=	Cultural barriers
Problems encountered with **capital**	=	Economic barriers
Problems encountered with **commerce**	=	Physical infrastructure barriers

The author will address these barriers, namely spatial & technological, social, cultural, political, physical infrastructure, knowledge, and economic, later in this chapter.

Szilárd Molnár (2003) is also op opinion that the digital divide is much more than a technological divide and suggests the use of various digital divide types to addresses the various dimensions of the digital divide. If the digital divide is seen as being a number of different divides, then the problems created when it is viewed mainly as a problem of IT access, will be solved. According to Molnár (2003) three digital divide types can be classified, as shown in the following table:

Table 5.3: Various digital divide types

Adaption stage:	**Type:**	**The digital divide term**	**Description:**
Early adaptation	Access divide	Early digital divide	Describes the difference between those with and without access
Take-off	Usage divide	Primary digital divide	Describes the difference between users and nonusers
Saturation	Divide stemming from the quality of use	Secondary digital divide	Describes the difference in quality between users and users

Thus, it can be seen that a pure "digital" divide can exist in the early stages of information technology diffusion. During this stage, a clear difference can be identified between user with access to IT and those without access. This pure technological divide will then transform into a usage divide as users obtain access to information technology. This second divide can be described by looking at the difference between users with access who use IT and users with access who do not. Molnár (2003) further suggests a secondary digital divide, which entails a divide stemming from the quality of use. These quality differences are outlined according to two variables: skills, abilities (i.e. navigation skills) and empowerment (i.e. effectiveness of use). Thus, the divide becomes a question of attaining information literacy skills and not usage or computer literacy skills as at the second stage.

As can be seen in Molnár's takeoff stage (2003), there are differences in the user in terms of usage. Thus, even if users are given access to IT, certain reasons can be given, as to why some users actually use the IT and why other users do not. Therefore, even if the digital divide is bridged from a technological dimension, and users are provided with access to IT, those

users might still prefer not to use it, recreating the digital divide. This is a distinctive feature in the book of Van Dijk (2005), *The Deepening Divide. Inequality in the Information Society.* According to Van Dijk (2005), a conceptual division exists in the general term, 'access'**.** Van Dijk (2005) is of the opinion that the concept of access is not just concerned with providing physical access to digital technology. The concept is much more complex and can be divided into four specific, successive kinds of access to digital technology, computers and the internet. These are, motivational access, material or physical access, skills access and usage access. With regard to motivational access, this is concerned with the motivation to adopt, acquire, learn, and use digital technology. According to Van Dijk (2005), this motivation should not be taken for granted. Although many 'have-nots' can be given access to technology, they might not want this technology and are thus not 'have-nots' but 'want-nots'. Furthermore, it is very difficult to separate the have-nots from the want-nots, seeing that some 'have-nots' are also 'want-nots'. Van Dijk (2005) is of the opinion that there are five basic reasons why the 'want-nots' do not want technology. These are:

a) no need or no significant usage opportunities;
b) no time or liking;
c) rejection of the medium;
d) lack of money;
e) lack of skills.

It is the author's opinion that some of these reasons also apply to the people who do not have access to IT. No significant usage opportunities, lack of money and lack of skills are important reasons for the 'have-nots' who do not have the opportunity, skills or money to be able to access IT.

With regard to Van Dijk's (2005) material access, after the user has acquired the motivation to get access, the new challenge is to act upon it. Thus, the user has to purchase a computer or if he or she cannot afford to do so, the user has to go to a telecentre, internet-café or similar venue to obtain physical access to technology. According to Van Dijk (2005) this divide of material access is already beginning to shrink in the developing world as the economy

of these nations improve. This factor, namely the economic wealth of nations is the most important factor in explaining the divide in material access. Van Dijk (2005) is further of the opinion that this divide can also be attributed to the following causes:

a) the availability and cost of digital technology in a country;
b) the general level of literacy and education in its population;
c) the language skills of its population;
d) the level of democracy (freedom of expression);
e) the strengths of policies promoting the information society in general and access in particular;
f) a culture that is attracted to technology, computers, and ICT.

The author is of the opinion that these causes of the digital divide, with regard to material access, have already been discussed in chapter 4, and form part of the indicators of the criteria of the information and knowledge society. Firstly, the availability and cost of IT, along with language issues, was discussed under the usable content indicator of the social criterion. The general level of literacy and education was addressed under the high quality education indicator of the social criterion. Levels of democracy and other policies promoting the information and knowledge society were addressed under the political criterion and, finally, the cultural aspects relating to IT were addressed under the cultural criterion of the information and knowledge society. These indicators and criteria will also be applied to two developing countries, namely Niger and South Africa, later in this chapter.

The third divide, in terms of access, discussed by Van Dijk is the so-called skills access. Having acquired the motivation to use computers and gained some level of physical access to them, the user has to learn how to manage the hardware and software. These skills refer to both computer literacy skills (referred to as operational skills by Van Dijk) and information literacy skills. Both these types of skills have already been discussed by the author in chapter 4, as part of the knowledge criterion of the information and knowledge society. This third category of access, skills access, thus, also corresponds with the third digital divide type according to Molnár (2003). This divide, with

regard to quality of use, can only be improved by providing the user with the necessary skills to improve his or her usage, thus information literacy skills. According to Van Dijk (2005), the last type of access that can cause a divide is usage access. This is the last stage in the full appropriation of digital media, when the user becomes an active user of digital technology. Aspects that can be measured in terms of this type of access include:

- what type of IT the user is using;
- the usage time of the specific type of IT;
- the usage diversity;
- the availability and use of Broadband;
- the users creative usage.

The author is of the opinion that most of these aspects have also been discussed in chapter 4. With regard to the first four aspects, namely type of IT, the usage time, and the diversity and availability of broadband, these aspects form part of the spatial and technological criteria of the information and knowledge society (see chapter 4, 4.5.2). The last aspect, namely the creative usage of the user, was addressed in the local content creation indicator of the knowledge criterion (4.5.7).

Thus, as can be seen from this extended discussion on the digital divide, the notion of this divide originated as a way of describing an existing gap in access to information technologies between those who can afford to purchase a computer and those who could not. However, the author has argued that the term digital divide has, over time, evolved into a much more complex notion and, when studied, unfolds into a field with various possible approaches, interpretations and meanings, as aptly described by authors such as Lor (2003), Molnár (2003) and Van Dijk (2005).

From the context of this thesis, it is important to include all these dimensions and types of the digital divide, and not just focus on the information technology dimension. A shortage or lack in any of these dimensions (connectivity, content, community, commerce, capacity, culture, cooperation,

capital) as well as a shortage in any of the types of access (motivational, material, skills and usage) to the digital divide results in barriers that developing communities or countries have to overcome. These barriers prevent the interaction and exchange of data, information, and knowledge between the countries local knowledge systems and the global knowledge system. Limited or even non-interaction between the GKS and the community's LKS will have to be rectified, so that developing countries can progress to become information and knowledge societies and share in all the advantages thereof, as discussed in chapter 3.

In the following section, the author will discuss one of the consequences of this digital divide, namely, that it deters the developing country from becoming information and knowledge societies. The deterrence of developing countries from becoming information and knowledge societies, and reasons for this deterrence, will be discussed in the following section by applying the indicators of the criteria of the information and knowledge society, as identified in chapter 4 (see 4.5) to two developing countries, namely Niger and South Africa.

5.5 THE DETERRENCE OF DEVELOPING COUNTRIES FROM BECOMING INFORMATION AND KNOWLEDGE SOCIETIES

One of the important characteristics of globalisation, as discussed in chapter 4, is countries becoming information and knowledge societies, through the sharing of knowledge and ideas. This sharing of knowledge and ideas is enabled by the interaction and exchange of data, information, and knowledge between the country's local knowledge system and the global knowledge system. As was shown in chapter 4, this interaction and exchange process can help countries comply with the indicators of the criteria of the information and knowledge society as identified and discussed in chapter 4 (see 4.5), and, thus, stimulate the process of these countries becoming information and knowledge societies. Once these countries become information and knowledge societies, they can truly benefit from the advantages associated

with information and knowledge societies, as discussed in chapter 3 (see 3.6.1).

As already discussed in the previous chapter, there are certain indicators of the criteria with which a country needs to comply to be an information and knowledge society. By complying with these indicators and, thus, consequently the stated criteria, the country can become an information and knowledge society. However, it must be stressed that these indicators and the associated criteria are only guidelines for the reader to assess the countries for information and knowledge society status. The author, as mentioned in the previous chapter, will use the following scale. If the country does not comply with any of the indicators, then the country does not comply with the stated criteria of the information and knowledge society. If the country complies with at least one of the indicators of the stated criteria but less than half of the indicators, then the country only slightly complies with the criteria. In the case of the country complying with more than half of the indicators, but not to all, the country partially complies with the criteria, and if all the indicators are complied with, then the country fully complies with the stated criteria.

In the following section, the author will investigate why developing countries struggle to become information and knowledge societies, by applying the indicators of the criteria for such a society to two developing countries. Firstly, for the purpose of this thesis, the author will refer to Niger, ranked 177th out of the 177 UN member countries listed on the Human Development Index 2006 (compiled on the basis of 2004 data). Although there were 192 UN member countries in 2006, 15 UN member countries did not partake in the United Nation Development Program. Niger was also chosen as it is on the list of least developed countries (LDC) and is also rated as a landlocked developing country (LLDC). According to the UN Cyberschoolbus Programme. (2007), landlocked countries suffer from a lack of territorial access to the sea, remoteness, and isolation from world markets and high transit costs that continue to impose serious constraints on their overall socio-economic

development. Referring to Niger, furthermore, gives this thesis an African perspective.

The second country chosen is the country of origin of this thesis, namely South Africa. The author will refer to South Africa as this thesis is based upon a South African perspective. South Africa is currently ranked number 121 of 177 countries listed on the Human Development Index.

In the following paragraph, the author will discuss the first criterion of the information and knowledge society, namely the economic criterion.

5.5.1 Economic criterion

This criterion has already been discussed in detail in paragraph 3.5.1 in chapter 3, and indicators for this criterion identified in chapter 4 (see 4.5.1). As previously discussed, within the information and knowledge society information is seen as a key economic factor: as a resource, service, commodity, or a source of added value and employment (Martin, 1995). For this to take place a very strong economy is needed (Calanag, 2003), and the author will discuss in the paragraphs to follow whether this is the case in Niger and South Africa. One way to obtain such a strong economy is through the creation of better job and work opportunities that would generate the revenues needed to contribute to an information and knowledge society. Thus as discussed in chapter 4, the first indicator of the economic criterion is work opportunities leading to better income/wage opportunities. This can be measured in the unemployment rate of a community or country.

The unemployment rate within the country will have a direct impact upon the second identified indicator of the economic criterion, namely the standard of living of the specific country. As discussed in chapter 4, this can be measured by standards such as income inequality, poverty rate, and the real (i.e. inflation adjusted) income per person. According to Spangenberg (2005), these are of the most important indicators of a sustainable information and

knowledge society that combines both the economic and social criteria of such a society.

The third indicator of the information and knowledge society is also supported by Spangenberg (2005) who is of the opinion that a growing and healthy economy can be measured by the growth in the Gross Domestic Product, (GDP) of a country as well as the inflation rates of the specific country. According to the World Bank's global economic prospect report of 2004, developing countries are poised for economic growth at more rapid rates than ever before. This can be seen in aspects such as the growing GDP in developing countries, as well as the inflation rate that has been moderating in the developing world during the past seven years. As can be seen in the following two figures, developing countries have been experiencing an upward and growing trend in their GDP growth, from the early 1980's to the present day (World Bank, 2004).

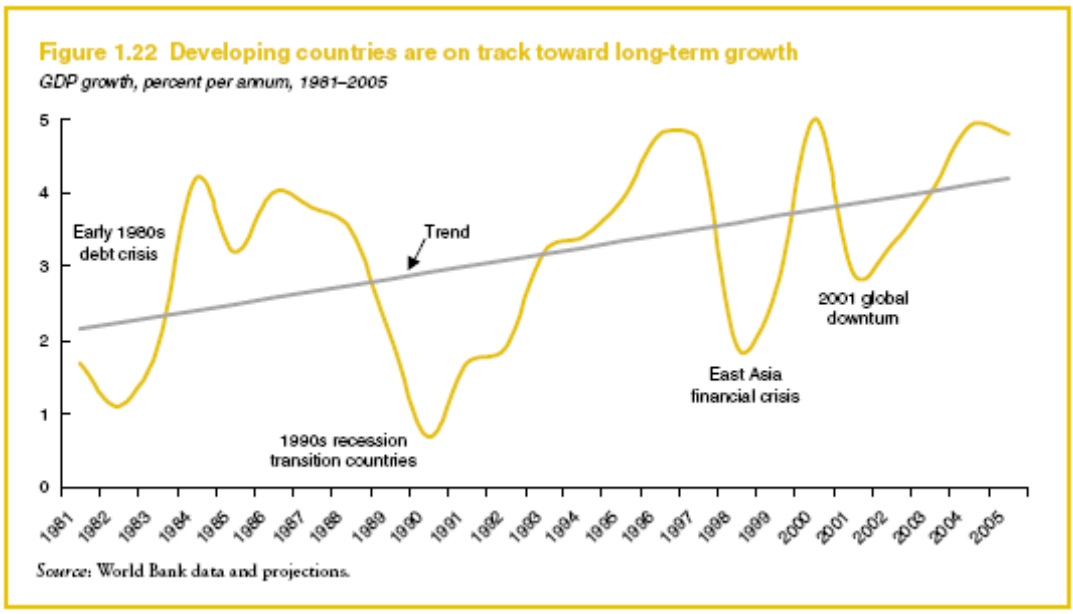


Figure 5.1: Upward trend of developing countries GDP

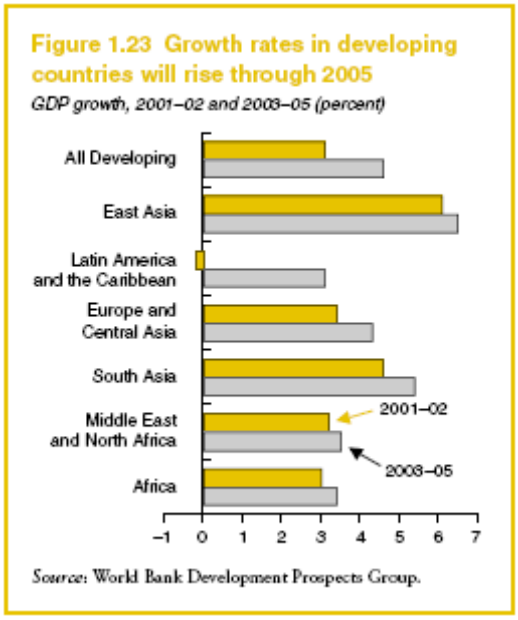


Figure 5.2: Developing countries GDP growth rates

With regard to the inflation rate in developing countries, as can been seen in the following figure, inflation rates started to drop significantly from October 2001 and, despite a spike during November and December 2002, this trend is expected to continue.

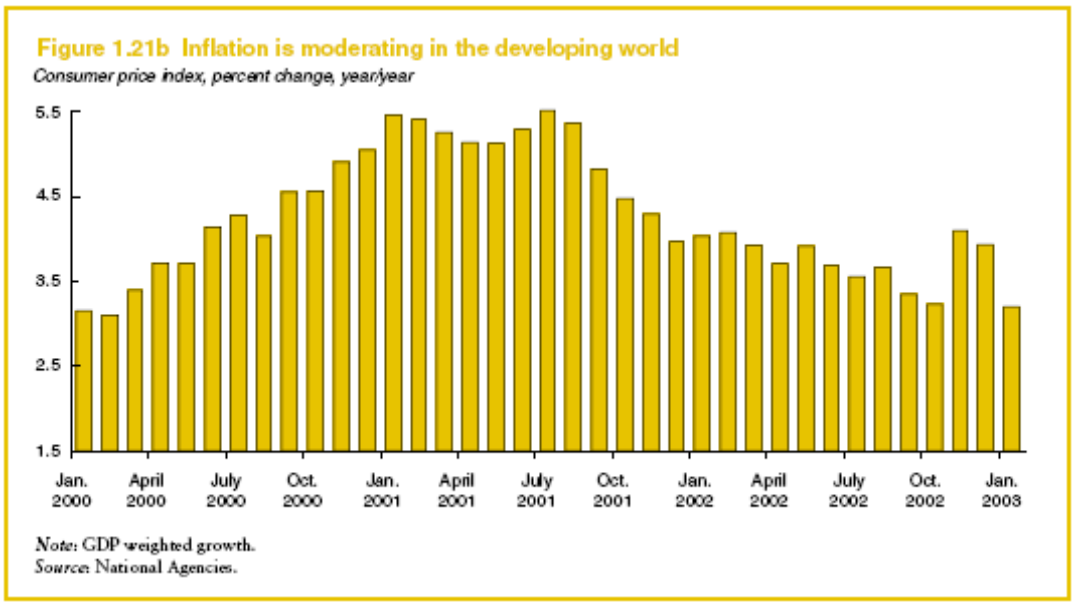


Figure 5.3: Moderating inflation rates in the developing world.

Thus, the following are the identified indicators of the economic criterion:

a) Unemployment rate;

b) Standard of living:
   i. Income inequality;
   ii. Poverty rate;
   iii. Real income per person.
c) GDP and inflation rates.

In the following section, the author will apply the above mentioned indicators of the economic criterion to Niger and South Africa respectively.

Niger

Niger is located in Western Africa, southeast of Algeria. As with most West African countries, the climate of Niger is predominately desert. In the North, the terrain is mostly plains, sand dunes and hills in stark contrast to the tropical sections in the extreme South. With regard to their economic situation, Niger is one of the poorest countries in the world. In December 2005, Niger received 100% multilateral debt relief from the International Monetary Fund (IMF), which translates into the forgiveness of approximately $86 million USD in debts to the IMF, excluding the remaining assistance under Highly Indebted Poor Countries (HIPC). Even with this external debt relief, nearly half of the government's budget is derived from foreign donor resources (CIA World Fact Book, 2006).

a) Unemployment rate

Unfortunately, information regarding the overall unemployment rate in Niger is almost impossible to locate. None of the organisations that would usually provide such information, UNESCO Institute for Statistics (UNESCO, 2007b), the UN itself (through their world reports such as the Human Development Report (UNDP, 2006), the BBC (through their country profiles (2007)) and the US State Department (through their investment climate statements) provide such information. This is also the case with other leading statistical providers such as the CIA World Factbook (2007a), Indexmundi, NationMaster, Encarta, Nations encyclopaedia and Wikipedia, which are all of the opinion that no

unemployment trend data is available for Niger. The only available information regarding the overall unemployment rate that could be found was a report of the National Union of Nigerian Workers (Nigeria is one of Niger's neighbouring countries), in a report entitled the Job market in Niger (2002). According to this report, the overall unemployment rate in 2000 was approximately 18.1%. In the table below, the growth rate in this sector is clearly visible. Where the unemployment rate was only 1.2% in 1977, it had risen to 8.0% in 1998, and on further to 18.1% by 2000.

Table 5.4: Niger Unemployment rate 1977 – 2000

Table 16 : Unemployment rate, 1997-98 (%)

Age	1960	1977	1988	1997	1998	2000
15-19 years		4.6	4.7			
20-24 years		1.3	3.8			
Men		0.9	2.1			
Women		4.1	3.0			
Total		1.2	2.3	2.3	8.0	18.1

However, despite this lack of general information, there is considerable data available concerning the unemployment of the youths in Niger. According to a report of the Third High-Level Forum on Co-operation between Africa, Latin America and the Caribbean in the framework of the Convention to Combat Desertification (UNCCD) (2002), Niger reported that the problem of unemployment among youths has reached endemic proportions and accounts for 70% of the country's total unemployment. Youths in Niger have insufficient income, very little or no professional training, and lack organisational capabilities in association movements. However, this is not a problem that is unique to Niger. Youth unemployment rates in the whole of Africa, including Sub-Saharan Africa, are much higher than the overall world average. This can be seen in the following figure:

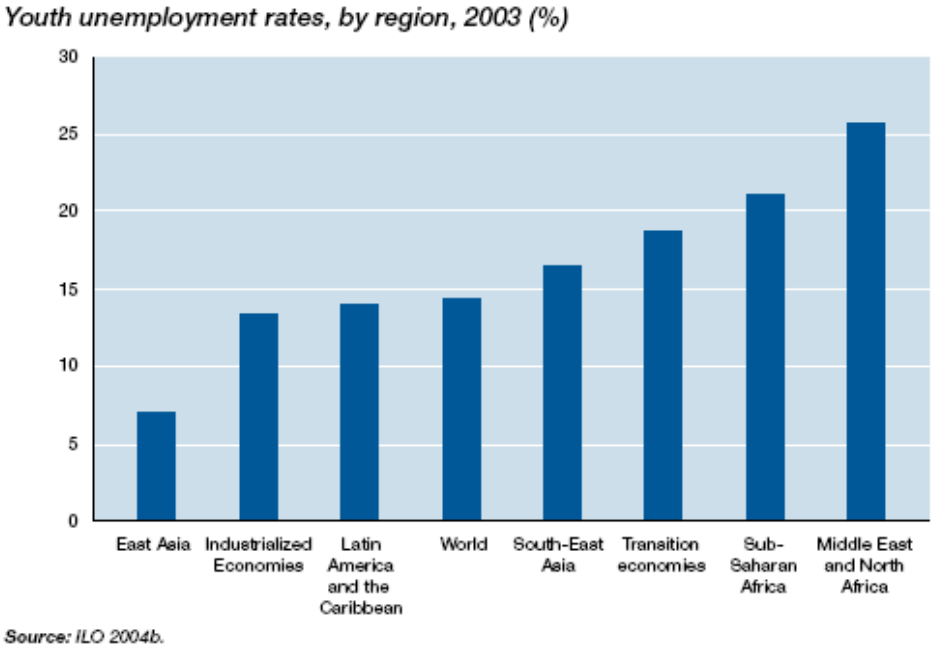


Figure 5.4: Youth unemployment by region

According to the ILO (2004) the highest unemployment rate among youths can be found in the Middle East and North Africa, where the unemployment rate is estimated at 25.6%, with the second highest unemployment rate found in Sub-Saharan Africa standing at 21%. As can be seen in the above figure, both these are much higher than the World average of 14.4%. The continent with the lowest youth unemployment rate in the world is East Asia where it is only 7%.

In 2003, the Government of Niger together with the United Nations Convention to Combat Desertification (UNCCD), and the United Development Programme (UNDP), launched a project aimed specifically at tackling the high youth unemployment rate by engaging them in income-generating pro-environment activities specially designed to prevent environmental degradation. In this 3 year project, "Youth Corps for the Rehabilitation of Degraded Lands and the Environment in Niger," the youth will be trained to participate in activities such as anti-erosion measures, the creation of tree nurseries, the protection of riverbanks, cleaning of organic waste, and bee keeping, as part of an effort to rehabilitate degraded land. In the urban areas, the youth will be given the opportunity to produce and commercialise compost

with biodegradable waste and recycle and commercialise non-biodegradable waste at economic value so that they may become future private providers of these services (UNCCD, 2003).

Thus, as can be seen from the above discussion, unemployment in Niger is very high, and is supported by the high poverty rate that will be discussed later in this section. It can thus be inferred from this that Niger does not comply with the first indicator of the economic criterion of the information and knowledge society. Many more initiatives like these discussed above, will have to be implemented to improve the employment condition in Niger so that they will be able to become an information and knowledge society. The very high unemployment situation in Niger will have a direct impact upon the standard of living of citizens of Niger. This standard will be discussed in the following section.

b) Standard of living

As discussed in chapter 4, the high standard of living indicator consists of three sub-indicators, namely income inequality, poverty rate, and real income per person. In Niger, a very high-income inequality is evident. When measuring this inequality using to the Gini coefficient, Niger has an inequality score of 50.5 according to the Human Development Report (UNDP, 2006). As previously explained, the Gini coefficient is a common measure of equality and ranges from 0 in the case of "perfect equality" (each share of the population gets the same share of income) to 100 in the case of "perfect inequality" (all income goes to the share of the population with the highest income). Compared to Norway's Gini coefficient of 26.1 and the US's at 35.2, the income inequality of Niger is very high. However, this income inequality alone does not really convey the seriousness of the income situation in Niger. This becomes very apparent when compared to the rest of the world in terms of income inequality. According to NationMaster (2007a), Niger is ranked 103rd of 125 countries listed.

With regard to the second sub-indicator, the poverty rate, the situation in Niger is truly atrocious. According to the Worlds Bank's Poverty Report (2001), Niger is one of the poorest countries in the world. As can be seen in the following figure, the rest of the countries in Africa's poverty situation is also dire.

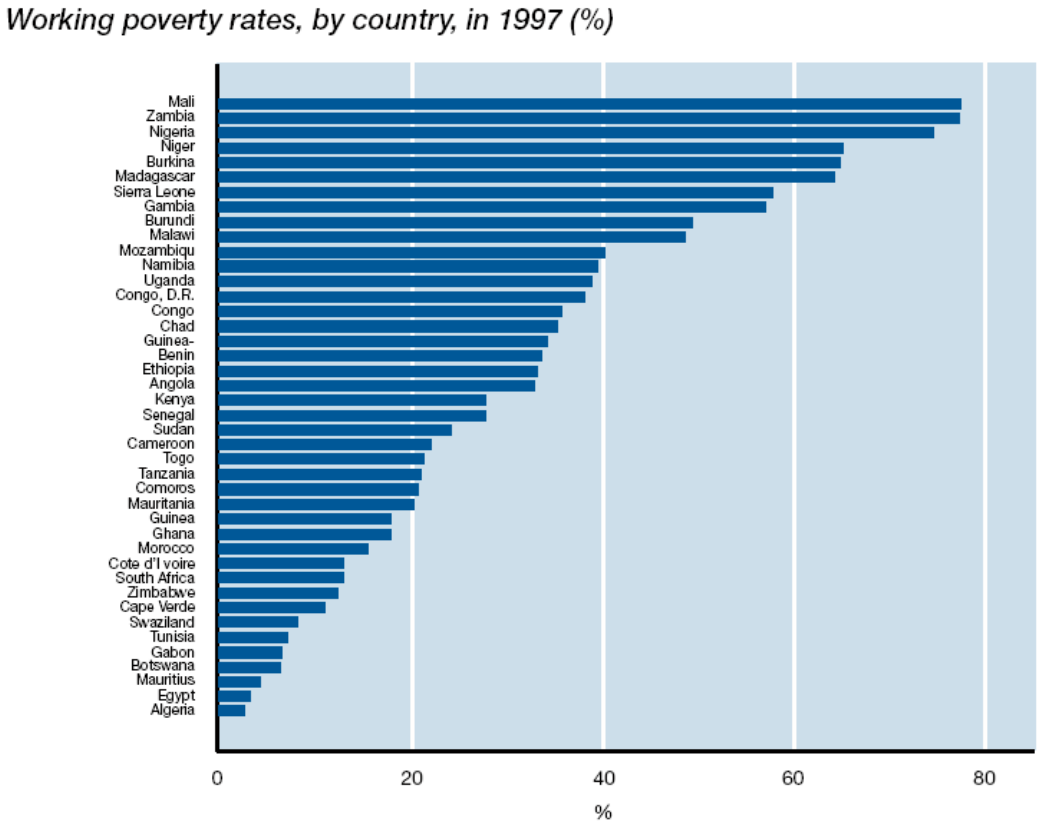


Figure 5.5: Poverty rates, by African country

Although it does appear, according to the Human Development Indicators (UNDP, 2006), that this situation has not approved, it must be noted that these indicators still use the data from 1993 and 1995. This can be seen in the following table, adapted from the Human Development Indicators 2006.

Table 5.5: Niger Poverty rates

National Poverty line					International poverty line		
	Survey year	Rural	Urban	National	Survey year	Below $1 a day	Below $2 a day
	1989-1993	66%	52%	63%	1995	60.6%	85.8%

As can be seen in the table above, in 1995 it was estimated that 60.6% of the entire Niger population lived on less than $1 a day and 85.8% lived below $2 a day. To try to rectify this situation, Niger's government, in collaboration with the IMF, launched a national Poverty Reduction Strategy in the mid 1990's. This strategy has an impact upon all sectors of the population within Niger. In the second progress report of June 2003 – July 2004, encouraging results could already be seen in terms of access to basic social services. In the area of education, in particular, the basic enrolment ratio rose, between 2002 and 2003, from 45.4% to over 50%. Similarly, in health over the same period, the percentage coverage rose from 56.4% to 65%. Showing improvement with the reduction of poverty was very important to Niger, as they were able to quality for debt relief under the HIPC Initiative in April 2004. This initiative was initiated by the International Monetary Fund (IMF) and the World Bank in 1996, and provides debt relief and low-interest loans to reduce external debt repayments to sustainable levels. Assistance is, however, conditional on the national governments of these countries meeting a range of economic management and performance targets. Due to Niger adhering to these conditions, they received about $890 million total relief from all of their creditors (Balls, 2005).

With regard to the third sub-indicator of the standard of living indicator, namely the real income per person within Niger, this can be discussed by looking at Niger's labour force. As can be expected from the high unemployment rate and high poverty rate discussed above, the total Nigerian labour force in 2001 consisted of 70,000 citizens who received regular wages or salaries (CIA World Factbook, 2007k). According to the US State Department (2007), this figure increased to 72800 in 2003. Unfortunately, these 72800 citizens earn very little. According to the Nigerien labour code, a minimum wage was established only for salaried workers in the formal sector with fixed (contractual) terms of employment. However, this minimum wage did not provide a decent standard of living for workers and their families. The lowest minimum wage was $40 (20,000 CFA francs) per month, with an additional $2 (1,000 CFA francs) added per month per child. As can be seen in the following table, adapted from the Human Development Report 2006, the

average female wage earner only earned an annual income of $560 in 2004. This is equal to $46 a month, which is just slightly higher than the fixed minimum wage. In contrast to this, the male wage earner within Niger nearly doubled the wage earned by the female, earning approximately $82 a month, more than double of the fixed minimum monthly wage (UNDP, 2006).

Table 5.6: Labour - 2004 Estimated earned annual income, female and male (non-agricultural)

Niger	**Annual income (2004)**
Female	$560
Male	$989

Due to these reasons, most households had multiple earners and many even relied upon under age children for support. In a Business Africa Online article concerning the ways in which the Niger's gold miners exploit children, Issa (2005) reported that most gold prospectors pay about $20 a month to the children they employ. Thus the author can, deduce from this discussion that the income or wages for citizens in Niger is extremely low, contributing to the atrocious level of poverty in which they are forced to live. In the following section, the author will discuss the GDP of the country and the inflation rate, which are also contributing factors to Niger's poverty.

d) GDP and inflation rates

According to the Human Development Report (UNDP, 2006), Niger had a positive growth rate of 1.1%, in terms of the GDP *per capita* in 2005. This is a great improvement over the negative growth rate of 2004 of -3.3%, as can be seen in the following table:

Table 5.7: GDP *per capita*, annual growth rate

Country	2005	2004	2003	2002	2001	2000
Niger	1.1	-3.3	1.8	-0.5	3.5	-4.7

With regard to the GDP based on purchasing power parity (PPP) *per capita*, in the following table a slight increase from the $750 *per capita* in 2004, to $781 in 2005 can be seen.

Table 5.8: GDP *per capita*, PPP, current international dollars

Country	2005	2004	2003	2002	2001	2000
Niger	781	750	756	728	718	678

The GDP mentioned above is incredibly low when compared to that of Norway, which was estimated at $47 800 *per capita*, and the USA (estimated at $43 500). Niger's GDP is the fifth worst in the world (2005). Of the 56 low-income countries, only Malawi, Burundi, the DRC, and Tanzania had a lower GDP than Niger in 2005. This can be seen in Table 5.9 below.

Table 5.9: Ten lowest low income countries in terms of GDP *per capita*, PPP.

Country		2005	2004	2003	2002	2001	2000
Malawi	MWI	667	645	600	566	554	583
Burundi	BDI	699	697	670	686	664	650
Congo, Dem Rep	COD	714	671	631	602	588	601
Tanzania	TZA	744	688	640	598	559	524
Niger	NER	781	750	756	728	718	678
Sierra Leone	SLE	806	754	713	669	539	463
Guinea-Bissau	GNB	827	799	785	789	860	863
Madagascar	MDG	923	880	837	768	890	843
Yemen	YEM	930	908	891	874	853	822

Zambia	ZMB	1023	959	902	855	828	785

With regard to the inflation rates, according to the CIA World Factbook (2007h), Niger has a surprisingly low inflation rate of only 0.2% and is, in fact, the eighth ranked country with regard to low inflation rate. This can be seen in the following table:

Table 5.10: Top ten countries with regard to lowest inflation rates

Rank	Country	Inflation rate (consumer prices) (%)	Date of Information
1	Nauru	-3.60	1993
2	Vanuatu	-1.60	2005 est.
3	San Marino	-1.50	2006
4	Northern Mariana Islands	-0.80	2000
5	Barbados	-0.50	2003 est.
6	Dominica	-0.10	2005 est.
7	Israel	-0.10	2006
8	Niger	0.20	2004 est.
9	Japan	0.30	2006 est.
10	Kiribati	0.50	2005 est.

The low inflation rate in Niger (and other developing countries) can mainly be attributed to high growth levels throughout the developing world. According to the Human Development Report (UNDP, 2006) indicators, this high growth was due in part to increased prices of primary commodities and supportive monetary conditions. Inflation rates remained low due to improved fiscal and monetary discipline, and especially the supporting monetary role of the IMF in Niger.

It is the author's opinion that the exchange of data, information, and knowledge between Niger's local knowledge system and the global knowledge system through the use of information communication technologies, cannot really occur in Niger. Unfortunately, as the next criterion will show, Niger has little or no ICT infrastructure to harness for this purpose.

Thus, with regard to the first indicator, a low unemployment rate cannot be achieved in Niger through the establishment of more job opportunities and by increasing labour growth and productivity through the use of information and communication technologies, because this technology does not exist. Furthermore, in contrast to developed countries such as Norway and the USA, local and global job opportunities cannot be made available through the exchange of data, information, and knowledge due to Niger's deficient ICT infrastructure. According to Van Dijk (2005), unemployed people, and students can improve their position in the labour market by familiarising themselves with ICT and the internet. Unfortunately, due to the nearly non-existent ICT infrastructure in Niger, these citizens also cannot capitalise on familiarising themselves with ICT to improve their economic position. Thus, these citizens find themselves excluded from economic participation that could improve their economic positions due to this inefficient ICT infrastructure (Van Dijk, 2005).

Therefore, it can be inferred from the above discussion regarding the economic criterion of the information and knowledge society that Niger does not comply with the first two indictors of this criterion. Niger has a very high unemployment rate and the standard of living is extremely poor. In terms of the third indicator, although there is a slight growth rate in the annual GDP of country, the total GDP in terms of PPP *per capita* is one of the lowest in the whole world. With regard to the inflation rate, although Niger appears to comply with this part of the indicator with their low inflation rate of 0.2%, it was shown that this rate is only so low due to the strict monitory regulations imposed by the IMF. It can thus be deduced that Niger does not comply with any of the indicators of this criterion, and consequently not to this criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Niger's economic situation and can be summarised as follows:

- High unemployment rate;
- Low standard of living expressed in a high poverty rate and low real income per person;
- Low GDP and an artificially low inflation rate.

The government of Niger will have to implement serious reforms to improve their economic position to such an extent that they will be able to comply with the above mentioned criteria and become an information and knowledge society. In the following section, the author will investigate whether South Africa complies with the economic criterion of the information and knowledge society.

South Africa

Compared to Niger, South Africa's economy is much stronger, and as mentioned previously is ranked 121st out of the 177 countries listed on the Human Development Index 2006. Unlike Niger, which is classified as being a low-income country, South Africa is classified as being a middle-income country. In the following section, the author will discuss whether the South African economy is strong enough to meet the set criteria to become an information and knowledge society.

a) Unemployment rate

According to the CIA World Factbook (2007c), the current unemployment rate in South Africa is approximately 25.5%. As can be seen in the table below, South Africa is ranked 172nd of 197 countries with data (CIA World Factbook, 2007k). Thus, South Africa has the 25th highest unemployment rate of all the countries listed.

Table 5.11: World ranking in terms of unemployment rate.

172	South Africa	25.50	2006 est.
173	Montenegro	27.70	2005
174	Honduras	27.90	2006 est.
175	*American Samoa (United States)*	29.80	2005
176	Cameroon	30.00	2001 est.
177	Equatorial Guinea	30.00	1998 est.
178	Libya	30.00	2004 est.
—	World	30.00	2006 est.

179	Marshall Islands	30.90	2000 est.
180	Serbia	31.60	2005 est.
181	Yemen	35.00	2003 est.
182	Macedonia	36.00	September 2006 est.
183	Afghanistan	40.00	2005 est.
184	Swaziland	40.00	2006 est.
185	Kenya	40.00	2001 est.
186	Nepal	42.00	2004 est.
187	Lesotho	45.00	2002
188	Bosnia and Herzegovina	45.50	31 December 2004 est.
189	Senegal	48.00	2001 est.
190	Djibouti	50.00	2004 est.
191	Zambia	50.00	2000 est.
192	East Timor	50.00	2001 est.
193	*Cocos (Keeling) Islands* (*Australia*)	60.00	2000 est.
194	Turkmenistan	60.00	2004 est.
195	Zimbabwe	80.00	2005 est.
196	Liberia	85.00	2003 est.
197	Nauru	90.00	2004 est.

A point of concern however, is that, unlike Niger, where the high unemployment rate can be attributed to the low level of literacy and education in the country, in South Africa this is not the case. According to a labour force survey conducted by Statistics South Africa (2007), the highest rate of unemployment is in the category of people who have a Grade 11/Standard 9 equivalent education level. These statistics can be seen in the following table:

Table 5.12: South African unemployment rate by highest level of education

Highest level of education	Total					
	Total	Inactive	Economically active			
			Total	Workers	Unemployed	Rate
Total	**23 530**	**10 845**	**12 684**	**8 850**	**3 834**	**30.2**
None	1 658	951	707	585	121	17.2
Grade 0 to Grade 3/ std 1	946	473	473	369	104	22.0
Grade 4/std 2	680	342	338	260	78	23.2
Grade 5/std 3	793	384	409	306	103	25.1
Grade 6/std 4	1 147	568	579	444	135	23.4
Grade 7/std 5	1 788	926	861	631	230	26.7
Grade 8/std 6	2 162	1 215	946	691	255	27.0

Grade 9/std 7	2 502	1 471	1 032	635	397	38.5
Grade 10/std 8	2 826	1 515	1 312	819	492	37.5
Grade 11/std 9	2 916	1 396	1 519	924	595	39.2
Grade 12/std 10	4 532	1 383	3 149	2 012	1 137	36.1
NTC I TO NTC III	82	34	48	32	16	33.6
Dipl./Cert. With less than Grade 12/Std 10	126	20	106	78	28	26.2
Dipl./Cert. with Grade 12/Std 10	906	101	805	691	115	14.2
Degree/Higher	379	24	354	332	22	6.3
Other	19	12	*	*	*	11
Don't know/ Unspecified	68	29	39	34	*	11.2

According to Kingdon & Knight (2005) this extremely high unemployment rate is seen as one of the most pressing socio-political problems facing the South African government. The main reason cited by Kingdon & Knight for this high unemployment rate is the lack of formal jobs (low labour demand) and the barriers citizens come up against when trying to enter the informal job market. These barriers include the high crime rate, poor infrastructure, and a lack of credit facilities.

However, the unemployment situation in South Africa is recovering. According to Statistics SA's latest labour force survey, the job market gained almost 200,000 jobs in the year to March 2007. This survey indicated that the number of employed South Africans rose from 12,451,000 in March 2006 to 12,648,000 in March 2007. This increased the percentage of working-age South Africans from 41.7% to 41.9%. Unfortunately, this increase had virtually no impact upon the official unemployment rate. Compared to 25.6% in March 2006, the official figure in 2007 was 25.5. This lack of impact, however, is due to the increase in the number of people in the market for jobs. South Africa's working age population (15- to 65-year-olds) increased from 29.8-million in 2006 to 30.2-million in 2007.

Unlike Niger, South Africa has an existing and growing ICT infrastructure that will be discussed in the criteria to follow. It is the author's opinion that the exchange of data, information, and knowledge between South Africa's local knowledge system and the global knowledge system through the use of ICT, can play a crucial role in the advancement of the economy, through the establishment of more job opportunities. Local and global job opportunities

can be made available through the exchange of data, information, and knowledge that is stimulated through the use of information and communication technologies. This provides the citizens of South Africa with a greater selection of job opportunities than before. Through utilising the existing ICT infrastructure within South Africa, the South African citizen can be provided with more and better job opportunities, leading to better wages or income and thus reducing the unemployment rate as well as the poverty rate, that will be discussed under the following indicator.

Furthermore, through the exchange of data, information, and knowledge that is stimulated by information and communication technologies, i.e the internet, new job opportunities can be created, through the use and expansion of e-commerce. According to World Wide Worx (2006), leaders in technology research in South Africa, the number of retail websites has increased dramatically. From 215 retail sites at the end of 2001, the number increased to 719 at end of 2003, and 826 retail sites were operational at the end of 2005. In 2005, the online retail in South Africa grew by 20%, thus providing more job opportunities for the South African citizens. According to this research the total spent on online retail goods in South Africa in 2005 was R514-million, an increase from R428-million in 2004, proving that the success of the online retail sector and e-commerce in South Africa.

Thus, it can be inferred from this discussion that due to the exceptionally high unemployment rate, South Africa does not comply with the first indicator of the economic criterion of the information and knowledge society. Although there has been a slight recovery in the unemployment sector due to government initiatives and the harnessing of the existing ICT infrastructure to enable e-commerce initiatives, the unemployment situation will still have to improve dramatically for South Africa to comply with this indicator. In the following section, the author will address the standard of living within South Africa.

b) Standard of living

As mentioned above, the standard of living can be discussed by addressing the income inequality within the country, the poverty rate as well as the real income per person.

With regard to income inequality, South Africa, has a even higher income inequality than that of Niger. When measuring this inequality according to the Gini coefficient, South Africa has an inequality score of 57.8, compared to the 50.5 of Niger, according to the Human Development Report (UNDP, 2006). As can be seen in the following figure, the Gini coefficient of South Africa is one of the highest in the world (Wikipedia, 2007):

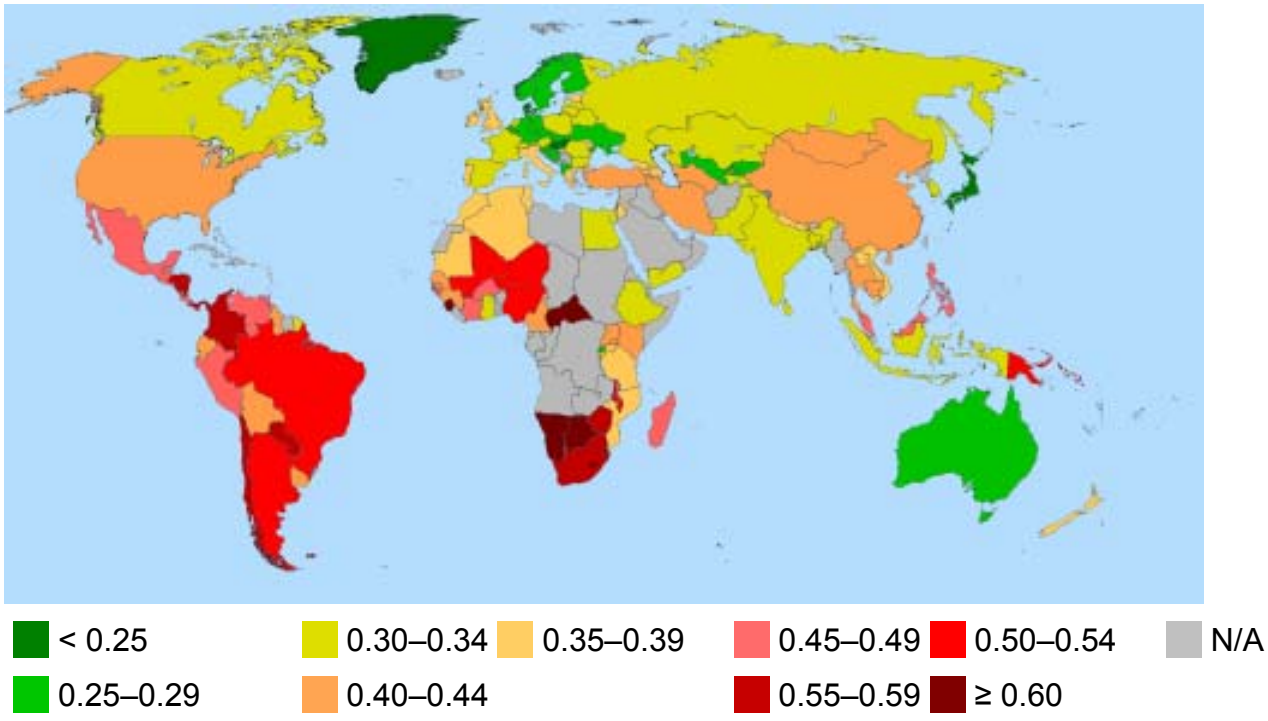


Figure 5.6: Gini coefficient, income distribution by country.

With regard to the second sub-indicator of the standard of living indicator, the poverty rate, South Africa also has a very high poverty rate. According to the Human Development Report's Human Poverty Index (UNDP, 2006), South Africa is ranked 53rd, with a poverty rate value of 30.9%. This is a much

higher ranking than the ranking of Niger (which is 99th, with a poverty value of 56.4%). NationMaster (2007c) is of the opinion that it was estimated that 50% of the South African population lived below the poverty line in 2000. This poverty rate increased to 57% in 2001. According to research conducted by the South African Research Council (HSRC), has shown that the poverty gap has grown from R56-billion in 1996 to R81-billion in 2001 indicating that poor households have sunk deeper into poverty over this period. In the following table, the breakdown of this poverty figure can be seen across the various provinces of South Africa:

Table 5.13: Poverty indicators by province

Province	**No. of poor persons (million)**	**% of population in poverty**	**Poverty gap (R billion)**	**Share of poverty gap**
Eastern Cape	4.6	72%	14.8	18.2%
Free State	1.8	68%	5.9	7.2%
Gauteng	3.7	42%	12.1	14.9%
KwaZulu-Natal	5.7	61%	18.3	22.5%
Limpopo	4.1	77%	11.5	14.1%
Mpumalanga	1.8	57%	7.1	8.7%
North West	1.9	52%	6.1	7.5%
Northern Cape	0.5	61%	1.5	1.8%
Western Cape	1.4	32%	4.1	5.0%
South Africa	**25.7**	**57%**	**81.3**	**100.0%**

Thus, it can be inferred from this discussion that South Africa still has an extremely high poverty rate, with more than half of their population living below the poverty line. This high poverty rate can be attributed to the high unemployment rate, discussed above, as well as the real income of the South African citizens that will be discussed in the following section.

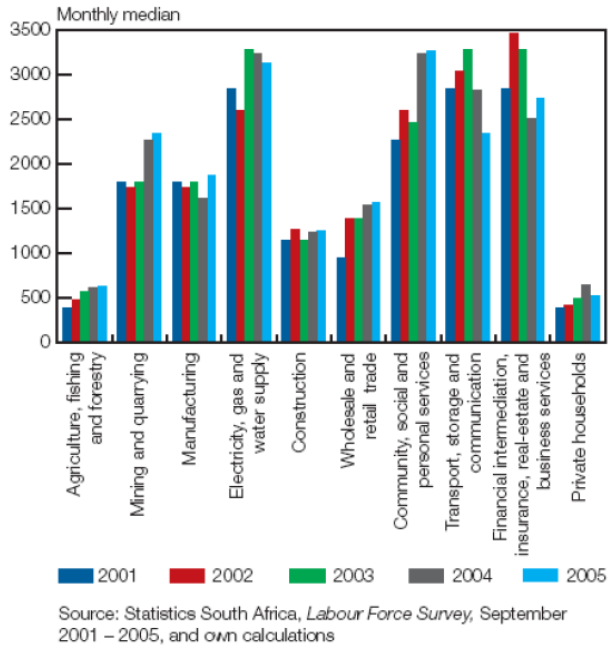
With regard to the last sub-indicator of the standard of living indicator of the economic criterion, according to Employment statistics of Statistics South Africa (2007), monthly income has increased significantly from 2004 to the present. This can be seen in the following table:

Table 5.14: Average monthly earnings

1.1 Total (All formal non-agricultural industries)

Year and month		Including bonuses and overtime					
		Estimates based on 2004 Frame			Estimates based on 2006 Frame		
		Average monthly earnings (Rand)	Quarterly changes (%) q/q	Annual changes (%) y/y	Average monthly earnings (Rand)	Quarterly changes (%) q/q	Annual changes (%) y/y
2004	Nov	6 887			-	-	-
2005	Feb	6 742	-2,1		-	-	-
	May	6 758	0,2		-	-	-
	Aug	7 006	3,7		-	-	-
	Nov	7 412	5,8	7,6	-	-	-
2006	Feb	7 096	-4,3	5,3	-	-	-
	May	7 213	1,6	6,7	7 531	-	-
	Aug	7 597	5,3	8,4	7 889	4,8	-
	Nov	-	-	-	7 924	0,4	-
2007	Feb*	-	-	-	7 870	-0,7	-
	May				8 093	2,8	7,5

However, this increase in wages earned by the South African citizen is not evident in all industries, as can be seen in the table below. For example, monthly wages earned in the electricity, gas, and water supply industries decreased between 2003 and 2005, and no wage increase has since been evident in this sector. The same negative growth is visible in the transportation, storage, and communication industries, where wages were also at the highest in 2003 and decreased in 2004 and again in 2005. These statistics can be seen in the following figure:



Source: Statistics South Africa, *Labour Force Survey*, September 2001 – 2005, and own calculations

Figure 5.7: South African Wage prices per industry, 2001 – 2005

With regard to income earned per month in the formal or informal employment sector, the table below shows that wages in the informal sector are significantly lower than wages earned in the formal sector. About 40% of people employed in the informal sector earn less than R 1,000 ($143) per month (Knight, 2004).

Table 5.15: Income by sector 2003

Income by Sector – March 2003			
Monthly Income	**Formal**	**Informal**	**Total**
None	0.40%	14.00%	3.00%
R1-R500	8.40%	39.70%	18.90%
R501-R1,000	14.40%	21.50%	17.20%
R1001-R2500	28.70%	14.10%	24.10%
R2501-R8000	30.70%	5.80%	23.10%
R8000+	8.80%	1.40%	6.60%
Don't know/refused	8.30%	3.40%	6.70%

Unspecified	0.20%	0.20%	0.30%
Total	100.00%	100.00%	100.00%

From this discussion concerning wages/income earned within South Africa, it can be seen that monthly wages in certain industries are very good. Unfortunately, due to the high income inequality in South Africa only a few people earn really good salaries while the majority of the population still lives in poverty. The author is of the opinion that although wages earned in South Africa can be very good, due to the high income inequality and high poverty rate, the standard of living for the majority of South Africans is very low. Thus, South Africa complies to a lesser extend to the second indicator of the economic criterion, namely a high standard of living, that is expected within an information and knowledge society. In the section to follow, the author will address the issues of GDP and inflation rates in South Africa.

c) GDP and inflation rates

According to the World Bank (2007b) Development Indicators, the GDP in terms of PPP *per capita* has increased significantly from 2000. This can be seen in the following table:

Table 5.16: GDP in terms of PPP *per capita* ($US).

		2005	**2004**	**2003**	**2002**	**2001**	**2000**
South Africa	ZAF	11110	10401	9812	9445	9054	8764

With regard to the GDP based on purchasing power parity (PPP) *per capita*, in the following table shows a slight increase from the $4537 *per capita* in 2004, to $5050 in 2005.

Table 5.17: GDP *per capita*, current US dollars

Country	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**
South Africa	5050	4547	3542	2381	2569	2913

Although the GDP mentioned above is much higher than that of Niger, it is still very low when compared to that of Norway (estimated at $47,800 *per capita*), and the USA, which was estimated at $43,500.

With regard to inflation rates, Niger has a much lower inflation rate, namely 0.2% than that of South Africa, which has been estimated at 5%. As previously mentioned this low inflation rate in Niger has remained artificially low due to improved fiscal and monetary discipline and the supporting monetary role of the IMF in Niger. In the following figure, the inflation rate throughout the world, 2007, can be seen (Wikipedia, 2007e):

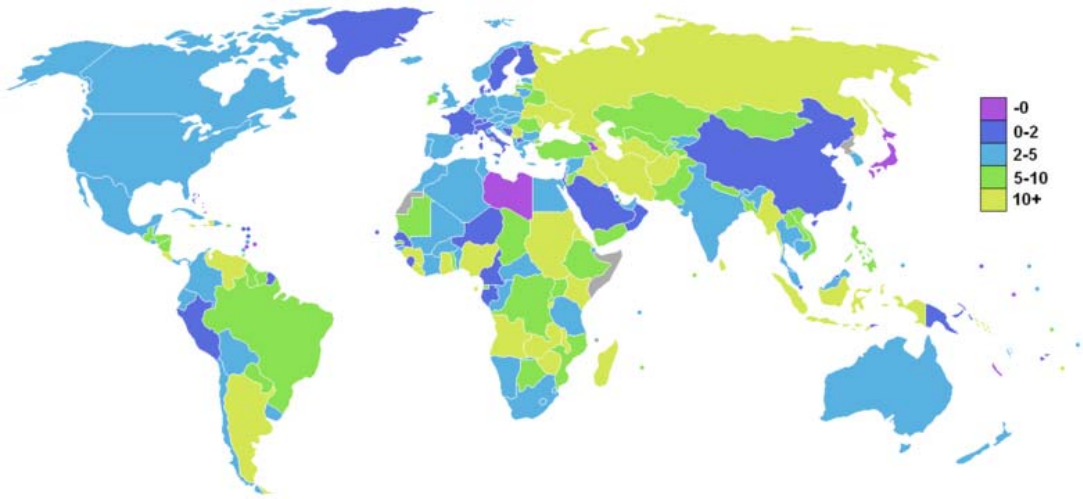


Figure 5.8: World Inflation rates 2007

As can be seen in the above figure, very few countries around the world have an inflation rate lower than 5%. In fact, the average around the world is estimated at between 5% and 10%.

As mentioned previously, the author is of the opinion that the South African economic situation can be improved through the interaction and exchange of data, information, and knowledge between their local knowledge system and the global knowledge system. This can be achieved by harnessing the existing ICT infrastructure, stimulating the interaction and exchange process though platforms such as the internet. Unfortunately, Niger cannot benefit from this process due to their deficient and non-existent ICT infrastructure (as

will be discussed in the following criteria). As will be shown in the following criteria, South Africa has an existing ICT infrastructure that, although relatively sophisticated, is very expensive and not well distributed within the country. This infrastructure can be utilised for the interaction and exchange process of data, information and knowledge. As previously mentioned, through the use of platforms such as the internet, the standard of living of citizen in South Africa can be increased. This statement can be illustrated though the following example. Through the marketing of local job opportunities on internet Web pages and forums, as well as more job opportunities created by e-commerce, citizens can become aware of more job opportunities that could lead to less unemployment. This would have an automatic ripple effect upon other indicators of the economic criterion, such as the third indicator, namely the GDP of the country. As the standard of living of the country increases, the productivity of the country will increase and thus the higher the GDP will be. Thus, the author can deduce from this argument that the overall economy of South Africa can be improved through the interaction and exchange of data, information, and knowledge between their local knowledge system and the global knowledge system. However, although there is a usable ICT infrastructure in place, this interaction and exchange process is further dependent upon other social criterion, such as education level, literacy rates, language ability, and skills pertaining to information literacy as well as computer literacy. These issues will be discussed later in this chapter. Only if South Africa complies with these criteria, can it be concluded that they are able to truly benefit from this interaction and exchange process.

Thus, from this discussion it can be inferred that South Africa does not fully comply to the first two indicators of the economic criterion, due to the high unemployment rate combined with the low standard of living. However, South Africa does comply with the third indictor, as South Africa's inflation rate compares favourably with the rest of the world, and the GDP is much higher than that of Niger and improving constantly. It can thus be concluded that South Africa complies to a limited extend to with the first criteria, namely the economic criteria of the information and knowledge society. This deduction is

based upon the comprehensive discussion concerning South Africa's economic situation and can be summarised as follows:

- High unemployment rate;
- Low standard of living expressed in a high poverty rate and low real income per person and
- Constantly growing GDP and low inflation rate.

As it was discussed in chapter 3, there is a very strong correlation between the economic development of a country and the development of information and knowledge societies. Thus, if South Africa is to become an information and knowledge society, the South African government will have to focus on improving the economic situation within the country. If the economic situation is not rectified, it will become a barrier that inhibits South Africa from becoming an information and knowledge society. Possible solutions and recommendations to overcome this barrier and others, will be provided in chapter 6 of this thesis. In the following section, the author will discuss the ICT situation in Niger and South Africa respectively.

5.5.2 Spatial and Technological Criteria

These criteria are discussed in detail in chapter 3 (see 3.5.1) and the indicators identified and discussed in chapter 4 (see 4.5.1). As mentioned in chapter 3, Webster (2002) discusses a further criterion for the information and knowledge society, namely the spatial criteria. This criterion must be considered in terms of time and space. In other words, the physical location of an information user is no longer a barrier in accessing the information as they can utilise existing remote networks through remote access. Therefore, information can be accessed at any time (Goddard, 1991). The spatial aspect of these criteria will be addressed by investigating whether the countries have access to the internet as well as a broadband connection, which will enable users to access information at any time and place as well as at a satisfactory speed. These remote networks, along with ICT, provide the infrastructure that enables this information to be distributed. Since this criterion is dependent on

the technological criterion, the author is of the opinion that it should be addressed together with the technological criterion and not as a separate criterion on its own. Unfortunately, as the following section will show, the required technological infrastructure is lacking within developing countries and, due to this fact, the country will not be able to access information through use of these networks. Thus, the physical location of the user will remain a barrier to accessing data, information, and knowledge from the global knowledge system, and so the interaction and exchange between this system and the country's local knowledge system not take place.

As previously discussed, the technological infrastructure of an information and knowledge society is very extensive and very complex, and is made up of various indicators. These indicators have been extensively discussed in chapter 4 (see 4.5.2) and are:

a) Access and use of personal computers;
b) Internet access and use;
c) Access to broadband service;
d) Telecommunication penetration:
    i. Fixed/Main line penetration;
    ii. Mobile phone penetration.

In the following section, these indicators will be applied to Niger and South Africa respectively, to see if they comply with them and, thus, by utilising them for the interaction and exchange of information between their local knowledge system and the global knowledge system, can become an information and knowledge society.

Niger

When looking at the ICT statistics for Niger, the picture looks extremely bleak. According to the World Information Society Report (ITU, 2006a), Niger is ranked 181st out of 183 countries in the Digital Opportunity Index, with only Chad and the D.R.C ranked lower.

This report is regarded as very important by the WSIS as well as the ITU, as it shows that there has been a steady expansion in terms of the digital opportunity of citizens around the world. This can be seen not only in the growth of widespread access to ICT but also in the growth in high-speed access to ICT. According to this report, greater numbers of people around the world are enjoying access to the benefits ICT can bring, and it is estimated that by the start of 2008, there will be around three billion mobile phones and more than one billion fixed lines around the world. Unfortunately, as the following section will show, this is not the case in Niger. Citizens in Niger do not have this opportunity, and due to this, will be increasingly marginalised if this situation is not rectified.

a) Access and use of personal computers

According to the World Bank's Information and Communications for Development Report (World Bank, 2006b), Niger only had one personal computer per 1,000 people in 2005. This is an improvement on the score in 2000, when they had zero computers per 1,000 people. With a population of approximately 14,000,000 this works out to approximately 14,000 computers within the whole country for the citizens to use. It is clear that the digital divide, seen from a technological perspective, is enormous. Hence, Niger does not comply to the first indicator of the criteria.

However, even with this seemingly unbridgeable divide, there is still hope. In the capitol of Niger, Niamey, the Zakat foundation of America has attempted to help by providing the city with a computer training classroom. In a country with an extremely low literacy rate, education has become a basic human need just like food and water. It is hoped that this computer classroom will bring the global knowledge system to the knowledge-starved Niger by providing the Niger population with access to i.e. digital libraries and e-learning initiatives (Zakat foundation of America, 2004). To accomplish this however, an internet connection is needed. In the following section, the author will address the status of internet access and use in Niger.

b) Internet access and use

The statistics regarding internet access and use are, unfortunately, not any better than the personal computer statistics. According to the World Bank's Information and Communications for Development Report (World Bank, 2006b), there were only 2 internet users per 1,000 people. In 2005, therefore, this would mean that in a population of 14 million, there were 28,000 internet users.

As previously mentioned, internet access is needed within a country so that the spatial advantage of this ICT can come to fruition. If there is limited internet access, as in the case of Niger, then the spatial aspect of this criterion is also limited and users will not be able to access information at any time and at any location. In 2006, Niger had only 3,600 internet subscribers (ITU, 2006b). This subscriber number is incredibly low when considering Niger's population, accounting for 0.02% of the total population.

Thus, it can be inferred from these very poor Internet use and access statistics, that Niger does not have an adequate ICT infrastructure that can be harnessed for the effective interaction and exchange of data, information, and knowledge between Niger's local knowledge system and the global knowledge system. Furthermore, this infrastructure will not be able to sustain an information and knowledge society. Hence, Niger does not comply with the second indicator of the criteria.

c) Access to broadband service

As can be expected from the extremely poor statistics for internet access and use, there is even less access to broadband services within Niger. According to the ITU ICT indicator statistics (2007) the number of broadband subscribers per 1,000 people in Niger was only 0.2. As was discussed in chapter 4, access to broadband services provides a high-speed internet access that is very important for societies to become information and knowledge societies as it opens up new possibilities and visions as to how the internet can provide a

platform for enhancing countries' social and economic development. Thus, access to broadband services can enable the interaction and exchange of data, information, and knowledge from and to the internet at much greater speed and in much higher volumes than ever before and is, therefore, of the utmost importance seen from the perspective of this thesis. This high speed interaction and exchange process can for example aid citizens to make use of e-learning initiatives. Through using initiatives such as these, online teaching aids for example video files, can be downloaded. Due to the near non-existence of broadband access in Niger, the transfer of high quantities of data, information, and knowledge (in different media) cannot happen. Thus, it can be seen from this lack of access to broadband services, that Niger also does not comply with this indicator of the spatial and technological criteria of the information and knowledge society.

d) Level of telecommunication penetration

The last indicator of the criteria, is the distribution of the telecommunication infrastructure within the country. As was previously mentioned, this indicator can be divided into two sub indicators, namely fixed/main line penetration and mobile phone penetration.

With regard to fixed/main line penetration, in 2001 there was an estimated 21,700 fixed line telephone lines in Niger. In five years this only increased by 2.5% to 24,000 telephone lines (ITU, 2007). Although this growth is encouraging, when the large population of Niger is taken into account, then these statistics indicate that there were only 0.2 telephone lines per 100 citizens in 2001. This figure actually fell to 0.17 per 100 citizens, due to the population growth with the country. Thus, between 2001 and 2006, a negative growth rate of -3.3% is recorded. This is reflected in Niger's world ranking in terms of number of main/fixed telephone lines. According to the CIA World Factbook (2007f), Niger is ranked 187th out of 234 counties with data

Fortunately, the growth rate in mobile telephone subscribers over the same period is much more impressive. According to the ITU ICT indictors of 2007,

there were only 23,200 mobile phone subscribers in 2001. By 2006, this number had dramatically increased to 323,900: a very impressive growth rate of 251.3% in a five-year period. This equates to 2.32 mobile phone subscribers per 100 citizens. With regard to Niger's world ranking in terms of mobile subscribers, the world ranking is slightly better than the ranking for fixed lines. Currently Niger is ranked 147th out of 227 countries with data (CIA World Factbook, 2007j).

A further important aspect concerning mobile phone subscribers is the amount of digital mobile subscribers, which gives an indication of the amount of people who can access third generation mobile services, also referred to as 3G services. Unfortunately, according to the ITU ICT indicators (2007) Niger has no digital mobile phone subscribers, thus no mobile phone subscribers that can access digital third generation services. As previously addressed in chapter 3, although these new services promise a wide range of new and innovative applications for users, they are unlikely to make a difference to the developing countries of the world as the majority of low-income countries have not yet deployed any 3G services. It is the author's opinion that this inadequate technological infrastructure cannot be the enabler for the interaction and exchange of data, information, and knowledge between the developing country's local knowledge system and the global knowledge system, as it has been in the case of Norway and the USA.

As mentioned, most of the criteria for an information and knowledge society are stimulated by the interaction and exchange of data, information, and knowledge between the countries local knowledge system and the global knowledge system. In this way, this interaction and exchange process can help the country to comply with the specific criteria. This is however not the case for Niger when considering the technological and spatial criteria. The various indicators of the technological and spatial criteria are needed to enable the interaction and exchange process. As mentioned previously the internet is a very effective platform for the interaction and exchange of data, information and knowledge. However, to achieve internet access, the user needs access to a personal computer and an active internet connection. This

exchange of data, information, and knowledge can, in turn, aid the country to comply with the other criteria of the information and knowledge society. This statement can be illustrated by the following example. Using the internet as exchange platform, users can interact and exchange local medical information, i.e. local cures and remedies for illnesses on Web forums and blogs with other users as well as access the global body of medical information. This can have a direct impact on for example the mortality rate as well as the life expectancy of citizens, which are two sub-indicators of the health prospect indicator of the social criterion. In this way the interaction and exchange of data, information and knowledge will thus help the country to comply with the social criterion of the information and knowledge society. For this reason the technological and spatial criteria is of the utmost importance for the effective and efficient exchange of data information and knowledge between the developing country local knowledge system and the global knowledge system.

As can be seen from this discussion on its totally inadequate technological infrastructure, Niger will not be able to harness this infrastructure to exchange data, information, and knowledge between their local knowledge system, and data, information, and knowledge in the global knowledge system. Thus, this interaction and exchange process will not take place and will not aid the country to comply with the other criteria of the information and knowledge society. The author can thus deduce that Niger does not comply with any of the discussed indicators of the spatial and technological criteria and accordingly does not comply with this criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Niger's inadequate ICT infrastructure and can be summarised as follows:

- low access and use of personal computers;
- low Internet access and use;
- low access to broadband service;
- low telecommunication penetration.

In the following section, the author will investigate whether South Africa is in a better technological position to comply with the various indicators of the technological and spatial criteria of the information and knowledge society.

South Africa

In South Africa, the ICT statistics look much more promising than in Niger. In 2006, South Africa was ranked 37th out of 115 countries surveyed in the World Economic Forum's (WEF) Global Information Technology Report 2005/06. This places South Africa ahead of countries such as China, Greece, Hungary, Italy, and India with regard to its overall ICT "readiness."

a) Access to and use of personal computers

In terms of access and use of personal computers, in 2001 it was estimated that there was approximately 66 personal computers per 1,000 people in South Africa. Within 5 years, this number increased slightly to 85 personal computers per 1,000 people. Although this number is much higher than that of Niger, is still is extremely low compared to countries such as Norway where 75% of the total population have access to personal computers. Taking South Africa's large population of 47,000,000 into account, these figures show that only approximately 8.4% of the South African population has access to a personal computer (compared to less than 1% of Niger) In the following graph from the ITU (2006b) the very slight increase in the amount of personal computers per 1,000 in South Africa, people can be seen:

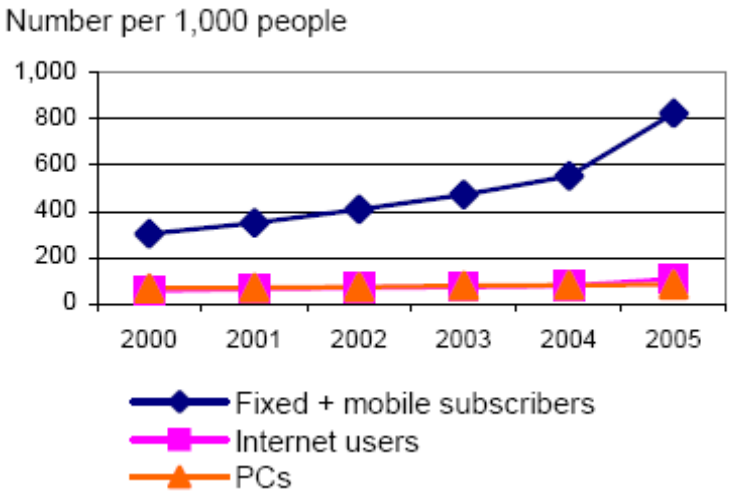


Figure 5.9: South African ICT statistics 2000 – 2005

In an effort to address this situation, the South African government has many initiatives and projects underway. One of the biggest of these projects is the South African government's commitment to the so-called "centre-approach". This approach entails the placing of centres, especially in rural areas, to place ICT and other information services within reach of disadvantaged South African communities (Snyman & Snyman, 2003). These centres will be discussed in greater detail under the universal access indicator of the social criterion, later in this chapter.

The author is of the opinion that although there are many initiatives and projects underway to increase the level of access to personal computers in the future, the current number of South African citizens who have access to a personal computer is far too low to support an information and knowledge society, compared to countries such as Norway and the USA. Although this situation is much better than the situation in Niger, South Africa still does not comply with this indicator of the spatial and technological criteria of the information and knowledge society.

b) Internet access and use

As is the case with personal computers, the figures for internet access within South Africa are also much better than those of Niger. According to the ITU ICT indicator statistics (2007) there were an estimated 4,279,200 Internet subscribers in South Africa in 2006. Seen in relation to the large population, this is equal to 9.02 Internet subscribers per 100 people.

With regard to the number of Internet users within the country, it can be seen in the figure above (Figure 5.8) that the amount of internet users within South Africa has increased from approximately 55 per 1,000 people in 2001, to 109 per 1,000 people in 2005 (IC4D, 2006).

The author is of the opinion that although the number of internet users is very small, these select few will be able to partake in the interaction and exchange process of data, information, and knowledge. As was previously mentioned, access to the internet is also a pre-requisite for compliance with the spatial aspect of the criteria. With internet access, South African citizens can overcome the boundaries of time and space and access information at any time and at any location that provides such access. Due to this spatial aspect, the few South African citizens with Internet access will be able to access government services and information, through e-government initiatives, as well as access educational information through digital libraries. These initiatives and others will be discussed later in this chapter. Furthermore, the first two of the indicators of the spatial and technological criteria, namely computer and Internet use, are needed for the interaction and exchange of data, information, and knowledge between the South African local knowledge system and the global knowledge system. This process aids the country to comply with the other stated criteria of the information and knowledge society. With such a low percentage of internet access and use however, only a few citizens of South Africa will be able to effectively and efficiently exchange data, information, and knowledge between their local knowledge system and the global knowledge system. Unfortunately, as in the case of access to personal computers, the number of South African citizens who can access

and use the internet is still too small, and the Internet infrastructure still too inadequate to support an information and knowledge society. Therefore, it can be concluded that South Africa also does not comply with this indicator of the spatial and technological criteria. In the following section, the author will discuss access to broadband services.

c) Access to broadband service

Unlike other countries in the African continent, broadband adoption in South Africa has dramatically increased over the past few years. According to the Information and Communications for Development Report (ITU, 2006b), South Africa had 0.0 broadband subscribers in 2000. This number increased to 3.5 broadband subscribers per 1,000 people in 2005. By 2007, this number had increased again. According to a recent study from World Wide Worx (2006), leaders in technology research in South Africa, entitled “Internet Access in SA 2007,” there will be more than 800,000 broadband subscriber accounts active by the end of 2007. These accounts represent 650,000 South African broadband users.

The author is of the opinion that this growth in broadband subscribers is very encouraging. As was discussed in chapter 4, access to broadband services provides the user with high-speed internet access that is very important for societies to become information and knowledge societies. This is because it opens up new possibilities and visions as to how the internet can provide a platform for enhancing a country’s social and economic development. Thus, access to broadband services enable the interaction and exchange of data, information, and knowledge from and to the internet at much greater speed and in much higher volumes than ever before and is, therefore, of the utmost importance seen from the perspective of this thesis. Although the number of broadband subscribers is constantly growing in South Africa, it is still very small compared to other countries (see Table 5.19 below). Thus, only a very few South African citizens can take advantage of the interaction and exchange process to further enrich their lives and contribute to their own development. The interaction and exchange of data, information, and

knowledge between the South African local knowledge system and the global knowledge system will, thus, only be able to impact the society as a whole if many more citizens obtain this access. This statement can be illustrated by the following example. As more South African citizens obtain access to broadband services, more citizens will be able to partake in for example e-learning and e-health initiatives. By partaking in these initiatives, citizens will be able to interact and exchange local education and health information and access global education and health information from the global knowledge system that can ultimately increase their education and health situation. In this manner the society as a whole can benefit from this interaction and exchange process.

Table 5.18: Top twenty countries in terms of number of broadband subscribers.

Rank	Country	DSL	Cable	Other	Total	Total Subscribers
1	Denmark	17.40%	9.00%	2.80%	29.30%	1,590,539
2	Netherlands	17.20%	11.10%	0.50%	28.80%	4,705,829
3	Iceland	26.50%	0.00%	0.70%	27.30%	80,672
4	South Korea	13.20%	8.80%	4.50%	26.40%	12,770,911
5	Switzerland	16.90%	9.00%	0.40%	26.20%	1,945,358
6	Finland	21.70%	3.10%	0.20%	25.00%	1,309,800
7	Norway	20.40%	3.80%	0.40%	24.60%	1,137,697
8	Sweden	14.40%	4.30%	4.00%	22.70%	2,046,222
9	Canada	10.80%	11.50%	0.10%	22.40%	7,161,872
10	United Kingdom	14.60%	4.90%	0.00%	19.40%	11,622,929
11	Belgium	11.90%	7.40%	0.00%	19.30%	2,025,112
12	United States	8.00%	9.80%	1.40%	19.20%	56,502,351
13	Japan	11.30%	2.70%	4.90%	19.00%	24,217,012
14	Luxembourg	16.00%	1.90%	0.00%	17.90%	81,303
15	Austria	11.20%	6.30%	0.20%	17.70%	1,460,000

16	France	16.70%	1.00%	0.00%	17.70%	11,105,000
17	Australia	13.90%	2.90%	0.60%	17.40%	3,518,100
18	Germany	14.70%	0.30%	0.10%	15.10%	12,444,600
19	Spain	10.50%	3.10%	0.10%	13.60%	5,917,082
20	Italy	12.60%	0.00%	0.60%	13.20%	7,697,249

As can be seen in the table above, the actual number of broadband subscribers in any of the top twenty countries far outnumbers the small number of subscribers in South Africa. From this the author can deduce that although there are many more subscribers than is the case in Niger, the number of subscribers in South Africa does not come close in comparison with the number of subscribers in other countries in the world. It can thus be deduced that due to the relative small amount of broadband subscribers in South Africa, they do not comply with this indicator of the spatial and technological criteria of the information and knowledge society. The author is however of opinion that this deduction would purely be based upon a statistical reality and not based upon an economic reality. Although there is a relatively small amount of broadband subscribers within the country, these subscribers are increasing daily and can still make a difference to the economic situation of the country through the interaction and exchange of data, information and knowledge from their local knowledge system and the global knowledge system. Though utilising this faster internet connection, South African citizens can upload their local knowledge to the global knowledge system in the form of local Web pages and local forums. By harnessing these platforms South African citizens can for example market and sell locally created products such as indigenous art and music, which would improve their economic reality as well as the economic reality of other South Africans through the creation of more local job opportunities.

In the following section, the author will investigate the telecommunication situation in South Africa.

d) Level of telecommunication penetration

Similar to what was seen in chapter 4, in the case of Norway and the USA, and then again in the discussion concerning the telecommunication situation in Niger, mobile subscriber numbers in South Africa far outweigh the number of subscribers to fixed lines. According to the ITU (2006b) South Africa had 4,924,500 fixed lines in 2001, decreasing to approximately 4,729,000 by 2006. This represents a negative growth rate of -1.0%. As mentioned previously, this decrease is mainly due to the increase in mobile penetration. With regard to mobile penetration within South Africa, there has been extraordinary growth over the past few years. From approximately 10,787,000 mobile subscribers in 2001, there was a 33.2% increase to 33,960,000 subscribers in 2006. This equates to 71.6 mobile subscribers per 100 inhabitants. This high mobile penetration within South Africa, places South Africa in 24th in the world with regard the number of mobile subscribers.

Considering these good mobile statistics, the percentage of these subscriptions that is digital can be described as being phenomenal. According to the ITU (2006b), 100% of these subscriptions are digital. Although this appears extraordinary, this figure simply gives an indication of the percentage of mobile subscribers that have digital ability and not the percentage of mobile subscribers that actually use this service. Unfortunately, due to the expense of this service, which will be discussed under the affordability indicator of the social criterion, not many South Africans can afford to access this digital service. However, in view of the high mobile subscriber numbers, the author is of the opinion that South Africa complies with the telecommunication indicator of the criteria.

Thus, it can be seen from this discussion that South Africa's telecommunication and network infrastructure is much better than that of Niger, although it is still not adequate when compared to developed countries such as Norway and the USA. Considering that South Africa complies with one of the four identified indicators, the author can conclude that South Africa only slightly complies with the spatial and technological criteria of the

information and knowledge society. This deduction is based upon the comprehensive statistical discussion concerning South Africa's inadequate ICT infrastructure and can be summarised as follows:

- low access and use of personal computers;
- low Internet access and use;
- low access to broadband service;
- high telecommunication penetration, expressed in high numbers of mobile subscribers.

In view of this it can further be deduced that the interaction and exchange of data, information, and knowledge from their local knowledge system with the global knowledge system, can be effectively used for the improvement of their daily lives: although this currently only apples to a select few. For example, the few South African citizens who have access to the internet can harness the power of ICTs to improve their employment situation. By using the internet as a platform, these citizens can look for local, national or international job opportunities. This will have a ripple down effect upon their poverty as their situation will be improved and thus, resulting from this, their general standard of living will be enhanced. In this way, the interaction and exchange of data, information, and knowledge can be used to stimulate development within South Africa. For South Africa to fully comply with the spatial and technological criteria, access to personal computers, internet access, and broadband access will have to be considerably improved. In the following section, the author will apply the various indicators of the political criteria to Niger and South Africa, respectively.

5.5.3 Political criterion.

This criterion is discussed in detail in chapter 3, (see 3.5 1) and indicators for this criterion identified in chapter 4 (see 4.5.1). According to this discussion, an information and knowledge society can be successful if the society has the necessary infrastructure and levels of democracy to ensure the information-based rights of citizens such as freedom of information, freedom of expression

and intellectual property rights. Furthermore, the freedom of information needed within the information and knowledge society, can lead to a political process characterized by increased participation and consensus. As identified in the previous chapter, the first indicator of the political criteria for an information and knowledge society is high levels of democracy, which is highly complex and made up of various sub-indicators. The author will discuss the following sub-indicators: the right to freedom of expression, the right to freedom of information, and Intellectual property rights. Within the information and knowledge society, freedom of expression is seen as a cornerstone of democratic freedom. Such societies have the right to receive, impart, and exchange data, information, and ideas between the local knowledge system and the global knowledge system by making use of, for example, the internet as distribution media. This statement can be illustrated by means of an example. Using the internet as distribution platform, citizens within the information and knowledge society will be able to interact and exchange local information i.e information concerning local arts, crafts and music. With the necessary information rights such as intellectual property rights in place, these citizens will not hesitate to exchange their local ideas and information as this information will be protected under these regimes. Furthermore, this first sub-indicator namely, freedom of expression, inherently relies on the availability of adequate information to inform opinions. Thus, you cannot truly have freedom of expression if you do not have access to the adequate information, which leads us to the second sub-indicator, namely freedom of information. With regard to the third sub-indicator, freedom of intellectual property rights, within the information and knowledge society, creators of information must have the legal protection that will ensure the protection of their intellectual activity in areas such as industrial, scientific, literary and artistic fields.

As identified in chapter 4, the second indicator of the political criteria is a political process characterized by increased participation and consensus. This second indicator of the political criterion can be addressed by investigating the voter turnouts for national elections in the two chosen developing countries.

In the following section, the author will apply the following indicators of the Political criteria of the information and knowledge society, to Niger and South Africa respectively:

a. Level of democracy:
    i. Freedom of expression;
    ii. Freedom of information;
    iii. Intellectual property rights.
b. Political participation.

Niger

According to Freedom House's 'Freedom in the World' survey (2007), Niger is regarded as only being partly free, with a score of three for political rights and civil liberties. This survey provides an annual evaluation of the state of global freedom as experienced by the individuals in the specific country. Niger's score places the country in the middle of the numerical rating of one to seven, where one indicates the highest degree of freedom and seven the least. In the following section, the author will discuss the first indicator namely the level of democracy.

a) Levels of democracy

Pertaining to the first sub-indicator, namely freedom of expression, this right is protected by Constitution of Niger, although this right has not been respected in the past. As indicated by Amnesty International (2004) and the US State Department, Country Reports on Human Rights Practices in Niger (2006), there were various incidences in 2003 and 2004 were the freedom of expression of Niger's citizens was not respected. Amnesty International (2004), reported on the following incidents in 2003, which violated the right of freedom of expression:

- In February 2003, the government of Niger ordered the closure of a privately owned radio-station *Nomade FM*. According to the government, this radio station incited rebellion through the criticism of the government by two former Tuareg rebels. These rebels criticized

the Nigerien government for not fulfilling its commitment under the peace agreements to reintegrate former rebels into society. The station was closed and only allowed to re-open two weeks later.

- In October 2003, the managing editor of a private weekly newspaper, *Alternative*, was detained for 48 hours for allegedly inciting a student protest to demand better living and working conditions. Moussa Tchangari was later released without charge.
- In November 2003, the editor of *Le Républicain,* the leading newspaper in Niamey, was arrested and imprisoned for publishing information criticizing government officials. Maman Abou, who is also a prominent human rights defender, was a prisoner of conscience. He was sentenced to six months' imprisonment for these actions. His trial failed to respect national or international fair trial standards by not questioning him or allowing him to challenge his accusers, who said he had obtained confidential documents by theft. Furthermore, Abou had no legal representation at his trial and was sentenced in his absence. His lawyer lodged an appeal but Abou was still held at the end of the year.

Further similar violations occurred in 2004. The following is such an example reported by the US State Department (2006):

- In December 2004, the Nigerien Government arrested Sanoussi Jackou, president of the Nigerien Opposition Party for Self-Reliance and owner of the independent Newspaper La Roue de l'Histoire. He was chardges with inciting ethnic hatred for his appearance on a radio talk show where he allegedly insulted an ethnic group.

Unfortunately, even in 2007 there were still such examples of freedom of expression violations. According to Agence France Presse (2007):

- In September 2007, Niger police arrested Moussa Kaka, a journalist working for Radio France International (RFI), a radio station that gives airtime to Tuareg rebels. Authorities then banned RFI from broadcasting on FM for a month for reporting what they called

"mendacious information" about the Movement of Niger People for Justice.

From these examples, it can be deduced that although the right to freedom of expression is protected by the constitution of Niger, the government does not respect this right. As can be seen in some of the above examples, the right of freedom of expression also has an impact upon the right to freedom of information. By having radio stations and newspapers closed down by their government, the citizens of Niger do not have access to the information distributed by these channels and, as a result, their right to this access information is violated. According to Anti-Corruption Resource Centre (2003), although the constitution guarantees the right to information and freedom of expression in almost every country in West Africa, not a single country has passed legislation to put freedom of information into practice. This can be seen in examples of such violations as can be found in the World Press Freedom Review (IPI, 2004):

- On 20 December 2004, police seized copies of issue 99 of the weekly newspaper, Le Témoin. Several uniformed officers arrived at the premises of the newspaper and stormed the printing workshop. The newspaper's entire print run was seized, along with materials necessary for the production of the issue. The issue on the printing press contained a photograph of four soldiers and gendarmes taken hostage by Touareg rebels operating in northern Niger.

Thus, the author can infer from these examples, that the citizens of Niger have freedom of information as long as the information does not harm the ruling government in any way. Although these rights are protected in the constitution, the government violates them in cases where its credibility is questioned or activities criticized.

Pertaining to the last sub-indicator of this criterion, namely intellectual property rights, Niger is a member of the West African Intellectual Property Organisation (OAPI). This organisation establishes the legal framework for protecting intellectual property and approves requests for registration. This

protection is initially granted for 10 years and is renewable for another 10 years (US State Department, 2006).

Furthermore, Niger is also a member of the World Intellectual Property Organisation (WIPO) and a signatory to the Universal Copyright Convention. In the following table, a summary of all the national legislation pertaining to intellectual property right protection within Niger can be seen:

Table 5.19: Intellectual Property rights legislation - Niger

National Legislation of Intellectual Property Rights

Legislation/Regulations	Year
Copyright and Related Rights	**1999**
Trademarks	**1977[1]**
Geographical Indications	**1977**
Industrial Designs	**1977**
Patents	**1977**
Layout-Designs (Topographies) of Integrated Circuits	**1977**
Protection of Undisclosed Information	
Control of Anti-Competitive Practices in Contractual Licences	**1977**
Collective Management Society	**yes**

Intellectual Property Related National Legislation

Legislation/Regulations	Year
Foreign Direct Investment	**1990**
Science and Technology	
Social Folk Custom	
Performing Folk Arts	
Oral Literature/Verbal Art	
Folk Songs	

Thus, it can be inferred from all this legislation pertaining to intellectual copyright protection that Niger does, in theory, respect the right to intellectual property. In practice, however, the government lacks the capacity and resources to enforce this legislation. Copyright violations, and counterfeit CDs and videocassettes are readily available in most cities in Niger (US State Department, 2006). In a particular and extreme case, the government's lack of resources to verify intellectual property proved deadly. In 1995, fake vaccines

did not sufficiently protect people from a meningitis epidemic, which led to 2,500 deaths (US State Department, 2006).

As previously discussed in chapter 4, intellectual property rights play a very important role in the interaction and exchange of data, information, and knowledge from Niger's local knowledge system to the global knowledge system. With these rights in place and secured by membership in the above mentioned Global Intellectual Property Rights organisation, the citizens of Niger can freely share their local knowledge with the rest of the world in the global knowledge system, because they know that their intellectual activities as creators are protected. However, as discussed previously, Niger does not have the ICT infrastructure that will support this interaction and exchange process.

From this discussion, it can be inferred that although Niger has intellectual property rights legislation in place, it does not comply with the first two sub-indicators and, thus, does not have a high enough level of democracy in place as required by an information and knowledge society. Accordingly, Niger does not comply with the first indicator of the political criterion of an information and knowledge society.

b) Political participation

With reference to the second indicator of the political criterion of the information and knowledge society, Niger does have an electoral government system in place that can ensure greater participation by the citizen of Niger in the political process of the country. According to the International Institute for Democracy and Electoral Assistance (IDEA, 2003), there was a registered voter turnout of 99.4% at the last parliamentary elections, giving Niger the first place ranking in terms of voter turnout for parliamentary elections. In the following table, the top ten rankings can be seen:

Table 5.20: Voter turnout for parliamentary elections

Rank	Countries	Amount (top to bottom)
#1	Niger:	99.4%
#2	Malta:	95.4%
#3	Australia:	94.9%
#4	Singapore:	94.6%
#5	Cambodia:	93.7%
#6	Uzbekistan:	93.5%
#7	Tajikistan:	93.4%
#8	Indonesia:	93.3%
#9	Cyprus:	91.8%
#10	Guyana:	91.7%

From this very high voter turnout, it can be deduced that the citizens of Niger are very involved in the political process at parliamentary level. However, voter turnouts for the last presidential elections were much lower, at 45%, indicating a decrease in participation in the national political process by the citizens (IDEA, 2003). The voter turnout for the last four presidential elections can be seen in the following table:

Table 5.21: Presidential voter turnout in Niger

Year	Total Vote	Registration	Vote / Reg
1993	1,325,152	4,482,096	29.6%
1996	2,525,019	3,064,550	82.4%
1999	1,815,411	4,587,684	39.6%
2004 [2]	2,363,692	5,255,232	45.0%

As discussed in the previous chapter, governments across the world are investing in online e-government programs to increase the participation of citizens in the political processes of the country. Programs like these can stimulate communication between the government and its citizens, and are crucial to progressing toward a more effective online government presence. According to West (2006) in the Global e-government report, Niger only scored 20 on the point scale between 0 and 100, with only 15 of the 198 countries scoring less than 20. The highest scoring on this scale was South

Korea with a score of 60.3 and the lowest Burundi with a score of 8.0. The author is of the opinion that this is mainly due to Niger's deficient ICT infrastructure. Providing citizens with such a program is not a high priority in a country where less than 1% of the citizens have internet access. E-government programs, as well as other modern initiatives such as e-learning and e-health, will be discussed in greater detail under the social criterion of an information and knowledge society.

Thus, it can be deduced from these statistics that, although the turnout on a parliamentary level is extremely high, indicating great citizen participation, this participation is not seen at presidential election level. Furthermore, due to the deficient ICT infrastructure, there are no or very few online facilities in Niger to increase the participation and consensus within the political process in the country. Therefore, Niger does not comply with this indicator of the political criteria.

As can be deduced from this discussion, Niger does not comply with any of the indicators of the political criteria. Pertaining to the level of democracy in the country, although freedom of expression and freedom of information are protected within the constitution of Niger, the government of Niger does not respect these basic human rights. With regard to intellectual property rights in Niger, there are many national laws to protect intellectual property in theory. In practice however, it was shown that Niger does not have the resources to enforce this protection. It was also shown that the participation of the citizens on national level is only 45% as was measured by the voter turnout for the last presidential election. The opportunities to increase the participation of Niger's citizens within the political process are limited, owing to the deficient ICT infrastructure within the country. Accordingly, it can be deduced that Niger does not comply with the political criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning Niger's political situation and can be summarised as follows:

- Low levels of democracy, expressed in the governments disrespect of the right to freedom of expression, the freedom of access to information and various intellectual property rights and

- Low level of political participation.

The government of Niger will have to start respecting the basic human rights of freedom of expression and information, as well as enforce the existing laws concerning intellectual property if they want to become an information and knowledge society in future. In the following section, the author will discuss the level of democracy within South Africa.

South Africa

According to Freedom House's, 'Freedom in the World' survey (2007), South Africa has a political rights and civil liberty score of two and is rated as being totally free. In 2006, the rating for political rights was one but, due to the ruling ANC's technocratic nature and its increasing monopoly on policy making, this score was lowered to two in 2007. In the following section, the author will discuss the level of democracy within South Africa by addressing the right to freedom of expression, the right to freedom of information and intellectual property rights.

a) Level of democracy

With regard to the first sub-indicator, freedom of expression, South Africa has their own Freedom of Expression Institute (FXI). According to their website, the mission of this institute is to fight for freedom of expression and equalities in accessing and disseminating information and knowledge in SA and beyond (FXI, 2007). The FXI was established in 1994 to protect and foster these rights within South Africa. Furthermore, the FXI is a member of the International Freedom of Expression Exchange (IFEX), which monitors freedom of the media and freedom of expression on a global scale.

In South Africa, freedom of expression and freedom of the press is protected by the South African constitution. Generally, these rights are respected in practice. Due to the fact that many private newspapers and magazines are sharply critical of the government, political parties, and other powerful figures

and institutions, South Africa is regarded by many journalists as being the leader of freedom of expression on the African continent (Freedom House, 2007)

However, there is an increasing climate of intolerance of such critical debate especially from government officials. According to Da Silva (2007:1), in an article for Biz-Community entitled: 'South Africa: Freedom of Expression Misunderstood in SA', a government official is quoted as saying, "We must not forget that this is not Europe but Africa, where we have certain ways of doing things. We need to respect our leaders who fought hard to win this freedom, which is now misused by the press. There must be certain limits and some form of censorship in this so-called freedom of expression, especially when reporting on matters involving government's top figures. I also think that the ombudsman must get tough with these newspapers."

Further examples of this intolerance can also been found in the public health system. The FXI feels that recent reports strongly suggest free speech in the public health system needs intensive care. A good example of this is the case of Eastern Cape's Dr Nokuzola Ntshona, the Medical Superintendent at the Frere Hospital who was suspended for talking to the press. Attempts to shut down dissent in the public health system are not new. In the past, the FXI has dealt with numerous cases in the public Health Sector that threatens the right to freedom of expression. A few such examples (provided by the FXI) are:

- In the Western Cape, the health department wanted to ban doctors from speaking to the media.
- Nationally the Health Department tried to implement 'gags' on provincial health officials, preventing them from commenting in the media about HIV/ Aids, during the visit of United Nations Special Envoy on HIV/ Aids, Steven Lewis.
- Recently, Doctor Costa Gazidis was reinstated after being fired from the Department of Health for a media statement in which he criticised the Minister of Health.

- In 2006, Western Cape-based doctors were instructed to desist from protesting against budget cuts, even in their lunchtimes, and on their leave days.
- The FXI has also been reliably informed that a number of doctors have been told that they cannot speak to the media, even in their individual capacities.

Although these are isolated cases, incidences like these create a climate of intolerance towards freedom of expression. Situations like these will have to be carefully monitored so that they do not threaten the existence of critical public debate, which would do irreparable harm to the right of freedom of expression.

The author is of the opinion that the right to freedom of expression is an inseparable part of the interaction and exchange process of data, information, and knowledge. If this basic human right is not protected, and intolerances start surfacing, South African citizens will be less inclined to share their local information in the global knowledge system in fear of prosecution. As previously mentioned, this right also has an impact upon the right to freedom of information that will be discussed in the following section.

With regard to the right to freedom of information, this right is protected by the constitution of South Africa and also in separate South African legislation. In the new Constitution of the Republic of South Africa (Act 108 of 1996) the right of access to information is guaranteed. Section 16(1) states:
Everyone has the right to freedom of expression, which includes:
a. freedom of the press and other media;
b. freedom to receive or impart information or ideas;
c. freedom of artistic creativity;
d. academic freedom and freedom of scientific research.

Furthermore, in 2000, the Promotion of Access to Information Act (PAIA) was approved by Parliament and went into effect in 2001. This act is intended to

create a culture of accountability and transparency in South Africa by empowering citizens to fully exercise and protect all of their rights. Under this Act, any person can demand information and records from any government body without showing a reason. A unique provision of this Act is that it allows citizens and government bodies to access information and records held by private bodies when the record is deemed necessary for the exercise or protection of people's rights.

From this discussion, the author can infer that although South Africa is enjoying more freedom of expression and access to information than it has done for many decades, this situation still needs to be monitored for small incidences that could grow and possibly become a threat to the existence of these rights. It is the author's opinion that South Africa, through their existing legislation and practice of this legislation, truly complies with these two sub-indicators of the level of democracy indicator.

Concerning the third sub-indicator, intellectual property rights, South Africa is ranked in 21st place with a score of 6.4 out of 10 in the Intellectual Property Rights Index (2007). This is a very high ranking for a developing country, as all of the countries ranked higher than South Africa are all developed countries as can be seen in the following table:

Table 5.22: Intellectual Property Rights Index 2007

Top 25 Percent	2nd Quartile	3rd Quartile	Bottom 25 Percent
Norway (rank 1)	France (rank 19)	Turkey (rank 38)	Peru (rank 55)
Netherlands (rank 2)	Spain (rank 20)	Czech Republic (rank 39)	Honduras (rank 56)
Denmark (rank 3)	South Africa (rank 21)	Panama (rank 39)	Romania (rank 56)
Sweden (rank 3)	Portugal (rank 22)	Malawi (rank 41)	Ukraine (rank 58)
New Zealand (rank 3)	Chile (rank 23)	Mexico (rank 42)	Kenya (rank 59)
United Kingdom (rank 3)	Israel (rank 23)	Morocco (rank 42)	Guatemala (rank 59)
Germany (rank 3)	Korea (rank 25)	Brazil (rank 42)	Ecuador (rank 59)
Australia (rank 3)	Malaysia (rank 25)	Colombia (rank 45)	Pakistan (rank 59)
Switzerland (rank 9)	Tunisia (rank 27)	China (rank 45)	Russia (rank 63)

strongest

Austria (rank 9)	Italy (rank 27)	Philippines (rank 47)	Nigeria (rank 64)
Finland (rank 11)	Greece (rank 29)	Indonesia (rank 47)	Paraguay (rank 65)
Singapore (rank 12)	Hungary (rank 30)	Poland (rank 49)	Venezuela (rank 66)
Japan (rank 13)	Mauritius (rank 30)	Dom. Republic (rank 49)	Nicaragua (rank 67)
Ireland (rank 14)	Thailand (rank 32)	Argentina (rank 51)	Ethiopia (rank 68)
Canada (rank 14)	India (rank 33)	Egypt (rank 51)	Bolivia (rank 69)
United States (rank 14)	Costa Rica (rank 33)	Bulgaria (rank 51)	Bangladesh (rank 70)
Hong Kong (rank 17)	El Salvador (rank 35)	Tanzania (rank 51)	
Belgium (rank 18)	Uruguay (rank 35)		
	Lithuania (rank 35)		

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This high ranking of South Africa is due to the high amount of Intellectual Property legislation on national level. According to WIPO (2007), the following are laws and acts that protect certain aspects of intellectual property, for example:

- Patents;
- Trade Marks;
- Industrial Designs;
- Copyright and Related Rights.

As discussed in chapter 4, these rights play a very important role in the interaction and exchange of data, information, and knowledge between South Africa's local knowledge system and the global knowledge system. Because these laws exist in South Africa, the citizens of South Africa would not hesitate to disseminate and share their local knowledge i.e. local remedies and cures, with the rest of the world in the global knowledge system, because they know that their intellectual activities as creators would be protected. Furthermore, these rights also have an impact on the second sub indicator, namely the right to information, as the intellectual property that one citizen shares in the global information system becomes the information to which other citizens have a right to access. As mentioned in chapter 4, intellectual property rights give statutory expression to the moral and economic rights not just of the creator of the information, but also of the public who have access to that information.

b) Political participation

In terms of voter turnout for parliamentary elections, the statistics for South Africa look only slightly worse than those of Niger. According to the Institute for Democracy and Electoral Assistance (IDEA, 2003), there was a registered voter turnout of 98.4% for the parliamentary elections. The voter turnout for the last three parliamentary elections can be seen in the following table:

Table 5.23: Voter turnout for South African parliamentary elections

Year	Total Vote	Registration	Vote / Reg
1994 [1]	19,726,579	n/a	n/a
1999	16,228,462	18,177,000	89.3%
2004	15,612,671	15,863,558	98.4%

According to the Africa Elections Database, for the last National elections in 2004, there were 20,674,926 registered voters and a total voter turnout of 15,863,558. This equates to an estimated voter turnout of 76.7%. Thus, it can be seen that although the parliamentary voter turnout is only 1% less than that of Niger, the voter turnout for presidential elections are much higher than in Niger.

Furthermore, the South African government utilises their existing e-government initiatives to stimulate an increase in citizen participation in the political process. Although this portal is very sophisticated, due to the small number of South African citizens who have internet and computer access, this portal is not really functional. This is one of the reasons why South Africa only scored 29.2 on the point scale between 0 and 100 in the Global e-government report (West, 2006). This initiative of government as well as other online public services such as e-learning and e-health initiatives, will be addressed under the social criterion of the information and knowledge society, later in this chapter.

Thus, it can be seen from these statistics that, although there is increased participation by the citizens in the political process, as well as an awareness from the government to provide government information to the population through the use of modern ICT, in practice this is not being realized due to the poor ICT infrastructure in the country.

As can be deduced from this discussion, South Africa does comply with the sub-indicators and indicators of the political criterion. Pertaining to the level of democracy in the country, freedom of expression and freedom of information are protected within the constitution of South Africa in theory and, in practice, the Government respects these rights. With regard to intellectual property rights in South Africa, there are many national laws to protect intellectual property rights. These laws are so comprehensive, that South Africa is ranked 21st in the International Property Rights Index (2007). It was also shown that the participation of the citizens on parliamentary and national level is above 75%, as was measured by the voter turnout for the last parliamentary and presidential election. Although the South African government has a comprehensive e-government program, due to the limited number of citizens with computer and internet access, it cannot truly be utilised to increase the participation of the citizens within the political process. Accordingly, the author can deduce that South Africa fully complies with the political criterion of the information and knowledge society. Hence the author can deduce from this discussion that South Africa completely complies with the political criteria of the information and knowledge criteria. This deduction is based upon the comprehensive discussion concerning South Africa's political situation and can be summarised as follows:

- High levels of democracy, expressed in the constitutionally protected right to freedom of expression and the right to freedom of access to information as well as various intellectual property rights and
- High level of political participation.

The government of South Africa has done a significant amount in the recent years to respect the basic human rights of freedom of expression and information, as well as to enforce the existing laws concerning intellectual property. In the following section, the author will discuss the social criterion of the information and knowledge society and discuss whether Niger and South Africa comply with the indicators thereof.

5.5.4 Social criterion

Due to the fact that the social criterion has an impact upon all aspects of human life, this is a very complex and extended criterion. It was discussed in detail in chapter 3 and the indicators of this criterion identified and discussed in chapter 4 (see 3.5.4). As was discussed previously, within an information and knowledge society, information is seen as an enhancer of the quality of life. From this it can be inferred that the first indicator of the social criterion is the improvement of the quality of life. A very important aspect of this quality of life is the importance of good health prospects. As discussed in chapter 4, the improvement of the quality of life in terms of good health prospects can be measured by looking at three sub-indicators. The first sub-indicator is the mortality rates and life expectancy of citizens of the particular countries. The second is the number of practising physicians in the country, and the third is the total expenditure on health as a share of GDP.

The second indicator of the social criterion of an information and knowledge society is education opportunities. Within an information and knowledge society, effective education and training systems are vital to ensure economic competitiveness and social inclusion. Furthermore, education is, first and foremost, a fundamental human right, which is spelt out in Article 26 of the Universal Declaration of Human Rights (United Nations, 1948). The article declares that ‘elementary’ education shall be free and compulsory, and that higher levels of education will be equally available based on merit. Thus, education is an indispensable means for effective participation in the information and knowledge society. This indicator is measured by addressing two sub-indicators. The first of these sub-indicators is the literacy level of the

country and, the second, the amount of years of compulsory education in the specific country.

The third indicator of the social criterion identified and discussed in chapter 4, is the initiatives that are aimed at developing modern online public services and a dynamic environment for the citizens of the information and knowledge society. This indicator will discuss the following online initiatives: e-government (including e-voting initiatives); improvements in the health public service sector through e-health initiatives; and the importance of e-learning initiatives in a society increasingly based on knowledge and information.

A further aspect of the social criterion, discussed by Britz *et al* (2006) as one of the main pillars of the information and knowledge society, and identified by the author as one of the indicators of the information and knowledge society, is content that is usable and affordable. As previously mentioned in chapter 3 (see 3.5.2), access to information alone is not enough, and even being connected to the best ICT infrastructure, does not necessarily mean to be informed. To enhance the quality of life within an information and knowledge society, people need information that is usable. The sub-indicators of usable content can be deduced from Britz *et al* (2006) as follows:

- information that is affordable;
- information that is timely and available;
- information that is readily accessible;
- the language of the information.

Thus, the author can conclude that there are numerous indicators that play a role in the fulfilling of the social criterion of the information and knowledge society. In the sections to follow, the following indicators and sub-indicators will be applied to Niger and South Africa, to see if they comply with the social criterion of the information and knowledge society:

a) Health Prospects:

i. Mortality rate & life expectancy;

ii. Practicing Physicians;

iii. Health expenditure.

b) Education opportunities:

i. Literacy rates and

ii. Compulsory Education.

c) Public services:

i. e-government and e-voting initiatives;

ii. e-health initiatives;

iii. e-learning initiatives.

d) Usable and affordable content:

i. Affordability;

ii. Timely and available;

iii. Readily accessible;

iv. Language.

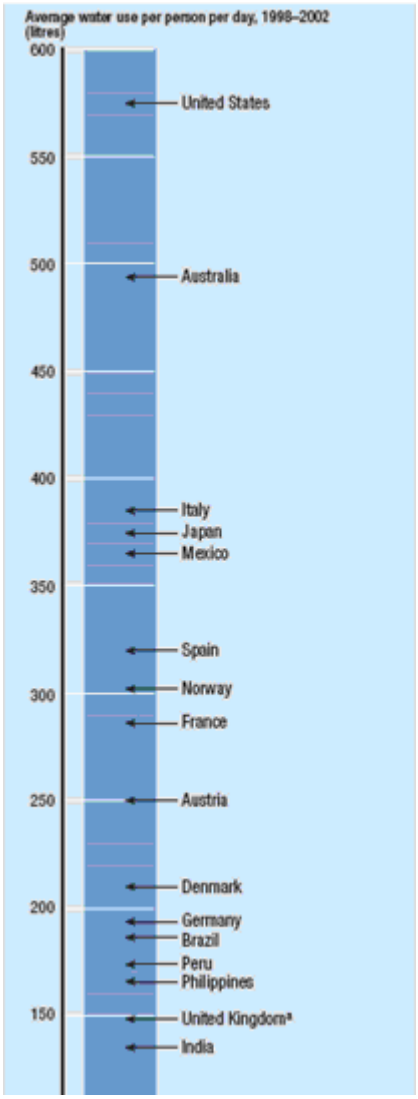
Niger

In the Niger, health is a very serious issue and, as can be expected from the high poverty rate, the health situation in Niger does not look good. In the following section, the author will address this situation by discussing the mortality rate, the life expectancy rate, the number of practising physicians and the government expenditure on health as part of the GDP.

a) Health prospects

In Niger, as mentioned above, there are no good health prospects to which citizens can look forward. In recent years, the country has been plagued by locust infestations and drought, which have contributed to the severe malnutrition of the Nigerien population. According to the World Health Organisation an estimated 160,000 children in Niger are moderately malnourished and an additional 32,000 children are severely malnourished (World Health Organisation, 2006a). This malnutrition has severe health

implications. According to the Human Development Report (UNDP, 2006), 40% of children under the age of five are underweight are for their age. Furthermore, due to the severe draught in the country and the lack of physical infrastructure, only 13% of the entire population has access to improved sanitation and 46% of the population has sustainable access to improved water services. The malnutrition, coupled with this lack of safe water and poor sanitation, has resulted in 43% of children under the age of five suffering from severe diarrhoea (UNDP, 2006). In the figure below, the water poverty in Niger can be seen:



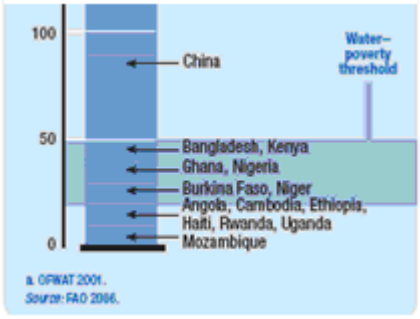


Figure 5.10: Average water use per day in selected countries (2006)

This critical health situation has, furthermore, resulted in the outbreak of various diseases in the recent years. Between 2004 and 2006, there have been outbreaks of cholera, meningococcal disease and avian flu outbreaks. Due to these conditions, it is not surprising that Niger has a very high infant mortality rate. According to the Human Development Report (UNDP, 2006), Niger had 152 deaths per 1,000 infants in 2004. Compared to Norway and the USA where the infant mortality rate is only 3.2 and 6.8 deaths per 1,000 babies respectively, Niger's infant mortality rate is inexcusable. Due to this high mortality rate, the probability of a baby in Niger surviving till the age of 40, is only 41.4% (UNDP, 2006). In the following table, the top ten ranking countries can be seen in terms of highest infant mortality rates in 2005. The table shows that Niger's infant mortality rate had declined slightly to 122 infant mortalities (per 1,000) between 2004 and 2005:

Table 5.24: Top ten countries in terms of infant mortality rate

Rank	Countries	Amount (top to bottom)
#1	**Angola**:	192.5
#2	**Afghanistan**:	165.96
#3	**Mozambique**:	137.08
#4	**Liberia**:	130.51
#5	**Niger**:	122.66

#6	Mali:	117.99
#7	Guinea-Bissau:	108.72
#8	Djibouti:	105.54
#9	Malawi:	104.23
#10	Bhutan:	102.56

The situation for adults in Niger is not much better. The adult life expectancy in Niger is only 44.3 years. Due to this low life expectancy, it is not surprising that of the total population of Niger, only 2% are aged 65 or older.

With regard to the second sub-indicator, namely the number of practising physicians within the country, there was only three physicians per 100,000 inhabitants in 2004. As discussed in chapter 4, the author is of the opinion that the appalling health conditions within the country create an unfavourable working environment for practising medical staff. This results in fewer practising physicians who, in turn, cannot attend to many patients, resulting in even higher mortality rates within Niger. The meagre number of physicians is also a contributing factor to the high infant mortality at birth. According to the World Development Report, at only 16% of the births is a skilled medical practitioner present (World Bank, 2007b).

The author is further of the opinion that the low numbers of practising physicians can be attributed to the low expenditure on health care within the country. This expenditure as a percentage of the total GDP of the specific country is the third sub-indicator of the good health opportunity indicator. If a health system in a particular country in not well financed, the health care of that country will be poor and there will be fewer practising physicians, as can be seen above. According to the OECD (2007) Health Data Report, the expenditure on health in most OECD countries is a large (and growing) share of the GDP from both public and private expenditure. In 2003, the current and capital spending from government (central and local) budgets, which included external borrowings and grants from international agencies and nongovernmental organisations, only accounted for 3.9% of Niger's GDP

(UNDP, 2006). In the following table, the figures of the World Health Organisation (2006a) for Niger can be seen:

Table 5.25: Niger expenditure on health as % of GDP

A. SELECTED RATIO INDICATORS* FOR EXPENDITURES ON HEALTH	2002	2003	2004	2005
I. Expenditure ratios				
Total expenditure on health (THE) as % of GDP	3.9	3.9	4.2	3.7

From the table above, it can be seen that, although total expenditure on health increased between 2002 and 2004, this percentage plummeted to an all time low in 2005. This was mainly due to the severe locust infestations and draught experienced in 2005. This expenditure of Niger is approximately one third of the expenditure of Norway. The Scandinavian country's spending on health standing at 9.1% of the GDP in 2005.

Thus, it can be deduced from the above discussion and statistics that citizens in Niger do not have a very good quality of life. This is reflected in the high mortality rate and low life expectancy. Furthermore, the Nigerien government is not in a financial position to improve the quality of healthcare services, which is reflected in the low percentage expenditure of the total GDP on health. This creates an unfavourable working environment for practising medical staff, which results in fewer practising physicians. In turn, the small number of practising physicians is capable of seeing fewer patients, resulting in an even higher mortality rate in the country. Therefore, it is the author's opinion that Niger does not comply with the first indicator of the social criterion of the information and knowledge society.

b) Education opportunities

As discussed above, the second indicator of the social criterion relates to quality education opportunities that can be measured in the literacy rate of the country as well as the number of years of compulsory education. Unfortunately, in Niger the extremely poor health situation is also reflected in

the educational opportunities of the citizens of Niger. According to the Human Development Report (UNDP, 2006), a mere 28.7% of the adult population of Niger is literate. Within this percentage, the proportion of male literacy far outweighs female literacy. In 2004, barely 15% of females were literate, compared to 42.9% of males. With regard to the second sub-indicator, the number of compulsory years of education, this is also very low in Niger compared to other countries, and can be seen as a contributing factor to the low literacy rates in the country. As can be seen in the following table, Niger ranks within the bottom ten countries, out of 172, in terms of compulsory education (UNESCO, 2006):

Table 5.26: Bottom ten ranking countries in terms of compulsory years of school

161	Niger	6
162	Central African Republic	6
163	Afghanistan	6
164	Rwanda	6
165	Nicaragua	6
166	Bangladesh	5
167	Nepal	5
168	Burma	5
169	Pakistan	5
170	Vietnam	5
171	Equatorial Guinea	5
172	Angola	4

Niger's record does not compare favourably with the countries at the top of this ranking. Countries such as the Netherlands, Belgium, Germany, Dominica, Saint Kitts and Nevis, and Saint Lucia all have 13 years of compulsory education which is more than double that of Niger (NationMaster, 2007b).

It is the author's opinion that this low literacy rate can be a big barrier for the electronic interaction and exchange of data, information, and knowledge, when using the internet as exchange platform. Although information in a multimedia format can be used to overcome this literacy barrier, this format requires a high-volume, high speed internet connection. As was discussed under the spatial and technological criteria, this is very problematic in Niger as there is only 0.2 broadband subscribers per 1000 people. As previously discussed, this deficient ICT infrastructure is already a limiting problem, but even if this can be overcome, the citizens of Niger will not be able to transfer their information to the global knowledge system, if they cannot write or type. In the same way, they will not be able to access, understand, and be able to contextualise information from the global knowledge system if they cannot read. This problem needs to receive urgent attention from the Nigerien government if Niger is to become an information and knowledge society in the future. Thus, it can be inferred from these low literacy rates, combined with the small amount of compulsory education, that Niger does not comply with the second indicator of the social criteria.

c) Public services

Pertaining to the third indicator of the social criterion, as mentioned above within an information and knowledge society there are initiatives that are aimed to develop modern online public services and a dynamic environment for the citizens of the society. The first of such modern online services is e-government and e-voting initiatives.

In terms of e-government, communication between the government and its citizens is crucial to progressing toward a more effective online presence. Feedback forms, e-mail addresses, polls, and other means of communication are vital to improving the sites that cater for citizens' needs. According to West (2006) in the Global e-government report, Niger only scored 20 on the point scale between 0 and 100, with only 15 of the 198 countries scoring less than 20. The highest scoring on this scale was South Korea with a score of 60.3 and the lowest Burundi with a score of 8.0.

This 100-point e-government index, reviewed each nation's websites based on the availability of publications, databases, and number of online services. Four points were awarded to each website for the presence of the following features: publications, databases, audio clips, video clips, foreign language access, not having ads, not having premium fees, not having user fees, disability access, having privacy policies, security policies, allowing digital signatures on transactions, an option to pay via credit cards, email contact information, areas to post comments, option for email updates, option for website personalisation, and PDA accessibility. Together, these features provide a maximum of 72 points for websites. Each site then qualifies for a bonus of 28 points based on the number of online services executable on that site (one point for one service, two points for two services, three points for three services, and on up to twenty-eight points for twenty-eight or more services). The e-government index runs along a scale from zero (having none of these features and no online services) to 100 (having all features plus at least 28 online services). Totals for each website within a country were averaged across all of that nation's websites to produce a zero to 100 overall rating for that nation (West, 2006). In the table below it can be seen that Niger only received a score for having a government website that contains databases. In the other categories, namely online services, publications, privacy policy, security policy, and W3C Disability accessibility, Niger received no score because these selected features were not available.

Table 5.27: E-government readiness 2007

Table A-2 Individual Country Profiles for Selected Features, 2007						
	Online Services	*Publications*	*Data bases*	*Privacy Policy*	*Security Policy*	*W3C Disability Accessibility*
Niger	0	0	100	0	0	0

It is the author's opinion that due to the lack of a sophisticated ICT infrastructure, the low educational and literacy level combined with the non-existence of e-government services, the use of e-voting for the majority of citizens in Niger will not become a reality for many years to come. In 2006, Niger successfully took part in the Global Human Referendum, Field e-voting

field test. On May 15, 2006, the test voting began. Each participant country could sign into a secured voting page and cast an electronic ballot. A minimum of one vote was required per voting station. The objective of this e-voting simulation was to establish a voting station in every country and territory on the planet. The purpose of this field test was to show the important role the internet can play in a global direct-democratic system, and formed part of the larger World Vote Field Test that investigates the possibility of extending universal voting rights to every man and woman on the planet, using both traditional techniques and new technology. The results of this e-voting field test were very encouraging. Participants in 190 countries and territories, representing 99.62% of the world population registered. Of these 190 registered countries, 171 actually voted, representing 97.63% of the world population. In Niger, there were 2 active and registered voting stations, which received five votes. This indicates that in future, once an effective ICT infrastructure has been put in place, e-voting can be considered as an initiative to increase citizen participation in the political process.

In terms of the second modern online service, namely e-health, Niger does not have any existing initiatives. However, according to a report of the WHO global observatory for e-health, 'Building foundation for e-health' (2006), Niger is busy working on creating an ICT environment that will be conducive to such a modern online service. The first step towards this environment was the establishment of a national information policy that was introduced in Niger in 2004. Plans for the future include the introduction of a national e-health policy that will promote the use of ICT across all sectors by 2008.

The third modern online service the author will address is e-learning programs and initiatives. Currently, due to the deficient ICT infrastructure of Niger, there are no e-learning initiatives or programs on a national level. However, representatives of Niger have attended the past two e-learning Africa conferences, which demonstrates a keen interest on the part of the Nigerien government in e-learning. As mentioned previously, donor foundations, such as the Zakat Foundation of America, have attempted to bridge the divide by providing a city with a computer-training classroom. It was hoped that this

would be the first of many, and that the citizens of Niger would start embracing e-learning and, through this, improve the overall level of education within the country (Zakat foundation of America, 2004).

It is the author's opinion that the establishment of an ICT environment that can be utilised for e-health and e-learning initiatives is of the utmost importance for Niger. This infrastructure could then also be utilised for e-government initiatives allowing the Nigerien population to play a greater part in the political process. Without an adequate technological infrastructure that enables a fast internet connection, the millions of people in Niger are not able to benefit from these online initiatives that could provide them with relevant electronic health and educational information. Furthermore, the inadequate adult literacy rate in Niger will be a further barrier for the citizens to overcome if they are to benefit from e-health and e-learning initiatives. This correlation is also of the utmost importance seen from the perspective of this thesis. Without the necessary technological infrastructure and educational level, Niger's citizens will not be able to share and exchange data, information, knowledge and experiences from their local knowledge system with the global knowledge system. These barriers will prevent the citizens of Niger from accessing, understanding, and contextualising global information, which could be used to aid their overall development. These barriers will be further elaborated and discussed later in the chapter.

Thus, the author can deduce from this discussion that Niger does not, presently, have any of the modern online public services discussed above and, consequently, does not comply with this indicator of the social criterion. In the following section, the author will address the content that could be made available to the citizens via such an ICT infrastructure, if one existed.

d) Usable and affordable content

As mentioned previously, to enhance the quality of life of citizens within an information and knowledge society, people need information that is usable. This means that content must be affordable, timely, available, readily

accessible, and in a language that the user can understand. In the following section, attention will be given to these aspects of usable content.

In terms of affordability, information does not come cheap in Niger. According to Cherry *et al* (2003), the ITU calculated a ranking for each of the 178 nations in the world, called the Digital Access Index (DAI). This index takes the following into consideration: education, the affordability of internet access, the proportion of internet users with high-speed connections, and the raw availability of bandwidth. According to this index, Niger is ranked last at 178th. According to the World Bank (2004), internet access in Niger costs approximately $96.9 per month, which is extremely high if one takes into consideration that 63% of the population live below the poverty line of 1$ a day. According to Hesselmark (2003), internet prices in Africa vary a great deal. In a comparative study of internet prices across 35 African countries, Hesselmark (2003) found that in about half the countries in Africa, one year of internet supply would cost more than the average annual income. In terms of GDP *per capita*, Niger's citizens require 3.99 their average income in order to pay for twelve months of internet access, using ten hours of connectivity per month. The pricing of the internet connection in Niger and other African countries, can be seen in the following figure.

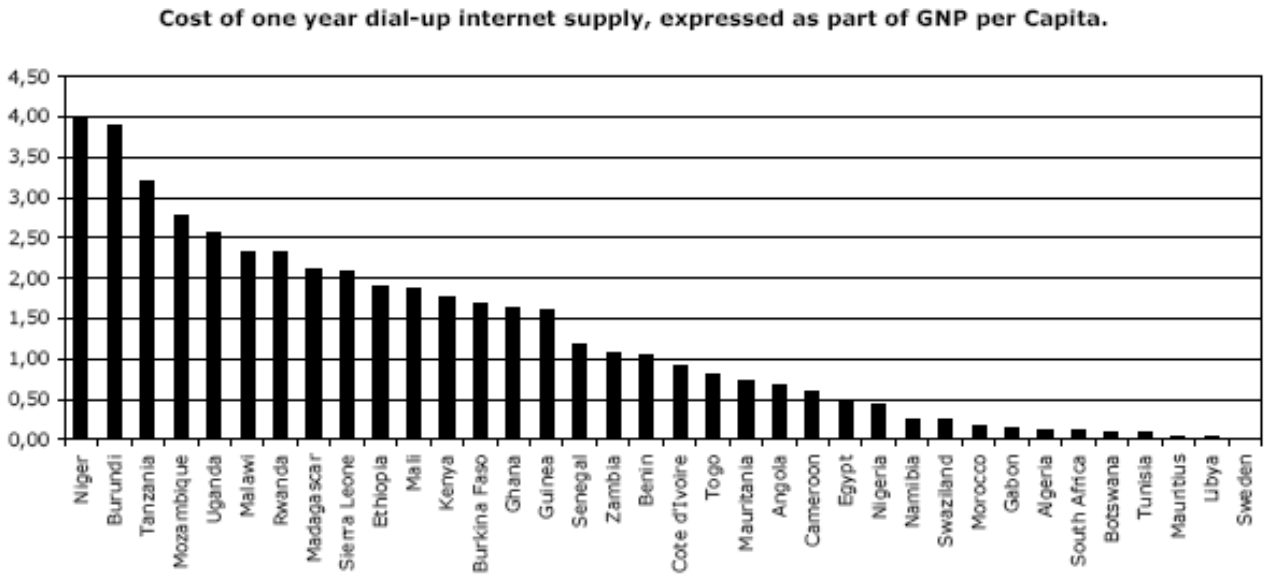


Figure 5.11: Cost of one-year dial-up internet connection – selected African countries

As discussed in chapter 4, the author is of the opinion that the affordability of information is of particular importance to the central problem statement of this thesis. If connection to the internet is not affordable for the citizen, as in the case of Niger, then the sharing and exchange of information will not take place and citizens will not share their data, information, knowledge, and experiences with the rest of the world. However, if the internet connection is more affordable, as in the case of Norway and the USA, then this would stimulate the citizens to share and exchange data, information, and knowledge from their local knowledge system with possible usable content from the global knowledge system. Furthermore, the author is of the opinion that the pricing for a higher speed connection is also crucially important. It would be very difficult to share and exchange data, information, and knowledge over an extremely slow internet connection, which will be a deterrent for citizens to share and exchange their knowledge if a higher speed connection is unaffordable to them. As was shown in the figure above, citizens of Niger cannot afford even normal internet access. Broadband connections are still not available in Niger, as was discussed under the spatial and technological criteria. The affordability of information, as well as the affordability of an internet connection, is another big barrier to the sharing and exchange of data, information, and knowledge in developing countries. This economic barrier will be addressed later in this chapter.

As discussed in chapter 4, usable content should be timely and available to the citizens of the country. This second sub-indicator also refers to the spatial and technological criteria of the information and knowledge society as already discussed. Through the use of modern ICT, electronic content can be made available at any time and in any space. Thus, physical location is no longer a barrier to access electronic information (Goddard, 1991). As previously mentioned, due to factors such as the high rate of illiteracy, the expense of information as well as the deficient ICT infrastructure in Niger, the citizens of this country cannot access information that is available in the global knowledge system, even if the information was timely. This problem is further complicated by the nature of the information. For the very few who have access to ICT and who can afford to access the internet, they are confronted

by information they do not understand and cannot contextualize. This is due to problems such as language, which will be discussed later in this section, but also because the information is foreign to them. The information in the global knowledge system is pre-dominantly information from developed countries that can afford the technological infrastructure. Local information from developing countries is rarely made available. According to Britz *et al* (2006), mostly non-African content is made available in Africa. This problem, together with the lack of e-content in developing countries will be discussed later in this chapter.

Another way to investigate the availability of electronic information is to look at the amount of internet hosts within a country. These internet hosts publicly make information available to anyone who has access to an Internet connection. Unfortunately, as was discussed under the spatial and technological criteria, in Niger, this would only mean 28,000 internet users of the whole population of 14,000,000. According to the CIA World Factbook (2007i), Niger had 189 Internet Hosts in the country in 2006, ranking Niger 181st of 230 countries with data. Considering Niger's population, this equates to 1.35 internet hosts per 1,000 inhabitants. Thus, it can be inferred from this discussion that information in Niger is not timely or available to the citizens of the country. It is the author's opinion that the amount of internet hosts in the country will also have a direct impact upon the sharing and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. As there are very few internet hosts in Niger, the citizens of Niger have no choice but to access global information that might not be locally relevant and may not be in a language they can understand. If there were more local internet hosts, as in Norway and the USA, then the citizens would be able to access content that is locally relevant and, through this process, share locally created data, information, knowledge and experiences with the global knowledge system.

With regard to the third sub-indicator of the usable content indicator, information must be readily accessible and be distributed through many channels such as the mass media. As discussed in chapter 4, information

distribution can be achieved through the use of media such as television, radio, newspapers and the internet, which enables the dissemination of information along the information superhighways (Webster, 1999). When referring to the internet as a distribution medium, this indicator also relates to the timeliness and availability of information discussed in the previous sub-indicator. The more Internet hosts there are in a country, the more information can be distributed and readily assimilated. In the case of Niger, there are very few internet hosts available within the country and, thus, very little local information can be distributed via the internet. In terms of the more traditional distribution channels, information can be distributed through the use of non-printed distribution channels (television and radio) as well as printed channels such as newspapers and similar material. In Niger, the most prevalent type of mass media to be found is a non-printed distribution channel, namely the radio. According to NationMaster (2007d), there were an estimated 680,000 radios in Niger in 2003. This places Niger 126th of 221 countries with data, in terms of the number of radios within the country. Pertaining to television, the statistics look slightly worse. In 2003, there was an estimated 125,000 televisions in the country, equating to 10.271 televisions per 1,000 people. The author is of the opinion that the lack of televisions is mainly due to the electricity issues within Niger. In 2003, the electricity consumption, *per capita*, only amounted to 40 Kilowatts an hour (UNDP, 2006). Thus, due to the limited electricity, mass media distribution channels that require electricity, such as television, are very limited within Niger. As a distribution channel, print mass media, such as newspapers, are very low in Niger due to the low literacy rate. According to the UNESCO (2007b) Institute of Statistics, the average circulation of daily newspapers, per 1,000 inhabitants was only 0.19, reflecting this low literacy and education level of the citizens of Niger.

With regard to the last sub-indicator of the usable content indicator, Niger has eight official languages. These are: French, Arabic, Fulfulde, Gourmanchéma, Hausa, Manga Kanuri, Tamajaq, and Zarma. These are the eight official languages of the 21 living languages listed as being spoken in Niger. When comparing the official languages with each other, it is interesting to note that only 6,000 people speak French, compared to the 5 million who speak Hausa

and the 2,100,000 who speak Zarma. This spread of language is very problematic when comparing Niger's statistics to the languages predominantly used on the internet. As discussed in chapter 4, English is still the predominant language of the Internet, as can be seen in the following table:

Table 5.28: Top ten languages of the internet

Top Ten Languages Used in the Web
(Number of Internet Users by Language)

TOP TEN LANGUAGES IN THE INTERNET	% of all Internet Users	Internet Users by Language	Internet Penetration by Language	Language Growth in Internet (2000 - 2007)	2007 Estimated World Population for the Language
English	31.2 %	365,893,996	17.9 %	157.7 %	2,042,963,129
Chinese	15.7 %	184,001,513	13.6 %	469.6 %	1,351,737,925
Spanish	8.7 %	101,539,204	22.9 %	311.4 %	442,525,601
Japanese	7.4 %	86,300,000	67.1 %	83.3 %	128,646,345
French	5.0 %	59,207,849	15.3 %	385.4 %	387,820,873
German	5.0 %	58,981,592	61.1 %	112.9 %	96,488,326
Portuguese	4.0 %	47,326,760	20.2 %	524.7 %	234,099,347
Korean	2.9 %	34,120,000	45.6 %	79.2 %	74,811,368
Italian	2.7 %	31,481,928	52.9 %	138.5 %	59,546,696
Arabic	2.5 %	28,782,300	8.5 %	940.5 %	340,548,157
TOP TEN LANGUAGES	85.0 %	997,635,142	19.3 %	203.7 %	5,159,187,766
Rest of World Languages	15.0 %	175,474,783	12.4 %	440.3 %	1,415,478,651
WORLD TOTAL	100.0 %	1,173,109,925	17.8 %	225.0 %	6,574,666,417

Thus, from this table, it can be deduced that only the 6,000 French-speaking inhabitants within Niger will not experience language issues when accessing the internet, as French is the fifth largest language of the internet, representing 5% of the world's Internet users. It is the author's opinion that this uneven language distribution on the internet will also play a big role in the exchange and sharing of data, information, and knowledge between the local knowledge system and the global knowledge system. Since English is not one of the eight official languages of Niger, this uneven language distribution will intimidate the citizens of Niger and the exchange process will not take place. This would be the case even if a full ICT infrastructure was in place, and the levels of literacy and education were not barriers. This language imbalance will stop the flow of data, information, and knowledge from the local knowledge system to the global knowledge system.

Thus from the above discussion, the author can conclude that there are numerous indicators that play a role in the fulfilling of the social criterion of the information and knowledge society. It is, thus, evident from the lengthy discussion on the social criterion for the information and knowledge society, that citizens of Niger do not have a very good quality of life, which is reflected in the high mortality rate, low life expectancy, low education level and a literacy rate of only 28.7%. This extremely low level of education, combined with the deficient ICT infrastructure, makes it impossible for the public in Niger to harness the power of ICT in the public sector, even if public service initiatives such as e-government, e-voting, e-health, and e-learning existed. Unfortunately, although the government of Niger has shown keen interest in implementing these initiatives, as shown in the discussion, there are currently no such public service initiatives on a national level in Niger. In terms of the affordability of information, it is clear that the majority of citizens in Niger, living below the international poverty level, cannot afford access to electronic information.

Pertaining to the language problem, as discussed above, even if the technological, education and financial barriers did not exist to hinder the access to information, due to uneven distribution of language on the internet, the citizens of Niger would not be able to understand or contextualise the information in the global knowledge system. Thus, it can be inferred that due to the innumerable problems that still persist regarding ICT, literacy, health, education, affordability, and language, Niger does not comply with any of the indicators of the social criterion of the information and knowledge society.
This deduction is based upon the comprehensive discussion concerning various social issues within Niger and can be summarised as follows:

- Poor health prospects expressed in high mortality rates, low life expectancy, a low amount of practising physicians and low expenditure on health;
- Poor education opportunities expressed in low literacy rates and a low amount of years of compulsory education;

- Poorly developed modern public services, expressed in the non-existence of e-government, e-voting, e-health and e-learning initiatives;
- Content that is unaffordable, not timely available or readily accessible and in a language most users cannot understand.

In the following paragraphs, the author will investigate whether South Africa complies with the same criterion.

South Africa

In South Africa, health is also a very serious issue due to the high prevalence of HIV/Aids. In the following section, the South African mortality rate, life expectancy at birth, number of practising physicians, and the government expenditure on health-related issues will be discussed. These figures will provide the reader with a very good oversight of the information, allowing a decision to be made as to whether or not a South African citizen can look forward to any good health prospects.

a) Health prospects

With regard to the infant mortality rate, the South African statistics are a significant improvement on the Nigerien statistics. According to Statistics South Africa (2007), the infant mortality rate is estimated to be 45.2 per 1,000 births. This is, approximately, one third of the infant mortality rate in Niger, which is recorded at 152 per 1,000 births. However, when compared to developed countries such as Norway and the USA, where only 3.2 and 6.8 deaths occur per 1,000 births, respectively, this figure is still extremely high. To place the South African mortality rate into a wider perspective, South Africa is ranked 55th out of 179 countries with data (NationMaster, 2007h). Thus, only 54 of the listed countries have a higher infant mortality rate than South Africa, compared to 124 countries whose infant mortality rate is less than that of South Africa. However, in the following figure, showing the UN's World Mortality Report (United Nations, 2005), it can be clearly seen that the infant

mortality rate in South Africa has been declining for the last six decades and that this decline is expected to continue.

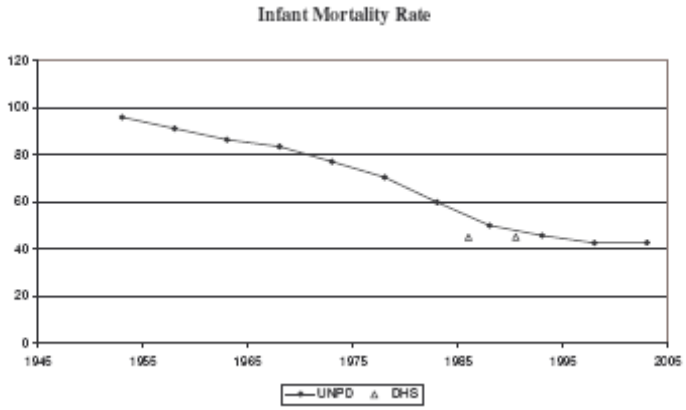


Figure 5.12: Declining infant mortality rate in South Africa

This declining infant mortality rate in South Africa is expected to continue as can be seen in the following table of the UN World Population Prospects (United Nations, 2006):

Table 5.29: Projected South African infant mortality rate

	Infant mortality rate (infant deaths per 1,000 live births)					
Country or area	*2000-2005*	*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2045-2050*
South Africa.....	51.9	44.8	39.5	34.9	31.5	19.4

With regard to the average life expectancy in South Africa, these statistics are only slightly better than those of Niger are. According to Statistics South Africa (2007), the average total life expectancy of males and females combined is 50 years. For South African males, life expectancy is estimated at 48.4 years, while their female counterparts live slightly longer: to 51.6 years. In the following two figures, a breakdown can be seen for provincial life expectancy for males and females respectively:

Figure 2: Provincial average life expectancy at birth, 2001–2006 and 2006-11 (males)

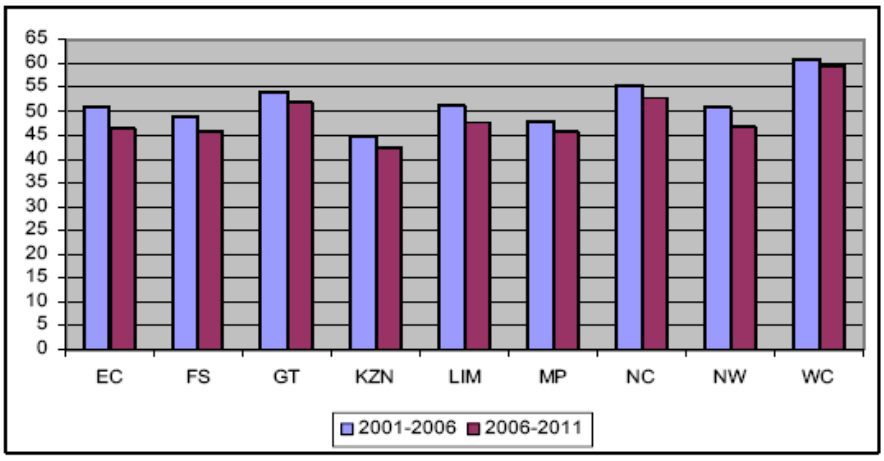


Figure 5.13: Provincial average life expectancy for males

Figure 3: Provincial average life expectancy at birth, 2001–2006 and 2006-11 (females)

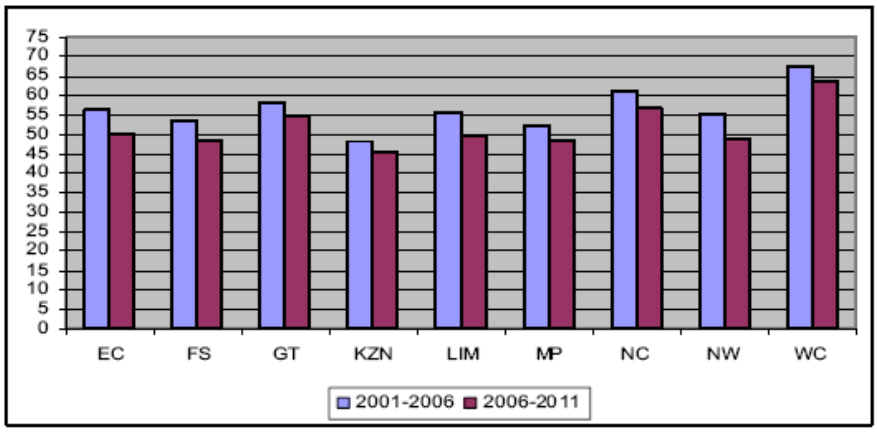


Figure 5.14: Provincial average life expectancy for females

According to the UN World Population Prospects (United Nations, 2006), the South African life expectancy is projected to increase in the decades to come. As can be seen in the table below, the projected average life expectancy by 2045 should be approximately 62.6 years:

Table 5.30: Projected South African average life expectancy

	Life expectancy at birth (years)					
Country or area	*2000-2005*	*2005-2010*	*2010-2015*	*2015-2020*	*2020-2025*	*2045-2050*
South Africa.....	53.4	49.3	50.0	52.2	54.2	62.6

Pertaining to the second sub-indicator, namely the number of practising physicians, South Africa is in a much better situation than Niger. According to the Human Development Report (UNDP, 2006), there are 77 practising physicians per 100,000 inhabitants. This must be compared with the measly three physicians per 100,000 inhabitants in Niger. As discussed in chapter 4, the author is of the opinion that the larger number of practising physicians in South Africa is due to the improved health conditions within the country that create a favourable working environment for practising medical staff. This results in more practicing physicians who, in turn, can tend to more patients, resulting in lower mortality rates within South Africa. This number of physicians is also a contributing factor to the lower infant mortality at birth within South Africa. According to the World Health Organisation (2006b), at 92.5% of the births a skilled medical practitioner was present. However, although this number of physicians is much higher than that of Niger, the average amount of practicing physicians in the OECD countries is three per 1,000 people. Thus, South Africa's 77 physicians per 100,000 inhabitants would equate to 0.77 practising physicians per 1,000 inhabitants and, thus, does not compare favourably at all.

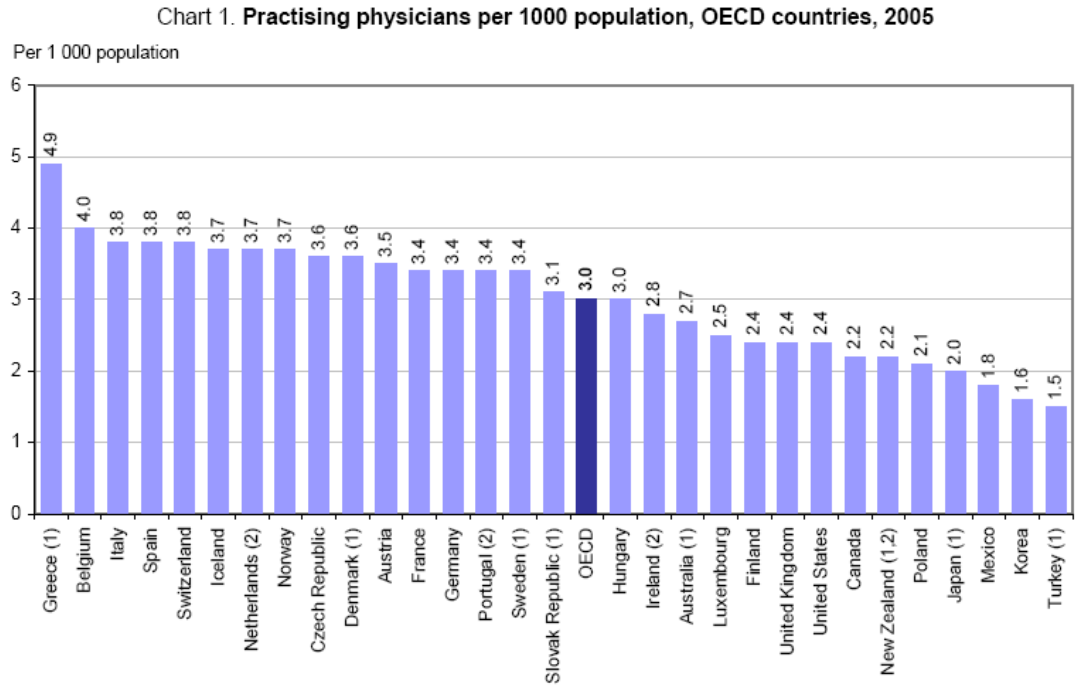


Figure 5.15: practicing physicians per 1,000 inhabitants, OECD, 2005

In terms of health expenditure as a percentage of the total GDP of the country, South Africa spends much more on health than Niger. The author is of the opinion that this is a contributing factor to the overall health situation within the country. If a health system in a particular country is well financed, the health care of that country will be good and there will be more practising physicians, as can be seen in the number of practising physicians within South Africa. Current and capital spending from the South African government (central and local) budgets, in 2004, accounted for 8.6% of the South African GDP. This compares very favourably with the average total expenditure on health in the OECD countries, as discussed in chapter 4. In 2005, the average expenditure was estimated at 9% of their total GDP.

Thus, it can be deduced from the above discussion and statistics that citizens in South Africa do not have a very good quality of life. This is reflected in the high mortality rate and low life expectancy. Furthermore, the number of practising physicians within South Africa is extremely poor when compared to other countries, which contributes to this high mortality and low life expectancy rate. The only sub-indicator in which South Africa compares favourably is the percentage expenditure of the total GDP on health. Thus, it is the author's opinion that although South Africa compares favourably in the last sub-indicator, this is still not enough for South Africa to fully comply with the first indicator of the social criterion of the information and knowledge society. As discussed in chapter 4, this indicator is very important as seen from the perspective of this thesis. Citizens who do not have a good quality of life, owing to high mortality rates and low life expectancy, will be less inclined to take part within the interaction and exchange process than citizens who have a good quality of life. Issues such as health and mortality are much more important to citizens than issues pertaining to usable content. Only when these issues are not a factor and the citizens have a good quality of life, then the issues regarding usable content become important to the user. In the following section, the author will address the education opportunities within South Africa in terms of the literacy rate of the population and the number of years of compulsory education in the country.

b) Education opportunities

Within South Africa, the right to a basic education is protected in the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996). According to this act, everyone has the right to a basic education, including adult basic education and further education. Furthermore, within reasonable measures, it is the responsibility of the State, to make this education available and accessible.

With regard to adult literacy rates, the situation in South Africa is wonderful compared to Niger. According to the Human Development Report (UNDP, 2006), the total adult literacy rate in 2004 was approximately 82.4%. As in Niger, the literacy rate for males is higher than for females. In 2004, the estimated literacy rate for males was 84.1%, which is only approximately 3% more than their female counterpart at 80.9%. A very encouraging sign is that the youth literacy rate is nearly 10% higher at 93.9% for 2004, indicating that the adult literacy rate will greatly improve within the next decade. The author is of the opinion that a contributing factor to the high youth literacy rates can be found in the number of years of compulsory education. According to UNESCO (2006), South Africans have 9 years of compulsory education, which is 3 years longer than in Niger. However. when compared to other countries this amount is still very low. As can be seen in the following table, the top 15 ranking countries in terms of the amount of compulsory education all have 12 or 13 years of compulsory education, which is 4 years longer than in South Africa.

Table 5.31: Top 15 ranking countries with regard to highest compulsory education

#1	Netherlands:	13 years
#2	Belgium:	13 years
#3	Germany:	13 years
#4	Dominica:	13 years

#5	Saint Kitts and Nevis:	13 years
#6	Saint Lucia:	13 years
#7	Barbados:	12 years
#8	Brunei:	12 years
#9	United Kingdom:	12 years
#10	Antigua and Barbuda:	12 years
#11	New Zealand:	12 years
#12	United States:	12 years
#13	Grenada:	12 years
#14	Bahamas, The:	12 years
#15	Bermuda:	12 years

In addition, the South African government is dedicated to the improvement of the education level for all South Africans. This can be seen in the percentage of the overall GDP of the country that is spent on education. In 2007, the expenditure of government on education was almost 5.5% of the gross domestic product, which compares very favourably with other developed countries. As mentioned in chapter 4, in the OECD countries, the average expenditure on education is 6.1% of the GDP. South Africa has one of the highest rates of government investment in education in the developing world.

As discussed in chapter 4, within an information and knowledge society, effective education and training systems are vital to ensure economic competitiveness and social inclusion. It is the author's opinion that from the statistics above the author can deduce that citizens of South Africa have access to good education opportunities, provided by the South African government. This government is dedicated to providing a good learning environment for all South Africans. Thus, from this discussion, it can be inferred that South Africa complies with the good education opportunities required within an information and knowledge society. One of the key elements to the maintenance of these good opportunities is the use of modern ICT, resulting in changes to the current educational system. Through the establishment of e-learning initiatives, the South African government hopes to harness the power of ICT in the educational sector. These initiatives, as well as other electronic public services, will be discussed in the following section.

c) Public services

When discussing the first of the modern online public services, namely an e-government program, in South Africa the wait for such an active e-government portal has been a long one. According to Guedes (2003), phase one of the e-government rollout was initially scheduled to be launched in December 2002 after years in development. This phase included the consolidation of information and existing government services along with the establishment of a call centre and portal to allow South Africans to access this information. Due to numerous delays, this phase was only launched in 2004.

This gateway provided a single entry point to government services and information, organised according to user needs rather than government structures. Within the new e-government gateway (www.gov.za), visitors can take one of two main paths. The first path is to the information portal, (www.info.gov.za) where comprehensive, updated information on government contacts, departments, events and projects, as well the latest government speeches, statements, notices, tenders and consultative documents can be accessed. From this portal, links to national, provincial, and local governments are easily accessible. Furthermore, this portal contains general information pertaining to the country as well as frequently asked questions on issues ranging from business to travel and tourism.

The second path available to visitors is the services portal (www.services.gov.za). Here information is broken down into services that are available for individuals, organisations, and for foreign citizens. It is hoped that services such as pension payouts, payment of taxes, housing subsidies and birth and death registrations, will be the first to be "e-enabled", and will be able to be accessed by the public in 2006/2007. During this intermediate phase of the e-government program, more services will become available to the user over the internet. To provide similar services to the larger part of the South African population who do not have an internet connection, future plans of the South African government include distributing government information via mobile services (South Africa Info Reporter, 2004).

The South African government was rewarded for its efforts in the rollout of the first phase of the e-government portal by obtaining a ranking of 136th out of 198 nations in the Global e-government report of 2007. The report scores each government against a 100 point e-government index that reviews each nation's websites based on the availability of publications, databases, and number of online services. Out of the 100 available points, the South African government portal received 27.7 points. In the following table the breakdown of these points can be seen:

Table 5.32: South Africa points for selected features in Global e-government report 2007

Online Services	*Publications*	*Data bases*	*Privacy Policy*	*Security Policy*	*W3C Disability Accessibility*
24	100	90	21	14	7

From this table it can be seen that the South African government portal can still be improved considerably by providing more online services as well as improving policies covering areas such as privacy and security. Furthermore, attention will have to be given to providing access to citizens with disabilities, in the subsequent stages of the South African e-government strategy. In the future, services such as e-voting could be included as, currently, there are no e-voting initiatives in South Africa. In an explorative study on the planning and design of a future e-voting system for South Africa, results from field work conducted by Masuku (2006) showed that the majority of South African citizens would prefer telephone voting as it is more convenient and accessible than, for instance, internet voting. Through a telephone voting system, they could call their local municipalities to enquire about the status of their electoral registration, and even cast their vote by sending a text message (sms). According to Masuku (2006), an e-voting system in South Africa would make it much more convenient and accessible for many more people than the traditional voting system currently is. Furthermore, this will have a significant

impact on the traditional voting system. Voting practices would be more robust and effective, as well as being more efficient in reducing human error and long queues, whilst accommodating voters who are absent at voting stations. In addition, implementing e-voting in South Africa will reduce the costs of vote counting and would appeal to younger voters, who in the past have abstained from voting, which will, subsequently, boost voter turnout in SA. However, Masuku (2006) points out that there are several disadvantages to implementing such a voting system, such as the threat of hackers, concerns about secrecy and privacy, viruses, and power supply disruptions, all of which would need attention before e-voting could be implemented successfully within South Africa. As mentioned previously, e-voting is one of the initiatives that is derived from e-government services. These services are an excellent platform for the interaction and exchange of local data, information, and knowledge. Through the utilisation of these services, local people can access government information, often in their own local language. These services can also be used by citizens to ask questions and request information from the government. This enables greater participation within the local governing processes.

The author is of the opinion that initiatives, such as South Africa's e-government portal, are of the utmost importance to the interaction and exchange of data, information, and knowledge between the South African local knowledge system and the global knowledge system. As previously discussed in chapter 4, the internet as a platform for these e-government and e-voting initiatives, provides the perfect stage for the exchange of data, information, and knowledge. Through the use of these initiatives, South African communities can now access local and global political information, which relates to the first indicator of the political criterion: high levels of democracy achieved through the right to information. These citizens can also partake in discussion forums and web-blogs where important local and global political issues can be discussed, thus enabling information transfer from the global knowledge system. Furthermore, citizens can access their right to vote through e-voting initiatives, which previously might have been difficult to do, due to geographical and spatial limitations. E-voting will also have an impact

upon the increased participation indicator of the political criterion. Through the utilisation of e-voting initiatives, the voter turnout can be increased and more people can take part in the political processes in the country. In addition, it can be seen, that this indicator is also closely related and dependant upon the spatial and technological criteria discussed in the previous section. Without the necessary and adequate technological infrastructure, citizens would not be able to interact and exchange data, information, and knowledge and, thus, would not be able to increase their participation in the country's political processes through the use of e-government and e-voting initiatives. Thus, there is an indirect relation between the existing ICT infrastructure (that enables the interaction and exchange process) within the country and the citizens' ability to increase their participation within the political processes of the country through the utilisation of public services such as e-government services.

From this discussion, it is clear that although there are still serious problems with the implementation of e-voting initiatives in South Africa (i.e. deficient ICT infrastructure), the government is trying to ensure that more people can take part in the political processes of the country by improving their e-government portal. In this way, technology can be successfully used to provide the citizens of South Africa with more reliable methods of obtaining access to the necessary government information. Through harnessing the potential power of ICT within the government and voting sector, the South African government is trying to ensure their social inclusion within the information and knowledge society and, thus, comply with this first modern online public service.

With regard to the second modern online public service, namely e-health initiatives, South Africa is in a much better situation than that of Niger. According to Brewin (2005), e-health initiatives were launched in 2005, when the Department of Health investigated the development of an electronic system of health records for the country's 45 million citizens. This was followed by the first IST-Africa e-health Workshop, held in conjunction with the Eastern Cape Department of Health at the Resource Centre, East London, South Africa from 21 - 23 September 2005. The purpose of this workshop,

organised by the Meraka Institute of the CSIR, was to create greater awareness of e-health issues, applications, and case studies amongst district health workers and to give practical training in the use of Information Communication Technology (ICT) (IST Africa, 2005). According to the workshop report, the e-health workshop was successful in creating awareness amongst health workers as to the possible uses of ICT in health. It is important to note that there was strong political buy-in from the Eastern Cape MECs and the national Department of Health to ensure ongoing sustainability of the e-health programme.

Another international e-health initiative was held in 2006, when the 11th conference of the International Society for Telemedicine and e-health (ISfTeH) was held at the International Convention Centre in Cape Town. There, delegates from around the globe gathered to discuss the benefits and challenges that e-health (electronic health) offers to both the developed and the developing world. It was the first time that the annual ISfTeH gathering has been held in Africa and, in the words of the society's president, Michael Nerlich, "The event should allow for increasing recognition of telemedicine and e-health in developing countries, particularly those in Africa," (Bolognesi, 2006).

In addition to these conferences and workshops on the theory of e-health initiatives, on an implementation level, progress is also being made. According to Engelbrecht (2007), a tender for the South African Department of Health's national electronic health record system is on track, and will be announced in due course. This tender has taken 10 years to come to fruition, due to the large amount of technical work and preparation that had to be completed. The National Health Information System (NHIS) is intended to provide the country with an overall patient information system, linking the private and public sector at local, district, provincial, and national level.

However, without an adequate technological infrastructure, this linking of the private and public sector will not take place. Without a technological infrastructure that enables a fast internet connection, South African citizens

will not be able to benefit from e-health initiatives that could provide them with relevant electronic health information. Furthermore, this correlation is of the utmost importance seen from the perspective of this thesis. Without the necessary technological infrastructure, South African citizens would not be able to share and exchange data, information, knowledge, and experiences pertaining to health information from their local knowledge system with the global knowledge system. Through the use of broadband services, South African citizens would be able to upload their local medical knowledge and experiences more easily onto the global knowledge system, where other people struggling with similar problems might benefit from it. However, as discussed under the spatial and technological criteria of the information and knowledge society, only 650,000 people out of the total South African population of 47 million, have access to broadband services. Therefore, it is the author's opinion that although there is progress in terms of implementing e-health initiatives within South Africa, much more attention will have to be given to the establishment of an adequate ICT infrastructure capable of supporting such initiatives within South Africa, before the majority of citizens will be able to benefit from them. However, based upon the available e-health initiatives currently available within South Africa, the country is starting to ensure their social inclusion within the information and knowledge society. This complies with this second online public service.

The author is of the opinion that e-health initiatives like these can be utilised to stimulate the transfer of data, information, and knowledge between the South African local knowledge system and the global knowledge system. Through the utilisation of internet technologies, South African patients could post items, such as symptoms of their ailments, on a forum or blog, which in turn, can be accessed by people in the global knowledge system. Through this interaction, possible diagnosis can be made that can be confirmed by visiting a clinic or general practitioner. When diagnosed and treatment for the ailment is suggested, the patient can find further information on the global knowledge system that will empower him or her to select the best treatment option for the condition. Furthermore, local information from the South African local knowledge system can also be obtained and transferred to the global

knowledge system, including traditional South African remedies. In this way, South African indigenous health knowledge can be preserved for the generations to come. By using this type of technology, the patient can also exchange information concerning his or her ailment and treatment on the global knowledge system that in future can be accessed by other patients experiencing the same symptoms. In this way, electronic information exchange can truly empower South Africans and be used successfully for social inclusion within the information and knowledge society.

In terms of modern online public services in education, South Africa has demonstrated an ability to produce, use and expand e-learning programs for distribution via the internet. It has also shown that such educational materials can be distributed via channels such as mobile phones and television. Ranked 40th of the world's 60 largest economies in terms of e-learning readiness (IBM, 2003), the following are some examples of e-learning initiatives within the country.

Thuthong education portal

This internet-based, non-profit e-learning initiative of the South African Department of Education, is aimed at both teachers and learners in South Africa. For teachers, the Thuthong Education portal offers resources on teacher development, curriculum, legislation, educational policy, administration, and links to external Web resources. Furthermore, this portal provides students access to a wide range of curriculum and support material, which are provided at no cost (Thuthong, 2007).

Mindset network

Utilising a different distribution media, namely satellite television, this R225-million multimedia e-learning initiative, was presented as an 85th birthday "gift" to Nelson Mandela. Mindset is aimed at uplifting all South Africans through better education by delivering 'free' educational material via satellite broadcasts, with supporting multimedia material in print and on the internet.

The first channel of the Mindset network, which broadcasts on channel 82 of DStv, and targets Grade 10, 11 and 12 learners and their educators and focuses on Maths, Science and English (Mindset Network, 2007). Although this initiative is aiming to reach as many people as quickly as possible, the author is of the opinion that it does not live up to this promise. In South Africa, access to satellite television is very limited and only the wealthy can afford to pay the subscription fee of approximately R415 per month. For the 57% of the population living in poverty, this is unaffordable and so, this e-learning initiative cannot uplift all South Africans through better education.

The learning channel

As the in example above, the learning channel also uses television as its primary distribution channel, although this e-learning initiative is broadcast on public television, and is, thus, much more affordable and accessible to the citizens of South Africa. This e-learning initiative was developed through a close collaboration of the South Africa Broadcasting Corporation with the South African Department of Education. In addition to the television broadcasts, the learning channel offers free downloadable workbooks for Grade 12 subjects. Furthermore, the learning channel is supported by private sector companies, such as Liberty Life, and Standard Bank (Learning channel, 2007.).

M-Web learning

M-Web is one of South Africa's leading internet service providers and, since its founding in 1997, has been unlocking the full potential of the internet for its subscribers by delivering access to a variety of online content. M-Web Learning offers excellent resources for scholars of all ages in the form of textbooks, past exam papers, and help for school projects (Mweb, 2007). As in the case of the Mindset channel, this e-learning initiative requires subscription, which is very expensive for the majority of South Africans. The affordability of online access will be discussed in greater detail under the

usable content indicator of the social criterion of the information and knowledge society.

In addition to initiatives like these, the South African government has set out an ambitious and necessary e-education policy goal, namely that every South African learner be ICT capable by 2013. The South African government's response to the new information and communications technology environment in education was demonstrated by the writing of the White Paper on e-Education. This White Paper outlines the right conditions for ICT in education to flourish in the coming decades. It ensures that every school has access to a wide choice of diverse, high quality communication services. It also seeks to ensure that all learners and local communities benefit from this investment. The services provided by this initiative will enhance lifelong learning and provide unlimited opportunities for personal growth and development to all. The White Paper represents a new framework for the collaboration of Government and the private sector in the provision of ICT in education. It became legislation in 2004 (PNC on ISAD, 2007).

Although these initiatives, policies and White Paper indicate a strong commitment to enhancing the education situation in South Africa with the use of new modern ICT, the supporting infrastructure is still inadequate in South Africa. South African citizens will only be able to truly benefit from lifelong education through the use of e-learning, when an extensive ICT infrastructure can be established within the country. This extensive ICT infrastructure, as well as network infrastructure, is required for the development of an information and knowledge society.

It is the author's opinion that initiatives like those discussed above, are central to the sharing and exchange of data, information, and knowledge between the South African local knowledge system and the global knowledge system. Through the use of such online education material, the section of the South African population that has access to the technology can truly benefit from the advantages ICT can offer in the educational sector. By interacting and exchanging their local data, information, knowledge, and educational

experiences with information from the global knowledge system, the local indigenous knowledge can be preserved for the generations to come. By the establishment of a two-way transfer of data, information, and knowledge, global knowledge can be included within the local educational curricula. This would then ensure that South African scholars stay locally relevant but can also be competitive in a global workforce. One question that will need to be taken into account, however, is whether South African citizens have the necessary skills to access this existing content. These skills include computer and information literacy, and will be discussed in greater detail under the knowledge criterion of the information and knowledge society, later in this chapter.

Thus, it is evident from this discussion that South Africa fully complies with the third indicator of the social criterion by having many e-government, e-health and e-education initiatives. In the following section, the author will investigate whether the content in these e-learning programs, and other electronic content on the World Wide Web, is truly usable to the South African public, in terms of affordability, accessibility, timeliness, and language.

d) Usable and affordable content

A further aspect of the social criterion discussed by Britz *et al* (2006) is content that is usable and affordable. As discussed in chapter 4, affordability of information is also closely related to the economic criterion of the information and knowledge society. This criterion has already been discussed (see 4.5.1) and, amongst other indicators, refers to the unemployment rate of the country, the income inequality, the poverty rate, and the real (i.e. inflation adjusted) income per person. If there is a high unemployment rate in a specific country, which leads to a high poverty rate and low income per person, then citizens of that country will be less inclined to pay for information and an internet connection to obtain it. However, if the unemployment rate is low, as in most developed countries (see Table 1, 4.5), leading to a low poverty rate and high real income per person, citizens will be more inclined to pay for the information and, thus, the information will be more affordable for

them. With regard to the first sub-indicator, affordability of information, the situation is, once again, much improved in South Africa compared to Niger. According to Hesselmark (2003), 12 months of dialup internet (10 hours connectivity) will cost approximately $402, compared to the $666 in Niger. However, the biggest difference is between the average incomes that are needed to pay for this access. Due to the improved economic situation in South Africa and the fact that just over 50% of the population live beneath the poverty line, it would only take 0.11 South African incomes to cover this access.

Furthermore, the affordability of an internet connection also depends upon the type of internet connection. As can be seen in the following table, a dial up connection to the internet in South Africa is by far still the cheapest connection.

Table 5.33: Telkom call charges

	Monthly subscription	Min Charge	Cost per minute	10 min	20 min	30 min
Peak time	R79.00[1]	R0.59	R0.38	R3.80	R7.61	R11.41
CallMore	R79.00[1]	R0.59	R0.16	R1.60	R3.20	R4.81

As can be seen in the above table, the cheapest Telkom dialup charges are approximately R0.16 per minute. The big drawback of this type of connection however, is the speed of the connection. It is the author's opinion that such a slow internet connection will not be effective for the interaction and exchange of data, information, and knowledge between the South African local knowledge system and the global knowledge system. It would be very difficult to share and exchange data, information, and knowledge over such an extremely slow internet connection and this will become a deterrent for citizens to share and exchange their knowledge if a higher speed connection is not available or unaffordable to them. In the same way the sharing and exchange of data, information, and knowledge can be stimulated if a higher speed connection is more affordable to the citizen of the particular country. In

the following table, the South African prices can be seen for a wireless broadband connection.

Table 5.34: Pricing for South African wireless broadband internet connection

Vodacom GPRS Data bundles

Bundle	Bundle cost	Price per MB in bundle	Price per MB out of bundle	20 MB	75 MB	150 MB	250 MB	500 MB	1024 MB	2048 MB
0 MB	R0.00	R2.00	R2.00	R40.00	R150.00	R300.00	R500.00	R1000.00	R2048.00	R4096.00
20 MB	R35.00	R1.75	R2.00	R35.00	R145.00	R295.00	R495.00	R995.00	R2043.00	R4091.00
75 MB	R110.00	R1.47	R2.00	R110.00	R110.00	R260.00	R460.00	R960.00	R2008.00	R4056.00
150 MB	R149.00	R0.99	R2.00	R149.00	R149.00	R149.00	R349.00	R849.00	R1897.00	R3945.00
250 MB	R200.00	R0.80	R2.00	R200.00	R200.00	R200.00	R200.00	R700.00	R1748.00	R3796.00
500 MB	R350.00	R0.70	R2.00	R350.00	R350.00	R350.00	R350.00	R350.00	R1398.00	R3446.00
1000 MB	R599.00	R0.60	R2.00	R599.00	R599.00	R599.00	R599.00	R599.00	R647.00	R2695.00
2000 MB	R1198.00	R0.60	R2.00	R1294.00	R1294.00	R1294.00	R1294.00	R1294.00	R1294.00	R1294.00

As can be seen in the table above, the price of the internet connection depends upon the amount of data in the bundle that you purchase. The cheapest broadband bundle is for only 20Mb a month and costs R35. However, this amount of data is so small that it really would not be adequate for any type of data, information transfer. Furthermore, as can be seen above, the price for the bundle increases as the amount of data you can download increases. Although the price per Mb within the bundle is then for affordable, very few South African citizens will be able to afford R350 to R1198 per month.

The author is of the opinion that the affordability of information is of particular importance to the central problem statement of this thesis. If connection to the internet is not affordable for the citizens of a particular country, then the sharing and exchange of information will not take place and citizens will not share their data, information, knowledge, and experiences with the rest of the world. However, if the internet connection were more affordable, then this would stimulate citizens to share and exchange data, information, and knowledge from their local knowledge system with data, information, and knowledge in the global knowledge system. 57% of South Africans live below the poverty line (similar to Niger, although there, the percentage is much higher). As a result, these people will not be able to afford to access

information in this manner. To try to rectify this lack of affordable access to the internet, the South African government has invested significant resources into the establishment of resource centres across the country, where citizens can obtain affordable access to the internet. Through these initiatives, South African citizens can thus partake in the interaction and exchange process of data, information, and knowledge. These South African Government initiatives will be discussed in greater detail under the indicator of universal access of the cultural criterion of the information and knowledge society.

Looking now at the second sub-indicator: information within the information and knowledge society should be timely and available. As mentioned previously, this sub-indicator also refers to the spatial criterion of the information and knowledge society. Through the use of modern ICT, electronic content can be made available at any time and in any space, thus physical location is no longer a barrier to access electronic information (Goddard, 1991). As in the case of Niger, in South Africa there are many factors that will deter South African citizens from accessing information that is available in the global knowledge system, even if the information was timely. These factors include the high rate of semi-literacy, the lack of affordable information, and the deficient ICT infrastructure. This problem is further complicated by the nature of the information. For the very few who have access to ICT and who can afford to access the internet, they are confronted by information they do not understand and cannot contextualise. This is due to problems, such as language, which will be discussed later in this section, but also because the information is foreign to them.

Another way to investigate the availability of electronic information is to look at the number of internet hosts that make information available to anyone that has access to an internet connection within a country. As was discussed under the spatial and technological criteria, in South Africa, there were 4,279,200 Internet users and 350,501 internet hosts in 2004 all publicly hosting information, thus, all disseminating timely, readily assimilated information to the public. From this discussion, it can be inferred that information in South Africa is more timely and available than is the case in

Niger. However, although South Africa has many more Internet hosts than Niger, compared to a country such as America, where there are 27,555,180 internet hosts, it is clear that South Africa needs to increase the number of internet hosts if they are to become an information and knowledge society in future. In the following table, the top 15 ranking countries in terms of the most internet hosts can be seen:

Table 5.35: Top 15 ranking countries in terms of internet Hosts 2005

United States	27,555,180
Germany	11,256,139
United Kingdom	6,899,006
Canada	2,315,427
Netherlands	2,035,155
China	1,895,010
Italy	1,786,147
Argentina	1,752,859
Australia	1,638,520
France	1,503,731
Japan	1,413,441
Korea, Republic of	1,214,701
Brazil	927,512
Spain	905,087
Switzerland	871,401

It is the author's opinion that the number of internet hosts in the country will also have a direct impact on the sharing and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. As there are relatively few internet hosts in South Africa, the citizens of South Africa will have no choice but to access global information that might not be locally relevant nor in a language that they can understand. If there were more local internet hosts, as in Norway and the USA, then the citizens would be able to access content that is locally relevant

and, through this process, share locally created data, information, knowledge, and experiences with the global knowledge system.

Turning to the third sub-indicator of the usable content indicator, information must be readily accessible and be distributed through many channels such as through the mass media in printed or non-printed format. According to the US State Department (2008), the print media reach only approximately 20% of the population. For the majority of the population, radio is the only mass medium available to them. In terms of non-printed information distribution, television penetration reached 135.306 per 1,000 South African inhabitants in 2003. This ranks South Africa 114th out of 209 countries with data, in terms of televisions *per capita* figures (NationMaster, 2007e). Radios in South Africa are more available to the average South African citizen and in 2003 reached a penetration level of 383.366 per 1,000 inhabitants. With regard to the radio *per capita* figures, South Africa is ranked 96th of 212 countries with data (NationMaster, 2007d).

When addressing the printed media in South Africa, South Africa has 20 daily and 13 weekly newspapers, most in English. In the following section the daily sales and readers of the daily papers will be provided:

SA'S DAILY PAPERS

- Daily Sun: average daily sales: 301,800, average daily readers: 2.29-million
- The Star: average daily sales: 171,542, average daily readers: 616,000
- Sowetan: average daily sales: 118,261, average daily readers: 1.54-million
- Die Burger: average daily sales: 109,513, average daily readers: 562,000
- Beeld: average daily sales: 105,681, average daily readers: 364,000
- The Citizen: average daily sales: 90,978, average daily readers: 466,000

- Cape Argus: average daily sales: 75,549, average daily readers: 407,000
- Isolezwe: average daily sales: 58,848, average daily readers: 391,000
- Daily News: average daily sales: 56,256, average daily readers: 308,000
- Cape Times: average daily sales: 51,285, average daily readers: 316,000
- Business Day: average daily sales: 42,322, average daily readers: 113,000
- The Mercury: average daily sales: 40,526, average daily readers: 213,000
- East London Daily Dispatch: average daily sales: 33,535, average daily readers: 226,000
- The Herald: average daily sales: 30,230, average daily readers: 193,000
- Volksblad: average daily sales: 28,707, average daily readers: 126,000
- Pretoria News: average daily sales: 28,055, average daily readers: 86,000
- The Witness: average daily sales: 23,804, average daily readers: 167,000
- Diamond Fields advertiser: average daily sales: 8,954, average daily readers: 55,000

From these circulation statistics of the various South African daily newspapers, the author can deduce that the printed media is utilised very successfully for the distribution of usable and affordable content. Furthermore, from this list of daily South African publications, it can be seen that there are local newspapers available that distribute information in the local language of the population, thus enabling the interaction and exchange of data, information, and knowledge with the local citizens, in their own local language. The author, thus, infers from these statistics, that information within South Africa can be easily distributed via non-printed mass media channels such as television and radio, and printed media such as newspapers. In the following

section, the author will address the issue of language, as this is a very important part of accessibility especially to electronic information.

Pertaining to the last sub-indicator of the usable content indicator, language in South Africa is also a major issue. According to Gordon (2005), the number of languages listed for South Africa is 31. Of those, 24 are living languages, three are second language without mother-tongue speakers, and the remaining four are extinct. The country's Constitution guarantees equal status to 11 official languages to cater for the country's diverse peoples and their cultures. These are: Afrikaans, English, isiNdebele, isiXhosa, isiZulu, Sepedi, Sesotho, Setswana, siSwati, Tshivenda, and Xitsonga. Other languages spoken (or used) in South Africa and mentioned in the Constitution are the Khoi, Nama and San languages, sign language, Arabic, German, Greek, Gujarati, Hebrew, Hindi, Portuguese, Sanskrit, Tamil, Telegu and Urdu. There are also a few indigenous creoles and pidgins (Gordon, 2005). According to the 2001 census, isiZulu is the mother tongue of 23.8% of South Africa's population, followed by isiXhosa at 17.6%, Afrikaans at 13.3%, Sepedi at 9.4%, and English and Setswana each at 8.2%. The language distribution in SA can be seen in the following diagram:

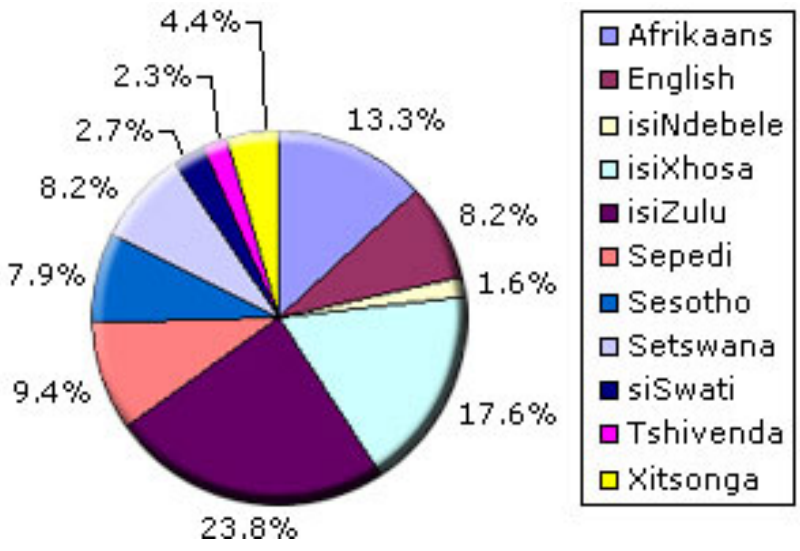


Figure 5.16: South African language distribution

From the statistics in Figure 5.16, it can be inferred that since only 8.2% of the South African population has English as a mother tongue, then access to the internet, where 56% of the content is in English, could be problematic. From the point of view of an information and knowledge society, there would be little access to information in a language that could be understood and that could be readily assimilated. The importance of the creation of local content being made available on the internet will be discussed under the knowledge criterion of the information and knowledge society. To help rectify the unequal distribution concerning languages, multilingualism is strongly supported by the South African government. According to the Council for Higher Education (2001) multilingualism is one of the six basic values that have to be promoted through the educational system. Among other important propositions, they state that, “There are two main values we wish to promote in the area of language, which are, firstly, the importance of studying through the language one knows best, or as it is popularly referred to, *mother-tongue* education, and secondly, the fostering of multilingualism. We do believe that an initial grounding in mother-tongue learning is a pedagogically sound approach to learning. We also believe that multicultural communication requires clear governmental support and direction” (Council for Higher Education, 2001:3).

Along with the South African government’s multilingualism policy, there are also other initiatives that seek to address the language problem from a technological perspective. The language barrier prohibiting many South Africans from effectively accessing ICT has been removed by the translation of a range of computer software into the country's 11 official languages. The company responsible for this, Translate.org.za, has also created the first all-South African language keyboard. For example Venda, one of South Africa's official languages of South Africa, cannot be accurately typed on a computer because it has five additional characters that are not used by any other language. These characters use diacritic marks that, on a standard keyboard, can only be inserted in a tedious, roundabout way. These marks cannot be left out as they change changes the meanings of words. The same applies, to a lesser extent, to three other South African languages, namely Afrikaans, Sepedi, and Setswana. The “South African keyboard" overcame this problem.

Released as open source software, it can be downloaded from the Translate.org.za website and installed on any number of keyboards without affecting their normal functioning. In addition, Translate.org.za has also developed spell checkers for all official South African languages.

Thus, from this discussion, it can be discerned that information in South Africa is relatively affordable to the population not living below the poverty line. Information is also, therefore, available in a timely and readily assimilated manner to the 11.54% of the South African population who use the internet, even taking into account that only 8.2% of the population have that language as their mother tongue. Hence, a small part of the South African population does comply with this criterion of the information and knowledge society, although this situation will have to be improved if the majority of the South African population are to be able to comply with this criterion.

Thus, it is thus evident from the extensive discussion on the social criterion for the information and knowledge society that South Africa is better positioned in terms of the education level and literacy rates, than Niger currently is. However, when compared to developed countries, such as Norway and the USA, South Africa still has a very long way to go in order to achieve good education opportunities for all their citizens.

With regard to a good quality of life, due to factors such as HIV/Aids, the life expectancy of South Africans is relatively low and the mortality rate is escalating. This situation will have to be rectified if the South African population is to benefit from the advantages the information and knowledge society brings. One way in which this could be achieved is by harnessing the power of ICT through the use of public service initiatives such as e-health. As discussed above, other public services such as e-government and e-learning are already being successfully implemented within South Africa, and in future it is hoped that services such as e-voting will follow suit. Through initiatives like these, data, information, and knowledge can be exchanged and electronic information distributed through the approximate 4 million internet Hosts in the country.

In terms of affordability of information, just over half the South African population still living below the poverty line and the country having a high unemployment rate, access to electronic information is still unaffordable to the majority of South Africans. However, this problem can be remedied by providing the South African population with access to cheaper internet connections at, for example, an established telecentre. The author can thus deduce that because some problems exist in terms of life expectancy, mortality rates as well as the relatively low amount of practising physicians within the country, South Africa does not completely comply with the social criteria of the information and knowledge society, and only slightly complies to this criteria. This deduction is based upon the comprehensive discussion concerning various social issues within South Africa and can be summarised as follows:

- Poor health prospects expressed in high mortality rates, low life expectancy, and a low amount of practising physicians ;
- Poor education opportunities expressed in low literacy rates;
- Well developed modern public services, expressed in the existence of e-government, e-voting, e-health and e-learning initiatives;
- Usable content that is mostly unaffordable but is timely available, readily accessible and in a language the user can understand.

In the following section, the cultural criterion and all its indicators and sub-indicators of the information and knowledge society will be discussed. They will then be applied to Niger and South Africa to see if there are initiatives in place to ensure cultural diversity within the information and knowledge society.

5.5.5 Cultural criterion

This criterion is discussed in detail in paragraph 3.5.5 in chapter 3, and the indictors identified and discussed in chapter 4 (see 4.5.5). As previously mentioned, of all the criteria discussed, those which entail changes in cultural values are morals are the most difficult to identify. According to Nassimbeni

(1998), the information and knowledge society will serve the cultural enrichment of all citizens through diversity of content, reflecting linguistics and cultural diversity. The following indicators were identified in chapter 4 that will serve the cultural enrichment and diversity of citizens in the information and knowledge society:

- obtaining universal access to information;
- the establishment of digital libraries for the preservation of cultural resources;
- the promotion of indigenous people initiatives on government level;
- the promotion of the tourism industry.

In the following section, the author will apply the above mentioned indicators of the cultural criterion of the information and knowledge society, to Niger and South Africa respectively.

Niger

a) Universal access

According to the United Nations Economic Commission for Africa (ECA), 2007, Niger currently does not have a policy for universal access to information and communication technologies. However, such a policy is included within their National Information and Communication Infrastructure (NICI) plan that was finalized in July 2005. The awareness building process has already started in 2006 with numerous workshops, seminars, and conferences organized in the various provinces and the capital city of Niger. A draft universal access strategy, as well as a draft cyber laws strategy, has already been finalized and is expected to be adopted by the Nigerien cabinet in 2007.

Although currently there are no government sponsored telecentres, or multipurpose community centres in Niger, there are other donor-funded initiatives underway to distribute information within Niger. One of the biggest

success stories concerning the use of ICT for development in Niger is RURANET. RURANET is a network of solar powered radio stations that provide farmers, especially in the remote, isolated villages, information on weather conditions, farming techniques and market trends in the local languages. This network of rural radio stations is also now being used as information centres. According to Benamrane (2005), these radio stations are now broadening their scope, and are becoming rural development and information centres (DICs). The centres will be equipped with the appropriate ICT to promote activities that complement the broadcasts and meet the needs voiced by rural communities, such as access to documentation and rural telephony. Through core funding from the United Nations Development Program, there were more than 80 radio stations in operation in 2005 and by the end of 2007, the number of stations is expected to have doubled. Furthermore, the UNDP requested UNESCO to assist in the establishment of 150 multipurpose community centres that will function as multimedia community centres as a contribution towards building democracy and good governance at grassroots level. Thus, these solar powered radio stations are a unique and very successful method of distributing information. Benamrane & Gallagher (2001) are of the opinion that this network of solar powered radio stations can be merged with other technologies to provide telecommunication and even internet access to the citizens of Niger. This can be achieved through the use of Tel@Bureaus. A Tel@Bureau is a portable, self-contained telecentre in a box. They can be located in a small shop, business, tourist hotel, or at a rural radio station. The Tel@Bureau's box opens to become a desk with a multimedia computer, printer, telephone, peripherals, radio, power supply, solar panels, and wireless and/or satellite equipment. All of these telecentres are further equipped with applications software relevant for all-purpose telecentre uses, such as e-mail, Web browsing, word processing, database, spreadsheet, and presentation software.

From the above discussion, it can be deduced that although universal access is still not a reality in Niger, the government, as well as many donor organisations such as UNESCO and the UNDP, have initiatives that aim to provide the basic ICT services for the population of Niger. However, many

more such initiatives are needed to be able to provide universal access to the majority of the Nigerien population. Consequently, Niger does not comply with this indicator of the cultural criterion of the information and knowledge society. In the following section, the author will investigate whether there are digital library initiatives that can be used to capture the cultural diversity of the Nigerien population for future generations.

b) Digital libraries

As discussed in chapter 4, ICT can be used to capture a nation's rich cultural heritage through initiatives such as digital libraries. Unfortunately, within Niger the development of digital libraries is weighed down by many challenges. The main challenge faced in Niger, and other developing countries, is the challenge related to the cost of technological access. ICT equipment is very expensive and, as discussed under the economic and social criteria, more than 50% of the population in Niger lives below the poverty line and, thus, cannot afford to purchase ICT equipment. Furthermore, in Niger, internet access is very limited, as was discussed under the spatial and technological criteria, and the literacy rate (as was discussed under the social criterion) is extremely low. Thus, even if the problems pertaining to ICT access can be overcome, problems such as education level, literacy rates, poverty rates and may still be a barrier for the citizens of Niger to access these digital libraries.
To help overcome the deficient ICT infrastructure within Niger, citizens can access various digital libraries. In the following section, the author will address three of these programs:

The digital library of the African Virtual University

The digital library provides easy access for the students of the virtual university, who are remotely located in 27 African countries, to quality, current, and relevant information resources. The digital library also provides access to the world's scholarly publications that are available electronically. Furthermore, the digital library provides access to electronic textbooks and this helps to reduce the pressure of the high cost of the textbook for individual

students (which are often too high for the average student to afford) (AVU, 2007). However, access to this digital library has two requirements that the majority of citizens of Niger simply cannot fulfil. Firstly, they need to be connected to the internet. Secondly, to receive access you need to be a registered student at the African Virtual University. Thus, it can be seen that although this digital library provides access to some of the Nigerien population, the majority of the population still cannot benefit from this initiative that could preserve the cultural diversity of the country.

The African Digital Library (ADL)

A similar initiative to the AVU digital library is the African Digital Library, although access to this library is not dependant upon being a registered student. The ADL is a collection of electronic books that can be accessed and used free-of-charge by any person living on the African continent. Individuals can access the library from any computer that is connected to the internet in Africa. Thus, this library overcomes the economic problem of the cost of the information, but not the problem of Internet connectivity. This digital library provides the user with access to 8,714 electronic books and other resources in digital format, which are all accessible through the internet.

The eGranary Digital Library

The third digital library that citizens of Niger can access is the eGranary Digital Library. This library overcomes the problems pertaining to the cost of the information, and inadequate internet access. This digital library provides millions of digital educational resources to educational institutions lacking adequate internet access. Many universities, schools, clinics, and hospitals in developing countries have no, or a very limited, internet connection, as is the case with most of the education institutions within Niger. For the few institutions that have an internet connection, the bandwidth is so limited that they cannot offer free Web browsing to the majority of their staff and students. To overcome this problem, the eGranary Digital Library uses a process of obtaining permissions, copying websites, and delivering them to

intranet Web servers inside the specific institutions in developing countries. Thus, the citizens of Niger can access millions of multimedia documents that can be instantly downloaded over their local area networks at no cost.

Through the use of digital libraries like these that specialize on African content and cultural heritage, the cultural diversity of countries like Niger can be preserved for generations to come, by making it accessible through platforms such as the internet. In this way, the data, information, and knowledge of the Nigerien population can be shared with other people accessing this information through the internet. However, only the section of the population that has the educational skills and necessary literacy level, can contribute their data, information, and knowledge with the rest of the global information system. Thus, the author can deduce from this discussion that although some the population of Niger has access to some digital libraries that can help preserve their cultural diversity, it is still not everyone. This is owing to issues pertaining to technology and education. For these reasons Niger only partially complies with this indicator of the cultural criterion. Part of the heritage that is preserved in these digital libraries, is the knowledge related to the indigenous people of Niger. In the following paragraphs, the author will investigate whether there are any initiatives, programs, or policies in place in Niger that will protect these indigenous people and their knowledge.

c) Indigenous knowledge/people initiatives

Within Niger there are at least eight ethnic groups, of which the Hausa constitute the major ethnic group. With regard to the ethnic compilation of the country, the Hausa represent 56% of the population; Djerma, 22%; Fulani, 8.5%; Tuareg, 8%; Beri Beri (Kanuri), 4.3%; with Arab, Toubou, and Gourmantche, 1.2%. The Hausa, the Djerma-Songhai, and the Gourmantche, are sedentary farmers who live in the arable, southern part of Niger. The remainder of Nigeriens are nomadic or semi-nomadic livestock-raising peoples: the Fulani, Tuareg, Kanuri, Arabs, and Toubou. Of these, the largest indigenous group is the Tuareg (US State Department, 2007). This minority group is estimated at numbering approximately 3 million. According to the

Centre for World Indigenous Studies (1999) approximately 1.5 million Tuareg are living in Niger; 1 million in Mali and the remaining 500,000 are spread through the rest of Africa, particularly West Africa. Since gaining their independence, the governments of Mali and Niger have increasingly marginalised the Tuareg culture and population. Throughout the last decade there has been ethnic conflict within Niger, and the increasing marginalisation of the Tuareg has led to many uprisings in Niger, which have cost hundreds of lives. Most of this conflict concerned the use of natural resources such as land, water, and crops. The following examples have been cited in various studies.

According to Heasley (2005), in October 1991, in southern Niger, a fight over crop damage started between Fulani herders and Hausa farmers. The initial fight left two farmers dead. In retaliation, hundreds of Hausa in the area went searching for revenge. These Hausa chased over one hundred Fulani women and children into a building, which they set on fire, killing all the women and children.

Despite this Hausa/Fulani fight, the Tuareg, perhaps more than any other people of Niger, have been involved in conflicts over the last two decades. The first Tuareg Rebellion was in the 1990s, by various Tuareg groups in Niger with the aim of achieving autonomy or forming their own nation-state. The Nigerien Army responded brutally, killing several hundred Tuaregs in the north, and sparking the creation of two Niger rebel groups: the Front for the Liberation of Air and Azaouak, and the Front for the Liberation of Tamoust (Decalo, 1979). The bloodshed continued until 1994, when both rebel groups agreed to a truce in 1994, which culminated in the final armed group signing in 1998. As part of this peace agreement, the Tuareg claimed that they did not receive enough attention and resources from the central Niger government. The government agreed to absorb some former rebels into the military as well as into the Nigerien national government.

Unfortunately, this was not the end of the Tuareg rebellion. The Second Tuareg Rebellion began in February 2007 by the Tuareg group, Niger

Movement for Justice (MNJ). The cause of this rebellion was over natural resources, namely Uranium. MNJ claims a share of the mineral wealth, which they proclaim to be in their indigenous territory. This rebellion came to international attention after they launched attacks against government, foreign interests, as well as tourist centres in northern Niger. On August 24, 2007 ,Niger's president Mamadou Tandja declared a state of alert in the Agadez Region, giving the security forces extra powers to fight the insurgency (Tran, 2007).

Despite this ethnic unrest and the Nigerien government's oppression of this particular minority indigenous group, at a national level, all major ethnic groups are represented at all levels of government (US State Department, 2006). According to the US State Departments' Country Report on Niger, President Tandja is, reportedly, half Fulani and half Kanouri, thus representing both ethnic groups, and is the country's first president who is not from the majority Hausa, or the Djerma ethnic group.

As can be seen from the examples above, on a practical level, the rights of the indigenous peoples of Niger are not protected. In theory, however, their rights are protected. On an international level, the Nigerien government has ratified all of the international conventions with regard to the protection of the rights of indigenous people. These include the following:

- International Convention of the elimination of all form of racial discrimination 1965;
- International covenant on economic, social and cultural rights 1966;
- Convention on the elimination of all forms of discrimination against women 1979;
- Convention on the rights of the child 1989;
- the African charter on the rights and welfare of the child 1990;
- the African charter on human and peoples rights 2003, and most recently the United Nations declaration on rights of indigenous peoples 2007.

The author is of the opinion that due to this disparity concerning the practical application of the conventions ratified by Niger, and the continuing ethnic conflict within the country, Niger does not fully comply with this indicator of the cultural criterion. The existing conventions and initiatives, such as the absorption of part of the Tuareg leadership within the Nigerien national government, can play an important role in the interaction and exchange of data, information, and knowledge between the local/indigenous knowledge system and the global knowledge system. However, more initiatives like these need to be implemented to secure the rights of indigenous people and their knowledge within Niger. From the perspective of this thesis, initiatives such as recognising minorities within national government structures can be utilised to recognise the culture and importance of indigenous people within Niger. This can play an important role in the interaction and exchange process of the tribal data, information, and knowledge from their information system and data, information, and knowledge within the global knowledge system. Through this process, the data, information, knowledge, experiences, culture and language of the Tuareg people can be shared with the rest of the Nigerien population and even the world, which could lead to increased mutual respect between these peoples. This local/indigenous knowledge can then be accessed through the internet and initiatives such as; the e-health and e-learning initiatives could be enacted, where local/indigenous Tuareg tribal remedies and knowledge might prove to be beneficial to the information and knowledge society.

Thus, it can be deduced from this discussion that the ratification of these international conventions as well as the initiatives of the Nigerien government, help to preserve the special value that indigenous people and their knowledge hold for the country as a whole, and so contribute to the social cohesion within the information and knowledge society. One of the values that the Nigerien government can capitalize on is the role the Tuareg Indigenous people can play in tourism. In the following section, the author will investigate the role tourism can play in the marketing of the cultural heritage and diversity of the Nigerien population including that of the indigenous population.

d) Tourism opportunities

As discussed in chapter 4**,** tourism is an important revenue generator for many developing countries and can account for a growing part of the GDP of that country. To promote this important revenue generator, the cultural diversity of the indigenous population can be used to attract more tourists to the country. This will have a direct impact upon the economic situation of the country as tourism can generate more employment opportunities. Furthermore, this will further impact upon the social criterion as the poverty rate will decrease and the standard of living of the population will increase.

As can be seen from the official websites from the Nigerien Ministry of Tourism (www.niger-tourisme.com), indigenous ethic art and symbols are used to promote the image of the country as a whole. In the map below, Tuareg crosses are used to indicate important tourism and cultural hotspot within Niger:

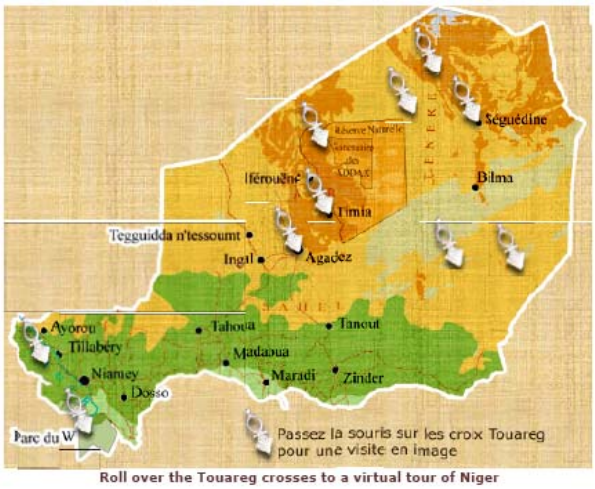


Figure 5.17: Map of tourism destinations within Niger

However, due to the escalating ethic violence, tourism in Niger has not demonstrated significant progress. According to the Travel & Tourism Economic Research on Niger (2007b) of the World Travel & Tourism Council, tourism and travel contributed only 2.9% to the GDP. This ranks Niger 174th in the world (with 176 countries sharing data) in terms of the share of the GDP provided by tourism and travel. In addition, tourism also did not account for

the creation of many employment opportunities in 2007, with only 0.9% of the total employment residing in the tourism and travel industry, and 2.7% of the total employment arising from the tourism and travel economy.

Unfortunately, tourism within Niger will not increase in 2007, due to the continuing ethnic unrest. The rebel group MNJ attacks have escalated and the Nigerien government has closed down many culture and tourist centres. It is expected that the tourist centre of Agadez will be empty during the fall/winter 2007 tourist season. The tourism industry in Niger received another blow in August 2007, when Point Afrique, the largest tourist air carrier running flights from Europe to Agadez, announced it would suspend flights for the 2007 tourist season (Temoust Survie Touarègue, 2007b).

The Nigerien government intends to rectify this situation by continuing to promote Niger as a vibrant tourist destination. Steps that will be taken by the government to achieve this include, improving border-crossing conditions and revamping tourism infrastructure (IMF, 2005).

Thus, the author can deduce from this discussion that tourism can play an important role in the preservation of Niger's cultural heritage by ensuring that the indigenous people and their knowledge does not vanish into the global information and knowledge society. However, presently Niger is not a favoured tourism destination, and thus does not comply with this indicator of the cultural criterion. It is important that the government improves the tourism industry by promoting Niger as a culturally diverse tourist destination by emphasising the importance of Niger's indigenous populations. Tourism also plays an important role seen from the perspective of this thesis. Through the interaction and exchange of data, information, and knowledge between the Nigerien local knowledge system and the global knowledge system, information regarding cultural issues can be exchanged. This process, in turn, will lead to other cultures of the world becoming more aware of the Nigerien and Tuareg cultures and other diverse cultural issues. The Nigerien government has already started this process by making use of Tuareg art and

symbols on the official Web page of the Ministry of Tourism, as mentioned above.

Thus due to the lack of ICT infrastructure within Niger, there are very few ICT initiatives that can be utilised to preserve the cultural heritage of the Nigerien population as well as the culture of the indigenous population, the Tuareg. Universal access still needs to be achieved within Niger to provide the majority of the population access to the diverse cultural heritage that can be preserved within digital libraries. Unfortunately, due to the cost of computer hardware, software and infrastructure, combined with the poor education level and literacy rate of the Nigerien population, these digital library initiatives cannot be utilised effectively. Furthermore, although Niger's government has tried to accommodate the indigenous population, many uprisings have occurred, ending in bloodshed. This ethnic violence has inhibited the promotion of the tourism industry within Niger and tourism will not increase until peace is restored to this West African country. It is thus of the utmost importance that the ICT infrastructure within Niger be improved, together with the education level and literacy rate so that the Niger population can truly benefit from initiatives such as digital libraries and their cultural diversity be preserved for the future. Accordingly the author can deduce that Niger only slightly complies with the cultural criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning various cultural issues within Niger and can be summarised as follows:

- Low universal access;
- Limited access to various digital libraries;
- Existence of indigenous people initiatives and
- Decreased tourism opportunities.

In the following section, the author will investigate whether South Africa has similar initiatives, policies and regulations in place to ensure that the South African cultural heritage is preserved for the generations to come.

South Africa

a) Universal access

As was shown in the discussion under the spatial and technological criteria of the information and knowledge society, ICT access within South Africa is also limited. With regard to access to personal computers, it was estimated that there was only 85 personal computers per 1,000 South Africans. Taking South Africa's large population of 47,000,000 into account, this indicates that only 8.4% of the South African population have access to a personal computer. The South African government has, in recent years, promoted various initiatives and projects to improve this situation as they believe that access to ICT can play a very important role in the development of the country (Van Audenhove, 1999). One of the biggest of these initiatives is the South African government's commitment to the centre approach. This approach entails the placing of information resource centres in rural areas, especially, to place ICT and other information services within reach of the South African population (Snyman & Snyman, 2003). From the perspective of this centre approach, the South African government has supported the following initiatives:

- In 1996 the Telecommunications Act was promulgated to provide for, among other matters, the Universal Service Agency (U.S.A). The U.S.A was made responsible for ensuring universal access to all South Africans (South Africa, 1996) by, amongst others, placing telecentres in developing communities.
- The Department of Communications also produced several documents outlining various other projects for extending access to ICT. Public Information Terminals (PITs) were to be placed in post offices and internet labs in previously disadvantaged areas (South African Department of Communications in Snyman and Snyman, 2003). The objective of PITs was, "to create a communication infrastructure through which the public will have access to information from Government/business as well as be empowered to communicate via

internet or e-mail with the party of their choice," (South African Post Office in Snyman and Snyman, 2003).

- The recommendation of the Task Group on Government Communications (ComTask) to establish the Government Communication and Information Services (GCIS) in the place of the South African Communication Services (SACS) was accepted. The GCIS had to focus, inter alia, on the establishment of Multi-Purpose Community Centres (MPCCs) to disseminate useful information about government and other matters to the South African public (ComTask, 1996).
- In 2000, a status report on MPCCs mentioned that in January 2000, an amount of R2 million was transferred to the USA to provide the rural areas with a ICT (Maphatane, 2000). Internet labs were later incorporated in what would become known as Citizen's Post Offices. Citizen's Post Offices are essentially 'internet cafes' for disadvantaged areas (Post Office in Snyman and Snyman, 2003).

Thus, it can be seen from these initiatives that universal access for the South African population is achieved by the following information resource centres: U.S.A telecentres, CPO's, MPCC, PITs, and other similar centres. According to the Universal Service Agency website, 133 telecentres have been established across South Africa (U.S.A, 2006). By 2003, the Department of Communications, in conjunction with the South African Post Office, had launched five Citizens Post Offices (Matsepe-Casaburri, 2003). These five are the first of a planned 25 outlets that have been earmarked for opening across the country. Unfortunately, many of the MPCC units were not sustainable. In a follow-up study to investigate the status of the USA telecentres, Holmner & Snyman (2006) found that of the 77 MPCCs, only 69% were still in operation and of these, only 35% had an active internet connection. These statistics can be seen in the following table:

Table 5.36: Status of MPCC

Number of MPCCs	Percentage unresponsive MPCC	Percentage without Internet connection	Percentage with Internet connection
77	31%	34%	35%

With regard to the progress of the PITs, according to the South African Government Services website (www.services.gov.za), there are 700 PIT terminals in South Africa, which offer the following five basic categories of services:

- direct access to government information and services, such as application for a driver's licence, ID forms and government post employment forms (Z83);
- access to business information, such as databases of local SMMEs;
- access to educational services;
- access to communication by e-mail;
- access and connection to the internet.

Thus, it can be inferred that, although universal accessibility to computers and the internet has not been attained from home, universal access in the country as a whole is average. Although many operate not efficiently, there are numerous venues, such as telecentres, multi-purpose community centres, citizens post offices, and public information terminals providing access. South Africa, therefore, complies with the universal access indicator of the cultural criterion of the information and knowledge society. The author is of the opinion that this universal access will enable all South African citizens to access new online information sources, such as digital libraries, in which the country's cultural heritage and diversity can be preserved. From the perspective of this study this level of access is important, seeing that data, information, and knowledge can be exchanged with other electronic sources from the global knowledge system for example, with data within digital libraries from across the world. In this way, cultural information can be

interacted with and exchanged across platforms such as the internet. In the following section, the author will discuss digital libraries within South Africa.

b) Digital libraries

As discussed in chapter 4, ICT can be used to preserve the diverse cultural heritage of a nation, through initiatives such as digital libraries. However, these initiatives, as well as access to them, are dependant upon the ICT infrastructure within the country, combined with the education and literacy level in the country. As was shown in the discussion above, access to ICT within South Africa is improving due to the establishment of information resource centres throughout the country. Furthermore, it is important to note that although any international digital library can be accessed with access to the necessary technology. From the perspective of this thesis, it is more important to have local Digital libraries where the local knowledge of the country can be captured and preserved. These libraries can then also assist in the creation of local content and the preserving of the diversity cultural heritage of the country.

With regard to accessing digital libraries, websites such as the Digital library of the African Virtual University, the African Digital library and the eGranary Digital library discussed in the previous section, can all be accessed from South Africa. These libraries provide South African citizens and students with access to more affordable information, as they do not require expensive subscription fees, or (as in the case of the eGranary Digital Library), no active internet connection.

Pertaining to preserving the unique cultural heritage of South Africa by preserving local content, many South African universities are members of the Networked Digital Library of Theses and Dissertations. This membership enables South African students to preserve their local knowledge in a digital library available to the global academic community of the world. The following South African universities are members of this initiative:

- University of Pretoria;

- University of South Africa;
- University of Limpopo;
- University of Johannesburg;
- Rhodes University;
- University of the Freestate;
- University of the Western Cape.

Thus, through digital library initiatives like these, the South African local knowledge and cultural heritage can be made more visible and accessible in the information and knowledge society by making use of the internet to circulate this heritage and make it known in the global knowledge system. Therefore, it can be deduced that South Africa also complies with the second indicator of the cultural criterion. Part of the diverse cultural heritage that can be preserved within these digital libraries is the knowledge related to the indigenous peoples of South Africa. In the following paragraphs, the author will investigate whether there are any initiatives, programs, or policies in place in South Africa that will protect the indigenous peoples and their knowledge.

c) Indigenous knowledge/people initiatives

Numerous population groups with different languages, cultural backgrounds and origins all coexist in South Africa, making up the very culturally diverse population of more than 47 million people. The three biggest population groups are the Zulu (21%), Xhosa (17%) and the Sotho (15%). Next are smaller minority population groups, such as the Tswana, Venda, Ndebele, Swasi, Pedi ,and others (Encyclopaedia Britannica Online**,** 2007). However, these minorities are not the original indigenous people of South Africa. Within South Africa, the Khoisan is the name for the indigenous group of Southern Africa, where they have lived since the 5th century AD. Culturally they are divided into the hunter gatherer San and the pastoral Khoi. The San, also referred to as the Bushmen, were displaced westward to the dryer Kalahari desert by the more powerful Zulu and Xhosa tribes who came fronorth

(Barnard, 1992). For this reason, the author views the Khoisan, as the first people indigenous to South Africa.

Although only the Khoisan can be regarded as being truly indigenous to South Africa, the South African government has broadened the concept of 'indigenous knowledge' to include the knowledge of the ethnic groups as well. Since 1994, the protection of indigenous people, their knowledge, culture, religion, and art has received a great deal of attention from the South African government. According to the Minister of Science and Technology, Mr. Mangena (2006) indigenous knowledge is central to the concept of an African Renaissance and provides the founding motivator for the actions of South Africans.

At the national government level, the Indigenous Knowledge System Policy that was adopted by the South African Cabinet in 2004 protects the rights of South African indigenous communities. The policy contributes to the spirit of the South African constitutional democracy by the improvement of the lives, dignity, and equality of the indigenous and local communities. Furthermore, this policy has led to the establishment of the national office on IKS (NIKSO). Future actions of this office in 2007 include the establishment of a national IKS public awareness week as well as the hosting of a competition for the best indigenous knowledge (IK) projects for poverty alleviation amongst South African communities (Mangena, 2006).

On an international level, the government of South Africa has shown their support in favour of the protection of indigenous people, their knowledge, culture and beliefs by the ratification of several international human rights conventions. According to the Human Development Report (UNDP, 2005), the following conventions and policies are supported by South Africa:

- International convention on the Prevention and Punishment of the Crime of Genocide, 1948;
- International convention on the Elimination of All Forms of Racial Discrimination, 1965;

- International Covenant on Civil and Political Rights, 1966;
- International Covenant on Economic, Social and Cultural Rights, 1966 (Signed but not yet ratified);
- Convention on the Elimination of all forms of Discrimination against Women;
- Convention against Torture and other Cruel, Inhuman or Degrading Treatment or Punishment, 1984;
- Convention on the Rights of the Child, 1989 and
- United Nations Declaration on Rights of Indigenous Peoples, 2007.

The author is of the opinion that the IKS initiatives, programmes and policies of the South African government concerning the indigenous peoples and their knowledge, can play an important role in the interaction and exchange of data, information, and knowledge between the local/indigenous knowledge system and the global knowledge system. Spurred on by the initiatives of the South African government, The Working Group of Indigenous Minorities in Southern Africa, WIMSA, was established in 1996 at the request of the San people in South Africa, Botswana, Namibia, Zambia and Zimbabwe. By the establishment of a website for this organisation (www.san.org.za), a platform for the exchange of information among San communities and other concerned parties was created. Furthermore, this website creates the opportunities to preserve the San cultural heritage, as well as make this local indigenous knowledge available to the global knowledge system via the internet. It can, thus, be deduced from all the above initiatives, policies and regulations that the South African government is on the forefront of recognising and preserving the special value that indigenous people and their knowledge hold for the country as a whole and, accordingly, complies with this indicator of the cultural criterion. One of the values on which the South African government can capitalise, is the role the indigenous people can play in tourism. In the following section, the author will investigate the role that tourism can play in the marketing of the cultural heritage and diversity of the South African population, including that of the San population.

d) Tourism opportunities

As was discussed in chapter 4, the tourism industry can improve the economic situation of the country by alleviating poverty through the creation of more job opportunities. This is also the case in South Africa. According to Apple (2007), the tourism industry is projected to contribute 12% of the country's Gross Domestic Product (GDP) by 2010. Currently the tourism and travel industry contributes 3.3% to South Africa's GDP and the total tourism and travel economy contributes 8.3%. These statistics can be seen in the following figure:

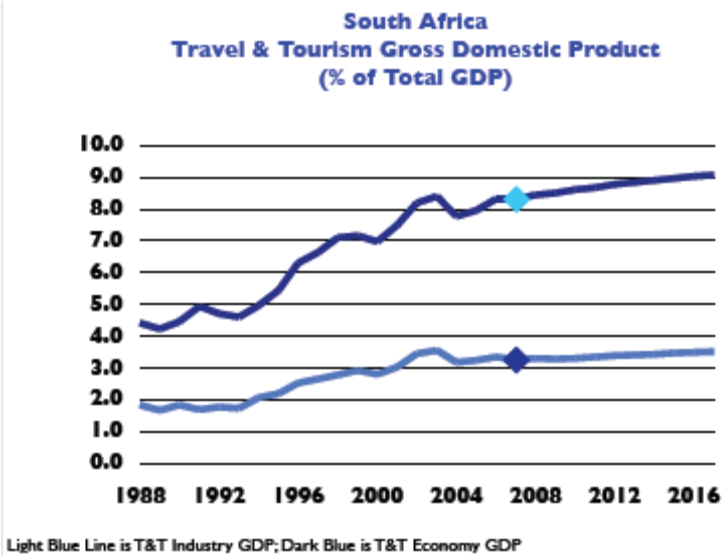


Figure 5.18: Contribution of travel and tourism to South Africa's GDP

With regard to the creation of new job opportunities for South African citizens, it was estimated that tourism and travel created 969,000 jobs within South Africa in 2007. This constitutes 7.5% of total employment or 1 in every 13.4 jobs (World Travel & Tourism Council, 2007c). These statistics can be seen in the following figure:

Figure 5.19: Contribution of travel and tourism to South Africa's employment

Thus, it can be seen from the figures above that travel and tourism contribution to the country's GDP has increased over the past few years. This is as well as an increase in the amount of jobs created by this sector. It is the author's opinion that this is due to the government's efforts to promote the rich and diverse indigenous heritage of the country. One example of such a tourism attraction is the Maropeng cultural heritage site. This state-of-the-art visitors' centre at South Africa's Cradle of Humankind world heritage site, won the British Guild of Travel Writers award for the best new tourism project worldwide in 2005 (South Africa Info Reporter, 2005). In addition to this world-class tourism attraction, the Department of Environmental Affairs and Tourism also promote tourists meeting people in South Africa's many cultural villages. These villages offer a close-up insight into the country's rich and diverse traditional cultures. Visits to townships in the major centres are also promoted through tourists tours offered, for example, in Soweto. Tourism also plays an important role seen from the perspective of this thesis. Through the interaction and exchange of data, information, and knowledge of the South African local knowledge system with the global knowledge system, information regarding cultural issues can be exchanged. This process, in turn, will lead to other cultures of the world becoming more aware of the South African culture as well as the cultures of the indigenous peoples within South Africa. Thus, the author can deduce from these tourism initiatives in South Africa, that

South Africa complies with this indicator of the cultural criterion of the information and knowledge society.

Thus, due to the initiatives and projects of the South African government, universal access to ICT in South Africa is improved through the provision of information resource centres such as the U.S.A Telecentres, Multipurpose Community Centres, Public Information Terminals and Citizens Post Offices. These centres provide the South African population with access to ICT and the global knowledge system, as well as access to global digital libraries such as the Networked Digital Library of Theses & Dissertations. In this digital library, South African students can load their local and traditional knowledge into the digital library where it can be accessed by students and academics all over the world. In this way, the local South African knowledge is transferred to the global knowledge system. Part of this knowledge can include knowledge pertaining to indigenous people, their cultures, beliefs, and religions. As the discussion has shown, indigenous peoples and their knowledge are protected within South Africa through policies and the ratification of various international conventions pertaining to indigenous peoples. Furthermore, the South African government has successfully harnessed the indigenous cultures within South Africa to increase tourism to the country and, thereby, create more job opportunities for South African citizens. It can thus be inferred that South Africa completely complies with the cultural criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning various cultural issues within South Africa and can be summarised as follows:

- Increasing universal access;
- Access to various digital libraries;
- Existence of indigenous people initiatives and
- Increased tourism opportunities.

In the following section, the author will discuss the physical infrastructure needed to sustain an information and knowledge society, and will apply the indicators of these criteria to Niger and South Africa respectively.

5.5.6 Physical infrastructure criterion

This criterion is discussed in detail in paragraph 3.5.6 in chapter 3, and in chapter 4 (see 4.5.6) and refers to the sophisticated physical infrastructure comprising of items like roads, railways and airports, which are needed in an information and knowledge society for the delivery of resources. These resources also need to be stored within warehouses. According to the Department of Revenue Services of Washington State (1996), the storage and shipment of goods is a vital part of the economy. As mentioned in chapter 4, the physical infrastructure is also directly related economic development and very important for foreign investors as well as tourists (Foley, 2005).

In Africa, roads are the prevailing mode of transport, accounting for 80 - 90% of all transport of goods and persons. Generally, it is the only means of access to the rural areas and is the most flexible and suitable transport mode due to the economic and social condition of many African countries. However, according to the UN Economic Commission for Africa, Africa has a very low road density of approximately 6.84 km per 100 km^2 as compared to Latin America's 12 km per 100 km^2 and Asia's 18 km per 100 km^2. As discussed in chapter 4, it is also important to note that the physical infrastructure criterion does not have a direct impact on the interaction and exchange of data, information, and knowledge from the countries local knowledge system with data, information, and knowledge in the global knowledge system. However, this criterion is still important as it has a direct impact on some of the other criteria of an information and knowledge society, which in turn have a bearing on the interaction and exchange process. For example, as previously mentioned, the physical infrastructure can influence the economic criterion of the information and knowledge society as the import and export of goods will have some bearing on the GDP of the country as well as the quality of life in the country. These indicators have already been discussed under the economic criterion. Furthermore, the physical infrastructure will also encroach upon the tourism of a specific country. If there is an adequate physical infrastructure, more tourists will be able to reach their

destinations and spend their money, having a direct impact on the GDP of the country. On the other hand, if there is a lack in physical infrastructure such as inadequate transport and roads, fewer tourists will visit the country, resulting in a lower overall contribution to the GDP. This lower contribution will have a negative 'domino' effect on the quality of life and the ability of citizens to partake in the interaction and exchange process.

In the following section, the author will investigate the physical infrastructures of Niger and South Africa respectively, with regard to the road, railway, and airport infrastructure as well as storage facilities available.

Niger

As is the case with many African countries, road transport is the prevalent form of transport in Niger. Unfortunately, however, the conditions of the roads available in Niger are very poor. It the paragraphs to follow, the author will discuss this transportation infrastructure.

a) Number of motor vehicles

Although road transport is the dominant form of transport in Niger, there are very few motor vehicles in the country. According to the Africa Development Indicators (World Bank, 2006a) the average number of passenger cars for the four year period 2000 – 2004, was estimated at 41,206, and the number of commercial vehicles estimated at a lower, 17,248. In the following table from the United Nations Statistical division, a breakdown of the amount of motors vehicles in Niger can be seen:

Table 5.37: Motor vehicles available in Niger.

Motor vehicles in use in Niger (thousand)					
Motor vehicles in use	2000	2001	2002	2003	2004

Passenger cars	4	5	5	5	9
Commercial vehicles	1	1	2	2	4

To place this number of motor vehicles in perspective, Niger only has 4 motor vehicles per 100 people, ranking Niger 119th of 134 countries with data, with regard to the amount of motor vehicles per 100 inhabitants. When comparing this statistic to other countries, Niger compares very unfavourably. For example, when Niger is compared to a country like Norway, which has 40 passenger cars per 100 people, and 494 motor vehicles per 100 people, then Niger's statistics are incredibly low.

The author is of the opinion that this low number of motor vehicles in Niger is a reflection of the low quality of life of Nigerien citizens, as discussed under the social criterion. Taking into account Niger's high poverty rate, high unemployment rate and low GDP, it is clear that the people of Niger would not be able to afford many motor vehicles. Furthermore, this low number of motor vehicles will, undoubtedly, have an impact upon the Nigerien Tourism industry, seeing that there are so few transport opportunities available. This fact was reiterated by the US State Department in their travel advisory for tourists wishing to travel to Niger. According to this document, although taxis are available at a fixed fare in Niamey, the capital of Niger, most are in very poor condition, and do not meet basic U.S. road safety standards. Other taxis, such as the Inter-city or 'bush-taxis', are available at negotiable fares, but these vehicles are generally older, unsafe models, which are overloaded, very poorly maintained, and driven by reckless operators seeking to save time and money. The condition of these vehicles is also due to the condition of the accessible road in the country, which will be discussed in the following section.

b) Accessible roads

According to Mr Bheki Cele, the MEC of Transport in South Africa, in the opening address at the expert session of the first African Union (AU) Conference of Ministers responsible for road transport (Cele, 2007), road infrastructure is increasingly becoming a key pillar for the economic development of the African Continent and the well being of its entire people. This well-being can only be achieved by maintaining accessible roads in Africa; roads that are needed for the efficient movement of people and goods as well as trade across national borders. Unfortunately, Niger cannot benefit from this economic development as the total road length available in the country is only 14,565 km. Of this total length, only 3,641 km is paved and the remaining 10,924 km is unpaved (NationMaster, 2007g). In the first of the two figures that follow, the small length of primary road in Niger is compared to the secondary roads. In the second, the proliferation of roads on the African continent can be seen (OECD, 2006).

Figure 5.20: Transportation infrastructure Niger (African Economic Outlook, 2006)

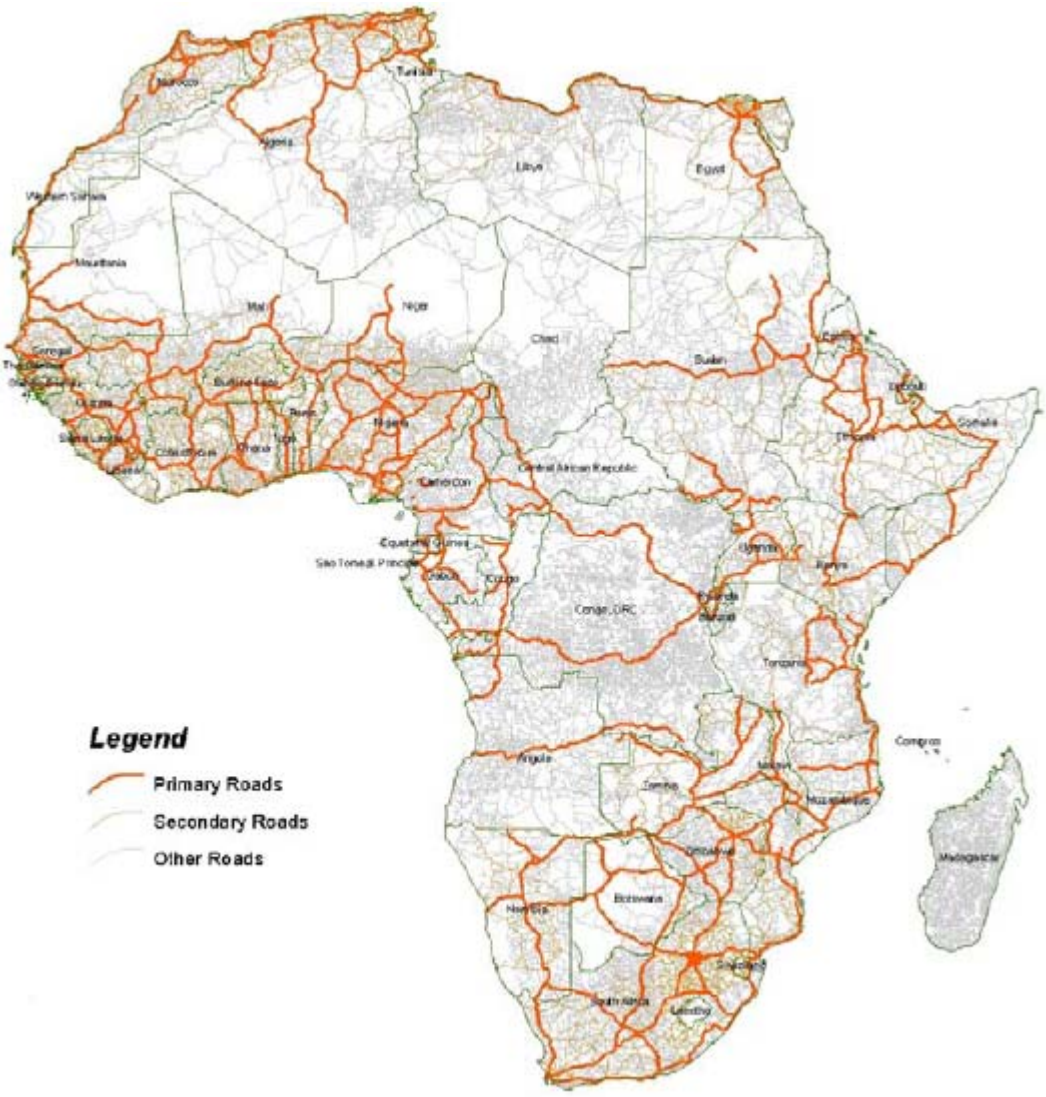


Figure 5.21: Road proliferation in Africa (UNECA, 2007)

As can been seen in the above figure, there are very few primary roads within Niger, and even the primary paved roads that do exist, are in an extremely poor condition. According to the Africa Development Indicators (World Bank, 2006a), only 65.2km of national / primary road within Niger is in good condition. To try to rectify this situation, the World Bank, in partnership with other international partners, has formed the SSATP program. The primary objective of the Sub Saharan African Transport Policy Program (SSATP) is to facilitate policy development and related capacity building in the transport sector in Sub-Saharan Africa. Through workshops and similar procedures, sound transport policies are developed that can lead to safe, reliable, and cost-effective transport. Furthermore, under a road network development plan,

the Nigerien government has started to implement a wide range of development programs to construct new roads and improve existing ones. In the last few years, approximately 20 billion CFA francs were raised by government and donor organisations, and invested directly in roads (UNECA, 2007).

Through programs like these, transport conditions within the country can be improved. Such improvement would support their economic development and, thus, reduce the level of poverty. However, Niger cannot currently benefit from this economic development due to the poor condition of the roads within the country. Thus, from statistics noted above, it can be deduced that Niger does not comply with the first two indicators of the physical infrastructure criterion, with regard to the number of vehicles available, as well as the length of accessible road. In the following section, the author will discuss Niger's air transport infrastructure.

c) Number of airports

Due to the landlocked nature of Niger, Niger is forced to rely heavily on air transportation. As can be seen in Figure 5.19, until recently, there was only one international airport in Niger, situated in the capital Niamey (African Economic Outlook, 2006). However, recently the airport at Agadez has also been upgraded to international standard. These two airports are two of 28 situated throughout the whole of Niger. This is an extremely low number compared to America's staggering 14,858 airports, and it equates to 2.171 airports per million people. As a result of having so few airports, Niger is ranked 129th out of 231 countries with data (CIA World Factbook, 2007e). Unfortunately, except for the two international airports that have paved runways, of the 26 remaining airports, only 7 have paved runways.

As previously mentioned, the availability of airports is very important seen from a tourism perspective. However, there are no direct flights from the US, and Air France is the only international carrier who offers direct flights from outside Africa. The author is of the opinion that this will definitely have an

impact upon tourism, as many tourists prefer direct flights, which are only available from France. A regional airline, Point Air Niger, offers weekly flights between France and the capital city Niamey. However, flights between France (Paris and Marseilles) and Niger (Niamey and Agadez) have been cancelled. The carrier, Point Afrique, has cancelled all their flights to Agadez for 2007, owing to the increased rebel conflict within the city. This cancellation will have a negative impact upon the already very small, fragile tourist industry (Temoust Survie Touarègue, 2007a).

d) Railways

Seventeen of the countries on the African continent have no rail transport whatsoever. According to UNECA (2007), these countries are: Burundi, Cape Verde, Central African Republic, Chad, the Comoros, Equatorial Guinea, the Gambia, Guinea Bissau, Libya, Mauritius, Rwanda, Sao Tome & Principe, the Seychelles, Sierra Leone, Somalia and Niger.

Although there are no railways within Niger, the joint Benin-Niger railway is utilised for travel and export by the citizens of Niger. This railway is reachable by road at Parakou, Benin. From here, OCBN, a joint Benin-Niger railway operates service to the Benin port of Coronou (Encyclopaedia of Nations, 2007).

However, to rectify this situation so that railroads can be used for the transport of export goods from Niger, India has proposed to finance and build a rail connection from the landlocked Niger and Burkina Faso to join seaports in Togo and Benin. According to Chadda (2006), the Indian government will provide half a billion dollars to help finance the construction of such a railway. This railway would be approximately 1,300 km long and connect both previously mentioned landlocked countries with the sea. The total estimated cost to build this railway is $1.5 billion, with the rest of the funding provided by the New Partnership for African Development (NEPAD). As mentioned in chapter 4, the railway sector was identified as the market with the greatest potential for growth over long distances. Thus, with the help of the Indian

government, the Nigerien economy will be able to benefit from this growth and improve trade through the export of more goods. These goods and resources have to be stored within warehouses or other storage facilities. In the following section, the author will discuss whether Niger has adequate storage facilities.

e) Number of warehouses

In Niger, the main export commodity is uranium, followed by cowpeas and onions and then small quantities of garlic, peppers, potatoes, and wheat. All these agricultural products have to be stored before export. Niger is West Africa's leading onion producer, and onions are its third largest export. Unfortunately, storage remains very small-scale, and is a problem, annually resulting in approximately one third of the crop being lost due to an insufficient storage capacity (SOFRECO, 2002). In the following table, these losses can be seen, expressed in tonnes:

Table 5.38: Losses of onions due to in adequate storage facilities

Table 4: Production, consumption and export of onions (Tonnes)

Year	1994	1995	1996	1997	19982001-02	
National production	185,700	184,600	178,000	178,000	226,000	271,234
Storage losses (30 %)	55,700	55,400	53,400	53,400	67,800	81,370
Seeds (10 %)	18,600	18,500	17,800	17,800	22,600	27,123
National consumption	9,800	10,100	10,400	10,700	11,000	12,000
Export surplus	**101,600**	**100,600**	**96,400**	**96,100**	**124,600**	**150,741**

Source: PPEAP 2000 and Agriculture Ministry statistics

This storage problem is also evident in the rural sector, and is indicated as one of the major constraints of rural sector development. According to the African Development Funds Appraisal Report on Niger (2006), the shortage of storage warehouses for agricultural produce is a general constraint affecting the whole country, and one that needs to be addressed as this could contribute to strengthening food security within the country. The author is of the opinion that this lack of storage facilities and warehouses within the country has a negative impact upon the economy of Niger, as a significant amount of export produce is lost due to the inadequate storage. Furthermore,

this ripples down and affects the overall GDP of the country, which, in turn, contributes to the high poverty rate, high unemployment rate, and overall low quality of life within the country.

Therefore, from this discussion, regarding Niger's physical infrastructure, it can be concluded that motor vehicle transport by road is very inadequate within the country. This is due to the very poor conditions of the accessible roads within the country, combined with the low number of motor vehicles available. This very small amount of motor vehicles per 100 inhabitants, combined with the extremely short length of paved road, will have a negative impact upon other criteria such as the economic and cultural criteria. These criteria will not benefit from tourism, as tourists will not be inclined to travel in a country with such low transport infrastructure. The inadequate transportation infrastructure is further depreciated by the very low number of airports within the country and by the non-existence of a railway network. Furthermore, the economic criterion of Niger is impacted by the lack of warehouse storage facilities, as a third of all export produce is lost due to the inadequate storage facilities.

For these reasons, the author is of the opinion that Niger does not comply with any of these indicators of the physical infrastructure criterion and, therefore, it can be deduced that Niger does not comply with the physical infrastructure criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning the limited physical infrastructure available within Niger and can be summarised as follows:

- low number of motor vehicles;
- low amount of accessible roads;
- low number of airports;
- no railways and
- low number of warehouses.

In the following section, the author will investigate whether South Africa complies with this criterion.

South Africa

South Africa's physical infrastructure network is among the most modern and extensive on the African continent, and looks much better than that of Niger. The increased tourism in the country (as was discussed under the cultural criterion) has prompted the South African government to fast track plans to improve transport infrastructure and services. These improvements can be seen in the following indicators:

a) Number of motor vehicles

In South Africa, transport via motor vehicle is a very important form of public transport. According to The first South African National Household Travel Survey (South African Department of Transport, 2003), the majority of households within South Africa use taxi transport, compared to motor car transport and other forms of transport available. This can be seen in the following table and figure:

Table 5.39: Method of transport within South Africa

Transport modes used by all household members in the week (7 days) prior to survey day, by province and settlement type

Province	Percentage of all people						
	Train	Bus	Metered taxi	Minibus-taxi	Sedan taxi	Bakkie taxi	Car
Western Cape	7.6	4.6	1.2	19.6	0.8	1.2	29.9
Eastern Cape	0.7	3.3	0.5	15.9	1.2	4.9	8.6
Northern Cape	0.3	2.2	0.4	12.7	0.4	0.9	16.1
Free State	0.2	3.3	0.9	22.5	1.5	0.6	12.6
KwaZulu Natal	1.1	8.7	1.6	20.5	0.9	2.8	11.2
North West	1.1	6.7	1.0	22.7	0.4	0.7	11.9

Gauteng	5.7	3.7	1.6	31.8	0.7	1.1	25.0
Mpumalanga	0.2	8.1	1.0	19.7	1.0	1.1	11.8
Limpopo	0.1	5.6	0.6	17.7	0.3	0.7	7.7
RSA	**2.3**	**5.5**	**1.1**	**21.7**	**0.8**	**1.9**	**15.3**
Metropolitan	5.9	6.3	1.8	29.3	0.8	1.2	24.5
Urban	1.0	3.9	0.9	24.4	1.4	1.2	19.8
Rural	0.3	5.7	0.7	14.0	0.5	2.9	5.0

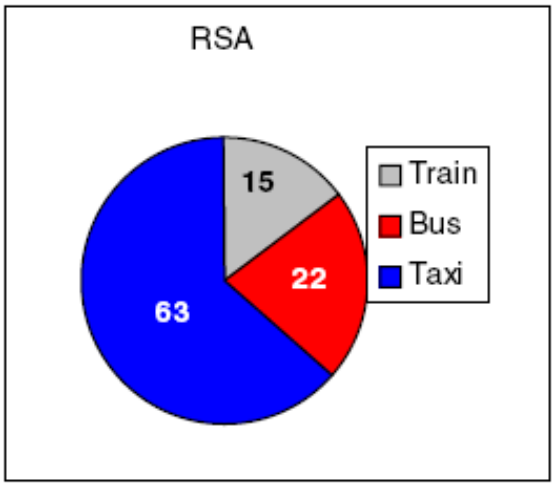


Figure 5.22: Public transport modes in RSA

For this reason, there is a very high number of motor vehicles present in South Africa. According to NationMaster (2007i), there are 146 motor vehicles per 100 inhabitants, ranking South Africa 53rd of 134 countries with data. This is considerably higher than the vehicle abundance in Niger, which stands at four motor vehicles per 100 inhabitants. In total, there are 8,047,331 vehicles in South Africa, the breakdown of which, provided by the South African Department of Transport, National Traffic Information System (2007) can be seen in the following table:

Table 5.40: Total amount of motor vehicles in South Africa 2007

Vehicle Class	Total
Motor cars and station wagons	5 128 031
Minibuses	272 118
Buses, bus trains, midibuses	39 016
Motorcycles, quadrucycles, tricycles	310 882
LDV's, panel vans, other light load veh's GVM <= 3500kg	1 800 013
Trucks (Heavy load vehicles GVM > 3500kg)	298 279
Other self-propelled vehicles	198 992
Total self-propelled vehicles	8 047 331
Provincial % of total	100.00%
Caravans	107 736
Light load trailers GVM <= 3500kg	667 275
Heavy load trailers GVM > 3500kg	130 969
Total trailers	905 980
Total provincial % of total	100.00%
All other and unknown vehicles	37 520
Total number of live vehicles	8 990 831
Provincial % of total	100.00%

From this table, it can be seen that there is a very large number of minibuses registered within South Africa. These motor vehicles are used in South Africa as taxis. This form of public transport is used by the most South African households, as can be seen in the following figure (South African Department of Transport, 2003):

Figure 1: Household access to public transport

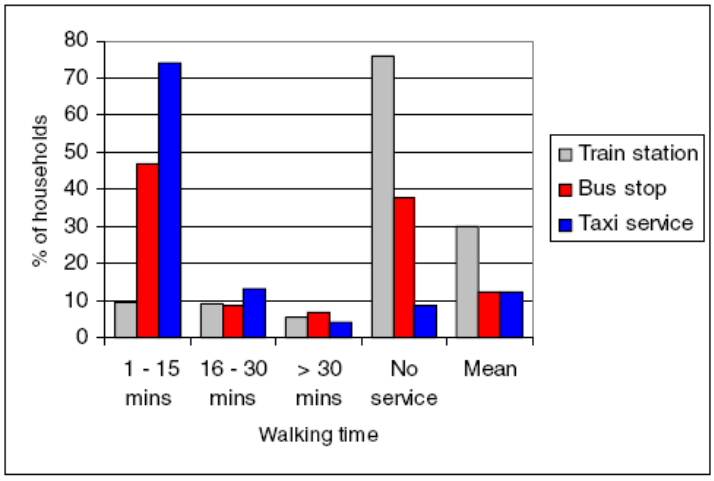


Figure 5.23: Household access to public transport

Car ownership in South Africa is not as prevalent as in other nations, with only 26.1% of the households having access to their own cars. It is the author's opinion that this is mainly due to the high unemployment and high poverty rate in South Africa. Many households cannot afford to purchase their own motor vehicles. It is also evident is the following table, that the household access to cars in the provinces with big metropolitan areas such as Western Cape and Gauteng, is much higher than in the provinces where the are more rural areas such as Limpopo and the Eastern Cape (South African Department of Transport, 2003):

Table 5.41: Household ownership by Province in South Africa

Household car ownership by province

Province	% of households with car access	No. of cars per household
Western Cape	45.5	0.68
Eastern Cape	15.5	0.23
Northern Cape	25.4	0.41
Free State	21.8	0.32
KwaZulu-Natal	23.2	0.34
North West	22.4	0.33
Gauteng	33.0	0.56
Mpumalanga	23.5	0.37
Limpopo	17.2	0.24
RSA	**26.1**	**0.40**

The higher prevalence of car ownership in the urban areas can be seen in the following figure:

Car ownership by settlement type in the RSA

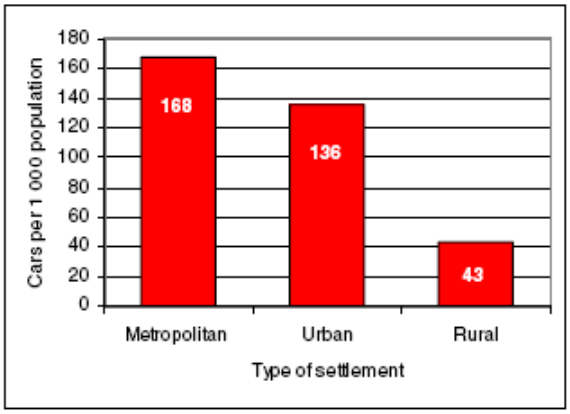


Figure 5.24: Car ownership by settlement type in the RSA

The author is of the opinion that this is mainly due to the greater employment opportunities that are available within the metropolitan areas than in the rural areas. In these urban areas, the unemployment rate is lower and, as a result, so is the poverty rate. This leads to a higher quality of life, which is demonstrated by the ability to afford to purchase a motor vehicle. Furthermore, the high number of motor vehicles within South Africa can also be contributed to the condition of the accessible roads, which will be discussed in the following section.

b) Accessible roads

South Africa is very fortunate to have an extremely long total length of road, compared to other countries on the African continent. According to NationMaster (2007f), South Africa has a total length of 362,099 km of accessible road, ranking South Africa higher than most other European countries, and higher even than Norway, discussed in the previous chapter. This ranking can be seen in the following table:

Table 5.42: World ranking in terms of length of accessible roadway

Rank	Countries	Amount (top to bottom)
#1	United States:	6,430,366 km
#2	India:	3,383,344 km
#3	China:	1,870,661 km
#4	Brazil:	1,751,868 km
#5	Japan:	1,183,000 km
#6	Canada:	1,042,300 km
#7	France:	956,303 km
#8	Russia:	871,000 km
#9	Australia:	810,641 km
#10	Spain:	666,292 km
#11	Italy:	484,688 km
#12	Turkey:	426,906 km
#13	Sweden:	424,947 km
#14	Poland:	423,997 km
#15	United Kingdom:	388,008 km
#16	Indonesia:	368,360 km
#17	South Africa:	362,099 km

Of this total length, 73,506 km is paved roadway and 288,593 is unpaved. According to the Africa Development Indicators (World Bank, 2006a), the condition of the majority of the paved roads is good, although some potholes might occur especially after heavy rain.

As previously mentioned, this long length of accessible road, in terms of both paved and unpaved roadways, can further stimulate economic development within South Africa, as it is very important for foreign investors to be able to reach their destinations, the infrastructure allows the import or export of resources or products. Thus, the length of accessible road will have a direct impact upon the economic criterion of the information and knowledge society. In terms of the cultural criterion, these accessible roads and adequate passenger transport will make it easier for tourists to travel in South Africa, which will make them more inclined to come to South Africa as their tourism destination, and so have an impact upon the economic criterion as a result of tourism's contribution to the GDP. Furthermore, as mentioned in the previous chapter, this physical infrastructure is also necessary for the delivery of goods and resources within the information and knowledge society. Through the interaction and exchange process, data, information, and knowledge can be obtained from the global knowledge system. However, if the necessary physical infrastructure is not available, the citizens in the particular country will not be able to react upon this information. For example, through the interaction and exchange process, information regarding the appropriate treatment of, for example, malaria, can be obtained. This information would, however, be of little use if the physical infrastructure that is needed to import, store and deliver the medicine was not available within the country. In South Africa, the first two indicators to enable this delivery are present, and it can, thus, be deduced from this discussion, that South Africa complies with the first two indicators of the physical infrastructure criterion, namely number of motor vehicles and the length of accessible roads within the country. A further indictor, which will influence the tourism in the country, is the number of airports, which will be discussed in the following paragraph.

c) Number of airports

According to SECinfo (2007), the OR Tambo International Airport (formerly Johannesburg International) in South Africa is the busiest airport on the continent, and can be classified as the air transport hub of southern Africa. This airport, furthermore, also contributes to the economic situation in South Africa by employing approximately 18,000 people to keep its modern infrastructure running smoothly.

This is one of South Africa's three International airports. The other two are, Cape Town International Airport and Durban International Airport. Alongside these three international airports, there are seven other national airports and 721 regional airports, totalling 731 airports within South Africa. According to the CIA World Factbook (2007e), this large number of airports ranks South Africa 10th in the world with regard to the amount of airports (See Table 4.52). The three international and seven national airports handle more than ten million departing passengers annually, and truly form the air transport hub of the entire African continent. In the following two tables, the high number of arrivals as well as departures can be seen:

Table 5.43: Passenger arrivals at international and national airports, RSA

Passenger arrivals at various ACSA airports

2007 (April)/ 2008 (March)					
Airport	**Domestic**	**Regional**	**International**	**Unscheduled**	**Total**
O.R. Tambo International	2301448	153652	1534761	18081	4007942
Cape Town International	1397089	29289	187843	1929	1616150
Durban International	1006649	1095	6278	1429	1015451
Bloemfontein	88250	N/A	N/A	823	89073
East London	155983	N/A	N/A	729	156712
George	125357	N/A	N/A	3068	128425
Kimberley	27872	N/A	N/A	4968	32840
Port Elizabeth	298904	N/A	N/A	398	299302
Upington	8687	N/A	N/A	1551	10238
Pilansberg	N/A	235	6	1538	1779

Table 5.44: Passenger departures at international and national airports, RSA

Passenger departures at various ACSA airports

2007 (April)/ 2008 (March)					
Airport	**Domestic**	**Regional**	**International**	**Unscheduled**	**Total**
O.R. Tambo International	2287994	158710	1570442	16110	4033256
Cape Town International	1423517	29782	199709	3037	1656045
Durban International	593161	611	3656	945	598373
Bloemfontein	89325	N/A	N/A	979	90304
East London	157448	N/A	N/A	1050	158498
George	131702	N/A	N/A	3313	135015
Kimberley	27605	N/A	N/A	4799	32404
Port Elizabeth	307204	N/A	N/A	543	307747
Upington	8340	N/A	N/A	1502	9842
Pilansberg	N/A	336	64	1848	2248

Thus, it can be inferred from this world ranking, that South Africa has an adequate number of airports to stimulate tourism and economic development. Through the use of this airport network, investors can easily reach their destinations and air transport can be utilised to provide necessary community services such as emergency medical flights, and law enforcement. Academics and scholars can also utilise this airport infrastructure to travel to foreign destinations. Such journeys may have been initiated by various scholar exchange programs, and can allow the academics to share their local knowledge with the rest of the world.

Together with this air travel infrastructure, the railway network is another form of transportation that can be used for passenger or cargo transportation. The railway infrastructure of South Africa will be discussed in the following paragraph.

d) Railways

Transportation via rail remains a very important method of transportation within South Africa due to its affordability, reliability, and accessibility. In terms of this accessibility, South Africa has a very long length of available railway that provides coverage of the entire country. According to NationMaster (2007f), the total length of railway in South Africa is 20,872 km, ranking South

Africa 14th of 134 countries with data. The underpinning concepts of affordability, reliability and accessibility are reiterated by The National White Paper in its transport vision, which states that rail transportation is seen as an essential long-term component of the network for both freight and passenger transport. To develop rail transport as a sustainable method of public transport for the majority of South Africans, the government of South Africa is investing large amounts of money in the rail infrastructure. In the 2002 – 2003 financial year, the rail industry received an operating subsidy of R1.5 billion, plus capital grants for the heavy maintenance rolling stock and infrastructure of some R700 million, coming to a total government contribution of R2.2 billion in that year. This level of subsidy for the improvement of the passenger rail infrastructure is necessary when considered alongside the trends in commuter rail passengers (South African Department of Transport, 2005). In the following figure, it can be clearly seen that the number of annual rail passengers are decreasing.

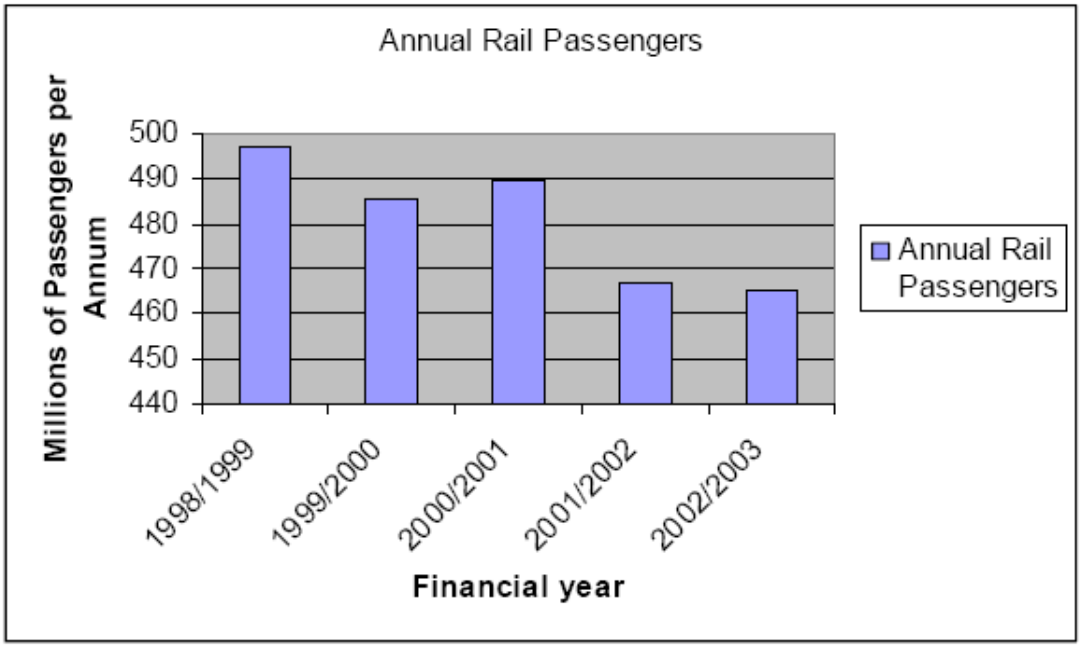


Figure 5.25: Decreasing trend in annual rail passengers, South Africa

Therefore, it is of the utmost importance for the South African government to invest in, and improve, the passenger rail industry, if they want rail transport to be viewed as an essential social service and economic enabler that is to the

good of society as a whole. As an economic enabler, rail transport is still the most affordable means of transportation within South Africa. This can be seen in the following figure:

Figure 19: Cost of commuting by public transport

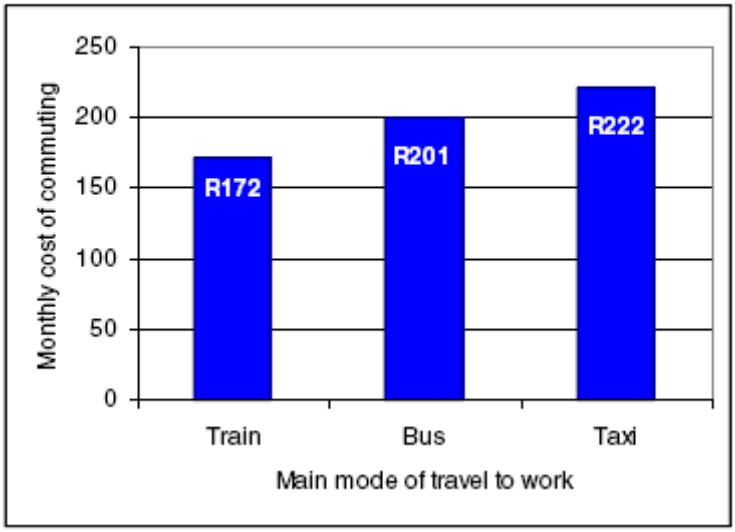


Figure 5.26: Cost of commuting by public transport.

It can be seen from the figure above that rail transport is approximately R30 a month cheaper than bus transport and R50 cheaper than transport via taxi. The author is of the opinion that South Africa has succeeded in utilising this form of transport to reduce the cost of transportation for South African citizens, which would have bearing upon the economic criterion as well as the quality of life, and the poverty rate.

Transport plays a significant role in the social and economic development of any country, and the Government of South Africa has recognised transport as one of its five main priority areas for socio-economic development. According to the White Paper on National Transport Policy (South African Department of Transport, 1996) the transport infrastructure in South Africa represents a significant proportion of Government's total financial investment in fixed assets and, as such, needs to be well managed. To accomplish this, the mission for the transport infrastructure is:

"To provide an integrated, well-managed, viable and sustainable transport infrastructure meeting national and regional goals into the 21st century, in order to establish a coherent base to promote accessibility and the safe, reliable, effective and efficient movement of people, goods and services" (South African Department of Transport, 1996:1).

From this mission statement, it can be seen that the South African government is serious about promoting and investing in the physical transport infrastructure in the country. This seriousness can be seen by the amount of money the government has allocated to the various transport methods in 2007 (Masango, 2007):

- R9 billion for the Public Transport and Non-motorised transport infrastructure for 2010;
- R5.2 billion for airports infrastructure upgrading;
- R63 billion for the preservation and development of the country's road network;
- R7.7 billion for the Taxi Recapitalisation Programme and
- R5 billion for the Bus and Passenger Rail Systems.

Thus, it can be inferred from this commitment by the South African government to invest in transport infrastructure (such as the R5 billion for bus and passenger rail systems) combined with the long length of railway within the country, that South Africa complies with the length of railway indicator of the physical infrastructure criterion. Rail transport is, furthermore, an excelling method of transportation of goods and resources. However, for the storage of these resources, adequate warehouse storage facilities are necessary. In the following section, the author will discuss the high amount of warehouses as the last indicator of the physical infrastructure criterion of the information and knowledge society.

e) Number of warehouses

As discussed in chapter 4, within an information and knowledge society a large amount of warehouse and storage space forms an integral part of the

economy and directly influences the trade, import, export and distribution of goods and products. In South Africa, warehouses are seen in this light and form an important part of the South African business sector. According to Du Toit (2007), senior economist of the ABSA Economic Research Group, the planned industrial and warehouse space increased in 2007 by 2.5%, as can be seen in the building plans that were approved for these structures (Tables 5.46 and 5.47). The main driving force behind this growth was a very strong growth of 23.2% in planned industrial and warehouse space in Gauteng. Another large growth was recorded in completed Industrial and warehouse space where there was a growth of 87.1% over last year, much of which can be attributed to the high rate of completion in industrial and warehouse space in KwaZulu-Natual, which recorded a 330.1% growth over last year. A growth rate of 105.8% in industrial and warehouse structures completed in Gauteng was also recorded. These statistics can be seen in the following two tables:

Table 5.45: Building statistics for January – May 2007.

Building statistics for January-May 2007							
Building plans passed							
	Residential				Commercial		
	Number of units	Y/Y % change	Square metres	Y/Y % change		Square metres	Y/Y % change
Houses of <80m²	14 615	-0.9	644 819	-0.8	Office and banking space	389 210	5.3
Houses of ≥80m²	13 242	-1.2	3 347 597	8.6	Shopping space	411 365	2.9
Flats & townhouses	14 207	17.0	10 742 689	20.9	Indus & warehouse space	874 714	2.5
Total	**42 064**	**4.4**	**14 735 105**	**16.7**	**Total**	**1 675 289**	**3.2**
Buildings completed							
	Residential				Commercial		
	Number of units	Y/Y % change	Square metres	Y/Y % change		Square metres	Y/Y % change
Houses of <80m²	10 636	31.6	441 494	28.2	Office and banking space	289 073	143.5
Houses of ≥80m²	8 827	12.7	1 986 272	11.5	Shopping space	234 081	-19.8
Flats & townhouses	10 435	23.0	1 126 257	1.5	Indus & warehouse space	527 965	87.1
Total	**29 898**	**22.5**	**3 554 023**	**9.8**	**Total**	**1 051 119**	**51.8**
Source: Statistics South Africa							

Table 5.46: Commercial building completed by province.

Commercial buildings completed by province												
	Period	Variable	WC	EC	NC	FS	KZN	NW	GAU	MPU	LIM	SA
Industrial and warehouse space	Jan-May 06	m²	134 361	20 604	1 917	2 859	38 176	4 989	62 336	15 253	1 713	**282 208**
	January-May 2007	m²	195 297	19 650	3 429	2 201	164 179	2 576	128 303	9 831	2 499	**527 965**
		% change	45.4	-4.6	78.9	-23.0	330.1	-48.4	105.8	-35.5	45.9	**87.1**
		% of SA	37.0	3.7	0.6	0.4	31.1	0.5	24.3	1.9	0.5	**100.0**

As can be seen from these statistics, a negative growth was recorded in only four of the nine provinces, namely in Eastern Cape, Free State, North West and Mpumalanga, indicating that these provinces completed fewer industrial and warehouse structures than the previous year. In the other five provinces, a high positive percentage change is visible, indicating that industrial and warehouse space increased over the previous year.

Thus, it can be inferred that South Africa has adequate warehouses to utilise for the export of goods within the country, to store raw materials for manufacturers, and then the finished products for retailers and wholesalers. These warehouses ensure that local markets can be expanded to the various provinces within South Africa and, by utilising the long length of rail, discussed under indicator (d), transport of these products will not be problematic. Accordingly, this will have a direct impact on the economy of South Africa and, thus, upon the indicators of the economic criterion previously discussed.

Therefore, from this discussion regarding South Africa's physical infrastructure, it can be concluded that a very sophisticated transportation system exists in South Africa, consisting of vehicle transport by road, air transport, and rail transport. This transport system, together with the amount of warehouse and storage facilities available, will ensure that South Africa can take part in economic activities such as the import or export of goods, foreign investment, and tourism. These economic activities are stimulated by the adequate physical infrastructure and will, in turn, have an impact upon the economic and cultural criteria of the information and knowledge society. The author, therefore, concludes that South Africa complies completely with the physical infrastructure criterion of the information and knowledge society. This deduction is based upon the comprehensive discussion concerning the comprehensive physical infrastructure available within South Africa and can be summarised as follows:

- High number of motor vehicles;
- High amount of accessible roads;
- High number of airports;
- High amount of railways and

- High number of warehouses.

In the following section, the author will investigate the last criterion of the information and knowledge society, namely the knowledge criterion and apply the identified indicators to Niger and South Africa respectively.

5.5.7 Knowledge criterion

This criterion is discussed in detail in paragraph 3.5.7 in chapter 3, and refers to the ability of countries to use existing global knowledge, by the interaction and exchange of data, information, and knowledge between their local knowledge system and the global knowledge system. Indicators for this criterion are identified and discussed in chapter 4 (see 4.5). As discussed in this chapter, the G8 members renewed their commitment to include everybody within the information and knowledge society so that all can share in the benefits this society would bring. This principle of inclusion states that: "everyone, everywhere, should be enabled to participate in and no one should be excluded from the benefits of the global information society. The resilience of this society depends on democratic values that foster human development such as the free flow of information and knowledge, mutual tolerance, and respect for diversity." Thus, a flow of information from the global information system to the country must be established and maintained for the country to benefit from the advantages of becoming and information and knowledge society. The author is of the opinion that the interaction and exchange of data, information, and knowledge from the countries' local knowledge systems, with data, information, and knowledge from the global knowledge system is, therefore, necessary for the country to become an information and knowledge society. Through this two-way communication process, local knowledge from the country is shared with the global knowledge system, and people accessing this information can learn more concerning the local country's culture, religion, and indigenous population. In this way, the local knowledge of the country can be preserved for generations to come, and mutual tolerance and respect for diversity can be stimulated.

However, to achieve this, sophisticated skills are needed to enable the citizens from the country to analyse, translate, and synthesize global knowledge and then to blend it with local knowledge in order to create new forms of local content. Thus, it can be inferred that literacy (information literacy and computer literacy) is a prerequisite for this interaction and exchange process to take place, and can be identified as the first indicator of this criterion. The literacy rate has already been discussed under the social criterion (see 3.5.4 and 4.5.4). Furthermore, the interaction and exchange of data, information, and knowledge also relies on an efficient ICT infrastructure through which information can be disseminated both easily and readily. Thus, a sophisticated ICT infrastructure can be identified as the second indicator. As this indicator has already been discussed under the spatial and technological criteria, (see 3.5.2 and 4.5.2) the author will not pay further attention to it. In addition to the skills and the sophisticated ICT infrastructure that are needed for this interaction and exchange process to take place, there needs to be information that can be exchanged. Hence, the creation of local content and local e-content can be identified as the third indicator of the knowledge criterion. In the following section, the author will apply the following indicators of the knowledge criterion of the information and knowledge society, to Niger and South Africa respectively:

a) Computer and information literacy skills;
b) Sophisticated ICT infrastructure;
c) Creation of local content/e-content.

Niger

As discussed under the social criterion, Niger has a very low literacy rate. According to the Human Development Report (UNDP, 2006), a mere 28.7% of the adult population of Niger is literate. Of this percentage, the proportion of male literacy further far outweighs the level of female literacy. In 2004, barely 15% of females were literate, compared to 42.9% of males that were literate. In the following paragraph, the author will discuss the computer and literacy skills available within Niger.

a) Computer and information literacy skills

As mentioned above, basic literacy skills within Niger are estimated at only 28.7%. Thus, only 28.7% of the adult population can read and write. However, of these 28.7% very few are computer and information literate. According to the Digital Opportunity Index (ITU, 2006a), Niger was the country with the third lowest score: 0.03 out of 1.00. However, this is not the only index that can be used to measure a country's digital successes and failure. Other indexes, such as the Digital Divide Index and the ICT Opportunity Index can also be used. To quantify whether a country has any computer and information literacy skills, the ICT Opportunity Index can be used. As can be seen in the table below, this index tries to quantify the information density skills of a country. This indicator is made up of statistics concerning educational skills such as literacy rates, as well as specialized skills such as information and computer literacy skills, which form part of the primary, secondary and tertiary education curricula. According to the ITU (2003), there is still no good assessment to measure ICT skills, and for this reason, the measurement of these skills relies on literacy rates and education enrolment statistics. As ICT skills and the pervasiveness of ICT are related, it can be deduced that if there is limited ICT availability in a country, there would also be limited ICT skills.

Table 5.47: Indexes used to measure digital divide

Digital Opportunity Index (DOI)	*ICT Opportunity Index (ICT-OI)*
Opportunity	**Info density: Networks**
1. Percentage of population covered by mobile telephony	1. Main telephone lines per 100 inhabitants
2. Internet access tariffs as a percentage of per capita income	2. Mobile cellular subscribers per 100 inhabitants
3. Mobile cellular tariffs as a percentage of per capita income	3. International Internet bandwidth (kbit/s per inhabitant)
Infrastructure	**Info density: Skills**
4. Proportion of households with a fixed-line telephone	4. Adult literacy rates
5. Proportion of households with a computer	5. Gross enrolment rates (primary, secondary and tertiary)

6. Proportion of households with Internet access at home	**Info use: Uptake**
7. Mobile cellular subscribers per 100 inhabitants	6. Internet users per 100 inhabitants
8. Mobile Internet subscribers per 100 inhabitants	7. Proportion of households with a TV
Utilization	8. Computers per 100 inhabitants
9. Proportion of individuals that have used the Internet	**Info use: Intensity**
10. Ratio of fixed broadband subscribers to total Internet subscribers	9. Total broadband Internet subscribers per 100 inhabitants
11. Ratio of mobile broadband subscribers to total mobile subscribers	10. International outgoing international traffic (minutes) per capita

With regard to the information density skills indicator, Niger only scored 20 out of a possible 100. This was measured by the literacy rate, where Niger only scored 17.6; primary and secondary school along with tertiary enrolment, for which Niger scored 40.0, 6.5 and 1.5 respectively (ITU, 2006a).

To improve this situation, there are a few initiatives underway that hope to increase the overall literacy rate in the country and to provide the Nigerien population with computer and information literacy programs. In 2002, the Nigerien government launched the Ten Year Education Development Program, designed to greatly improve the education situation within Niger. This program has already shown progress with primary school enrolment rates rising to almost 42% in 2002 from 37% in 2001.

Other initiatives from non-government agencies include the initiative from the NAVTI Foundation, which is a non-profit development organisation with headquarters in Kumbo, Cameroon. This foundation launched a computer classroom within Niamey, the capital of Niger, for computer literacy programs. The aim of this initiative is to bring the industrialized world's vast libraries to the fingertips of students. Further initiatives include the computer literacy program of NEPAD. The NEPAD e-school initiative aims to ensure that all students completing secondary school by 2008 are computer literate, and all primary school leavers five years later, in 2012.

Thus, it can be inferred from this discussion that although there are many initiatives underway to ensure the computer and information literacy of the citizen of Niger in the years to come, currently Niger does not comply with this indicator of the knowledge criterion of the information and knowledge society, as there are currently not many information and computer literate citizens in Niger.

In the following section, the author will discuss Niger's deficient ICT infrastructure, which inhibits Niger's becoming an information and knowledge society.

b) ICT infrastructure

As discussed under the spatial and technological criteria, the infrastructure within Niger is extremely poor. According to the World Information Society Report (ITU, 2006a), Niger is ranked 181st of 183 countries, scoring only 0.03 in a scale of zero to one, with regard to digital opportunity. This score is compiled from a score given for the country's digital opportunity infrastructure, and its utilisation thereof. The score for the infrastructure alone was 0.01. This score can be seen in the following figure:

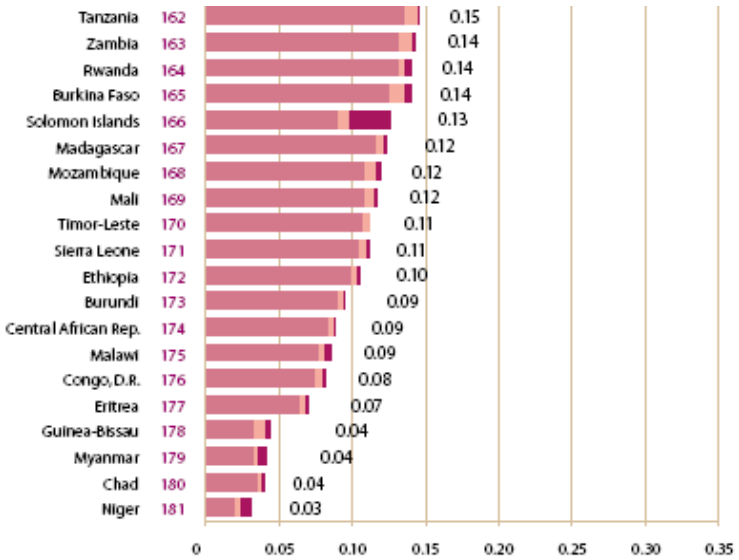


Figure 5.27: Niger's ranking on the Digital Opportunity Index 2005/2006

The following statistics, as discussed under the spatial and technological criteria (see 4.5.2) summarise the ICT infrastructure within Niger:

- 1 personal computer per 1,000 inhabitants;
- 2 internet users per 1,000 inhabitants;
- 0.02% of the total population is internet subscribers;
- Total of 40 000 internet user in the country;
- 0.2 broadband subscribers per 1,000 people;
- 0.2 telephone lines per 100 inhabitants and
- 2.32 mobile phone subscribers per 100 inhabitants.

As can be seen from these statistics, the ICT infrastructure in Niger is wholly inadequate and, accordingly, Niger does not comply with this indicator of the knowledge criterion of the information and knowledge society. In the following section, the author will investigate whether there is any local content available that can be accessed by the very few people within Niger that have access and the skill to do so.

c) Creation of local content/e-content

As discussed in chapter 3, stimulating the development of, and access to, diverse contents is crucial for the development of information and knowledge societies. In Niger, local content is already being developed with the help of RURANET, the rural radio and information network. This network downloads documents via the Afristar satellite. These documents are received by a digital receiver, which is hooked up to a personal computer powered by solar energy. On their wind-up radios, the nomadic herders and farmers of the region are able to listen to advice and news, translated into their own language by local radio presenters, thus, creating of local Nigerien content. This also means that local e-content has, by extension, also been created. There is a Wikipedia edition in Hausa, the indigenous language of Niger that can be accessed at http://ha.wikipedia.org and the Tuareg, the biggest ethnic group in Niger, have a Tuareg website that can be accessed at http://www.shindouk.org/home/.

It is the author's opinion that Niger cannot successfully take part in the interaction and exchange process between their local knowledge system and the global knowledge system. The initiatives that are in place to promote computer and information literacy are not enough to ensure the Nigerien population's participation. All of the initiatives, including the Nigerien government's 10-year educational development program, are currently unable to provide the necessary computer and information literacy skills required by the information and knowledge society. Due to a lack of these skills, combined with Niger's low basic literacy rate and deficient ICT infrastructure, the Nigerien population cannot transfer their own local knowledge to the global knowledge system by participating in internet forums, blogs or by creating their own Web pages. Thus, local Nigerien data, information, and knowledge are not made available using the internet as exchange platform. Furthermore, it is also necessary for the Nigerien population to be able to access locally created information from information systems, such as e-government systems and the internet, in their own local language. In this regard very few government initiatives are underway to ensure that information is made available to the indigenous population of Niger in their own indigenous language. Beyond that, very few Web pages are available that reflect the content or culture of the local indigenous population. Hence the author can deduce that Niger does not comply with any of the indicators of the knowledge criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion above, and can be summarised as follows:

- Low level of computer and information literacy skills;
- Inadequate ICT infrastructure and
- Limited creation of local content/e-content.

In the following section, the author will investigate whether South Africa is in a more favourable position.

South Africa

a) Computer and information literacy skills

With regard to information literacy in South Africa, as the following discussion will show, numerous projects have been underway since 1992, to provide South African citizens with the necessary skills needed within the information and knowledge society. According to UNESCO's, Information Literacy: an International state-of-the art Report (UNESCO, 2007a), the recognition of the importance of information literacy began in 1992 with the 'Senn Breivik Report'. This report, concerning the Western Cape Library project, addressed the need within the tertiary education sector to achieve transformation but with very limited resources. In this report, information literacy was identified as being part of the solution to problems resulting from weaknesses in access to information and the management of information resources. This report resulted in the establishment of one of the first pilot projects in information literacy.

The next important step in the development of information literary within South Africa was the establishment of the INFOLIT program in 1995. This program was funded by a grant of $1 million (US) from Reader's Digest SA and aimed to:

- Promote the concept, value and importance of information literacy and redress to key players in the region;
- Establish a series of pilot projects as a means of spreading information literacy education within South Africa;
- Investigate information literacy models and programs available in other countries that could be adapted for use within South Africa (UNESCO, 2007a).

Shirley Behrens who, in 1994, comprehensively reviewed the local state of information literacy within South Africa, pioneered extensive research into this filed. This was followed by important research papers such as, 'The state of

information education from 1997 – 2002' by De Jager and Nassimbeni (2002). This research showed that there were many information literacy projects and initiatives taking place in South Africa.

At the level of tertiary education, various institutions offer courses to improve the information literacy skills of their students. Many of these courses are accessible from their websites. The following examples are listed by UNESCO's Information Literacy: an International state-of-the art Report (2007a):

- Cape Peninsula University of Technology http://www.cput.ac.za/library/infoLit/index.html an information skills general training course;
- Rhodes University http://www.ru.ac.za/library/infolit/ a general skills training course;
- University of Cape Town http://www.lib.uct.ac.za/Training/lit/infoskills.htm. The information literacy website on the UCT Library's website, offering an information skills corner with a variety of guides;
- University of Johannesburg http://general.uj.ac.za/library/lidi/ujlic/Trainingframe.htm. This is the information literacy section on the University of Johannesburg's library website;
- University of South Africa http://www.unisa.ac.za/. There is a special section under Instruction on the Unisa website, describing the training courses;
- University of Stellenbosch http://www.lib.sun.ac.za/Library/eng/help/IG_Programme/Opleiding/Training_Index.html a catalogue of training course on offer by the Library; http://www.sun.ac.za/library/eng/help/Viewlets/menu.htm. Online training modules on topics such as the OPAC and various databases;

http://www.lib.sun.ac.za/Library/eng/help/Database_Tutorials/PubMed/Pubmed_viewlet_swf.html. A tutorial on how to use PubMed;

- University of the Free State
  http://www.uovs.ac.za/support/library/ilk/index.htm a credit bearing course for first year students at the University of the Free State;
- University of the Western Cape
  The website of the library at the University of the Western Cape offers online user guides on how to search the OPAC and electronic resources. The website has a section for information literacy at http://www.uwc.ac.za/library/ from which an online information literacy module is accessible:
  http://www.uwc.ac.za/library/infolit/infolit%20new/start.html.

With regard to computer literacy, this topic has become increasingly important to the South African government, which has mandated that by 2013 no child will leave a government school without having the necessary computer literacy needed to survive within the information and knowledge society (Fraser-Moleketi, 2007). This mandate will be strengthened by initiatives such as the establishment of a council to oversee the development of 'e-skills' in the country. These initiatives will be supported by the IT industry in South Africa, which is setting up new training centres to provide the necessary skills training for the South African population. According to President Mbeki the new e-skills council, comprising members of government, business and academia, would fast track the process of improving ICT skills in the country. According to the President, improving South Africa's ICT infrastructure would be of little use if the South African population could not benefit from the use thereof, due to a lack in computer skills.

Thus, it can be inferred from all these computer and information literacy initiatives and programs on secondary, tertiary, and national levels, that South Africa complies with this indicator of the knowledge criterion of the information and knowledge society. In the following section, the author will discuss

whether South Africa has the needed ICT infrastructure to become an information and knowledge society.

b) ICT infrastructure

As was discussed under the spatial and technological criteria, the ICT infrastructure in South Africa looks much more promising than that of Niger. In 2006, South Africa was placed 37th out of 115 countries surveyed in the World Economic Forum's (WEF's) Global Information Technology Report 2005/06. This ranking places South Africa ahead of countries such as China, Greece, Hungary, Italy, and India for its overall ICT readiness.

However, on the Digital Opportunity Index of 2005/2006, South Africa is only placed 86th of 183 countries, scoring 0.42 in a scale of zero to one, with regard to digital opportunity. This score is compiled from a score for the countries digital opportunity infrastructure and the utilisation thereof. For South Africa's infrastructure, the score was 0.24, indicating that this infrastructure has to be improved considerably if South Africa is to become an information and knowledge society in future (ITU, 2006a).

The following statistics, as discussed under the spatial and technological criteria (see 5.5.2) summarise the ICT infrastructure within South Africa:

- 66 personal computers per 1,000 inhabitants;
- 8.4% of the South African population has access to a computer;
- 4 279 200 internet subscribers in South Africa in 2006;
- 9.02 internet subscribers per 100 people;
- 3.5 broadband subscribers per 1,000 people in 2005;
- 800,000 broadband subscribers accounts active by the end of 2007;
- 4 924 500 fixed lines in 2001;
- 33 960 000 mobile subscribers in 2006 and
- 71.6 mobile subscribers per 100 inhabitants.

Thus, it can be seen that, although South Africa's telecommunication and network infrastructure is much better than that of Niger, it still is not adequate when compared to the developed countries, and will not be able to sustain an information and knowledge society that requires extensive telecommunication and network infrastructures. Accordingly, South Africa does not comply with this indicator of the knowledge criterion.

c) Creation of local content/e-content

Within South Africa, many government initiatives are underway to create local South African content, as well as local content in the indigenous languages of the ethnic population of South Africa. The government of the Western Cape, which launched the first trilingual e-government Web portal in 2004, has spearheaded these initiatives. This portal can be accessed at www.CapeGateway.gov.org. This portal provides Western Cape residents with a single point of access to government information and services in the province's three official languages, namely isiXhosa, English and Afrikaans (South Africa Info Reporter, 2004). This initiative was followed by the launch of the 'isiZulu' website in 2004. This site carries the same content as the printed isiZulu newspaper. As a result, it would encourage isiZulu readers who may have been hesitant or unable to go online before, to use the internet as an information tool.

A very important government initiative in the area of content in indigenous languages was the creation of TISSA in 2006 by the South African Department of Arts & Culture. TISSA is the Telephone Interpreting Service for South Africa and provides professional and efficient telephone interpreting services to all those who need to access government information in a language of their choice. With the use of this communication tool, all South African citizens now have access to government agencies, and can be served in a language of their choice, provided it is an official language in South Africa (Van der Merwe, 2005).

Further initiatives include the writing of bilingual dictionaries for the smaller ethnic minority languages within South Africa, such as isiNdebele, siSwati, Xitsonga and Tshivenda. According to the chief executive officer of the Pan South African Language Board (PanSALB), Cynthia Marivate, all 11 official languages of South Africa now have a formal dictionary (Benton, 2005).

According to Gadebe (2005), the Independent Communications Authority of South Africa (ICASA) has also launched initiatives to promote local language content. This authority granted the country's public broadcaster licences for two more regional television stations to be broadcast in indigenous languages. These stations will be known as SABC4 and SABC5. SABC4 will cater for Setswana, Sesotho, Sepedi, Tshivenda, Xitsonga and Afrikaans, whilst SABC5 will cater for isiZulu, isiXhosa, Siswati and Afrikaans.

Spurred on by these many government initiatives to provide local content to the South African citizens, the IT industry had also provided software in local languages enabling South Africans to use a computer in their indigenous language for the first time. In 2006, Microsoft released an isiZulu version of the Windows XP operating system and promised the release of a Setswana version within a year (South Africa Info Reporter, 2006). Furthermore, on a national level there are also various initiatives and programmes of the National Research Foundation, along with the various universities, that will stimulate the creation of local content through the offering of various bursaries and grants to academics within the country. This local content is usually in the form of articles that are written in accredited journals and are, thus, available to the global research community.

From all these initiatives from both government and industry, it can be deduced that South Africa complies with the creation of local content indicator of the knowledge criterion. However, it is the author’s opinion that South Africa only partially complies with the knowledge criterion of the information and knowledge society, due to the problems pertaining to one of the indicators, namely the effective and efficient ICT infrastructure within the country. Although South African citizens have the needed information and computer

literacy skills to be able to successfully take part in the interaction and exchange process between their local knowledge system and the global knowledge system, the current ICT infrastructure within the country limits this interaction. As already discussed, this is due to the fact that only 11.54% of the country's population has access to the internet, and there are only 7.26 personal computers per 100 inhabitants. Compared to the developed countries like America where 76% of the population own or have access to a computer, this figure is extremely low. The author can therefore deduce that South Africa only partially complies with the knowledge criteria of the information and knowledge society. This deduction is based upon the comprehensive discussion above, and can be summarised as follows:

- High level of computer and information literacy skills;
- Inadequate ICT infrastructure and
- Comprehensive creation of local content/e-content.

Thus, from this lengthy discussion, it can be seen that Niger does not comply with six of the seven criteria of an information and knowledge society. As was shown in the discussion, Niger does not have a stable economy. This can be seen in the high unemployment rate, low standard of living and low GDP. It was also shown that Niger has a very deficient ICT infrastructure. Very few people in Niger have access to a personal computer or the internet, and the main telephone penetration is very low. With regard to the political criterion, it was illustrated that the existing information based rights are not practically applied and protected within Niger and that the Niger population does not partake within the political processes of the country. Furthermore, the citizens of Niger have very poor health prospects and few education opportunities. The author deduced this form the low literacy rate within Niger, combined with the low amount of years of compulsory education. It was also argued that there are very few modern public services such as e-government, e-health and e-learning initiatives available in Niger. In terms of the physical infrastructure criterion, it was shown that Niger has a very inadequate physical infrastructure consisting out of very few motor vehicles, few accessible roads, no railways and very few airports. Due to the poor education opportunities and deficient ICT infrastructure, the citizens of Niger have a very poor computer

and information literacy rate and cannot adequately create local content for distribution via example the internet. Hence, it can be deduced that Niger cannot be classified as being an information and knowledge society and will, thus, not be able to benefit in full (if at all) from all the advantages of this society results.

With regard to South Africa, the country is in a much more favourable position than Niger, and will be able to become an information and knowledge society much quicker as a result. As can be seen from the discussion, South Africa complies completely with three of the stated criteria, complies partially with one of the criteria and to a limited extend complies with the remaining three criteria of the information and knowledge society. With regard to the economic criterion, South Africa's economy is more stable than that of Niger as could be seen from the lower unemployment rate. The standard of living of South African citizens is also higher than the citizens of Niger. This can be contributed to the lower poverty rate and a higher real income per person. With regards to South Africa's ICT situation, it was argued that South Africa has a relatively sophisticated infrastructure although access to this infrastructure is very expensive for most South Africans. Furthermore this ICT infrastructure is not well distributed within the country and is mostly available in the urban areas. With regard to the political criterion it can be seen from the discussion that all the information based rights such as the right to freedom of expression, access to information as well as intellectual property rights, are protected within South Africa and that there is an increase in the citizen's participation within the political processes of the country. The author also discussed the health prospect and education opportunities of South African citizens and it was argued that these are much better than those in Niger. This could be contributed to the lower mortality rate and higher life expectancy of the South African citizens combined with the higher literacy rate and higher amount of years of compulsory education. Furthermore, these citizens have access to many modern public services such as e-government, e-health and e-learning initiatives. Due to the improvement in universal access within South Africa, many citizens have access to digital libraries where the cultural diversity of the country can be stored and protected. In terms of the physical

infrastructure within South Africa, the citizens have access to many motor vehicles, accessible roads, many airports, railways and warehouses. With regard to the knowledge criterion, many initiatives are underway to ensure that the South African citizens have a high computer and information literacy rate which would enable them to successfully create local content and distribute this content via the internet. Consequently, it can be deduced that South Africa still is not an information and knowledge society, although the prospects of becoming such a society in future are very promising.

In the following table, this discussion is summarised:

Table 5.48: Summary of Niger and South Africas' position in terms of identified criteria of the information and knowledge society

Criteria	**Does not comply at all**	**Slightly complies**	**Partially complies**	**Complies completely**
Economic	Niger	South Africa		
Spatial & Technological	Niger	South Africa		
Political	Niger			South Africa
Social	Niger	South Africa		
Cultural		Niger		South Africa
Physical infrastructure	Niger			South Africa
Knowledge	Niger		South Africa	

In the following section, the author will discuss the barriers that prevent countries like Niger, from becoming information and knowledge societies. These barriers further inhibit the developing country from interacting with the global knowledge system and transferring their local knowledge to the global information system and vice versa.

5.6 BARRIERS PREVENTING THE INTERACTION AND EXCHANGE OF DATA, INFORMATION, AND KNOWLEDGE FROM THE LOCAL KNOWLEDGE SYSTEM WITH THE GLOBAL KNOWLEDGE SYSTEM

As mentioned previously, many obstacles and barriers prevent countries from becoming information and knowledge societies. These barriers also impede the countries' ability to take part in the interaction and exchange process of data, information, and knowledge between their local knowledge system and the global knowledge system. This interaction and exchange process assists the countries to comply with the needed criteria to become information and knowledge societies. Thus, if this interaction and exchange process does not take place, countries find it very difficult to comply, and will it take much longer for the country to comply with the stated criteria. As could clearly be seen in the discussion on Niger, various barriers prohibit this interaction and exchange process, resulting in Niger not complying with the criteria of becoming an information and knowledge society, and thus contributing to the growing digital divide within the country, as well as the divide between the country and the rest of the world.

In this context, Van Dijk & Hacker (2003) distinguish between four kinds of barrier that can contribute to this growing divide. These barriers are: lack of elementary digital experience; no possession of computers or network connections; lack of digital skills; and lack of significant usage opportunities. Other authors (Benjamin & Dahms, 1999; Shade, 2002; Fienberg, 2002; Lor, 2003) writing about this digital divide, as well as on the topic of utilising ICT for development, elaborate on various other barriers that exist, but it is the author's opinion that all the barriers can be condensed to seven main barriers.

The seven barriers that the author has identified, mirror the seven criteria of the information and knowledge society. In the opinion of the author, when any of the seven criteria are not complied with, then they become a barrier to the country's becoming an information and knowledge society. If these barriers are overcome, then the digital divide resulting from the barrier is overcome and the country can, accordingly, comply with the stated criteria and become an information and knowledge society. Therefore, these barriers are:

- economic barriers;
- technological barriers;
- political barriers;
- social barriers;
- cultural barriers;
- physical infrastructure barriers and
- knowledge barriers.

Seen from the perspective of the information and knowledge society, and the information needs of citizens within this society, these barriers can be viewed in conjunction with the information needs hierarchy of Maslow (1970), seen in the following diagram:

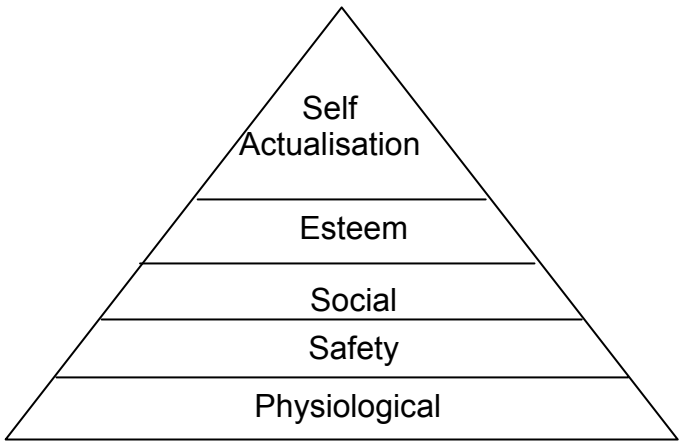


Figure 5.28: Maslow's hierarchy of information needs

From this perspective the following parallels can be drawn, as seen in Figure 5.29:

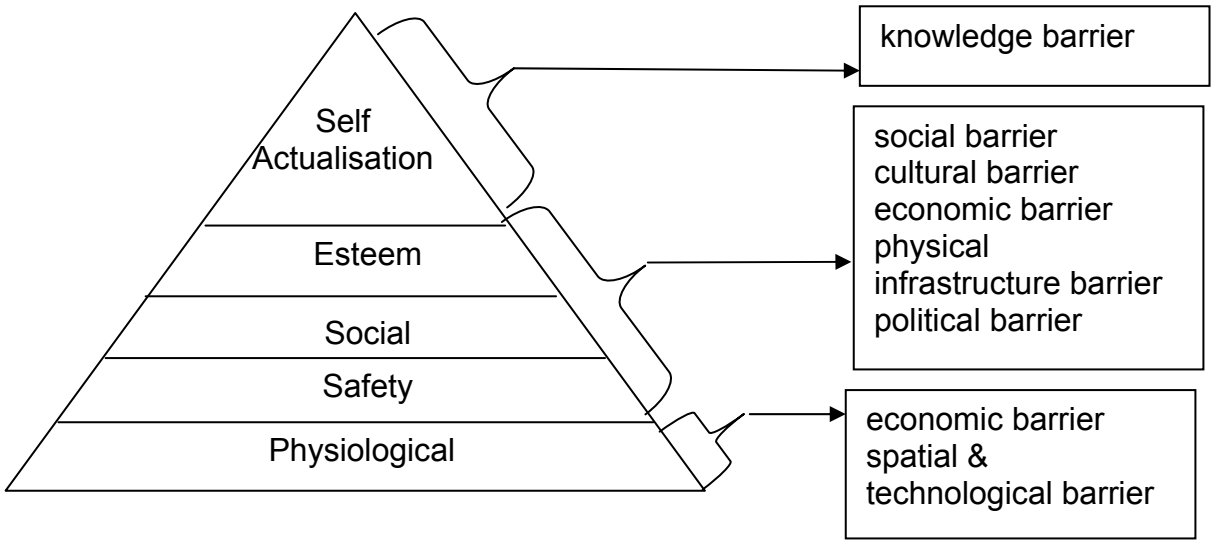


Figure 5.29: Parallels' between the stated barriers and Maslow's hierarchy of information needs

Thus, to fulfil the basic physiological needs of a country, firstly, the economic barrier will need to be overcome, i.e. the people of the country would need money to buy food. The spatial & technological barrier will also have to be addressed. This would help in fulfilling physiological needs, for example, having an adequate ICT infrastructure to supply access to information on water purification and other basic needs. However, overcoming the spatial & technological barrier will, furthermore, be dependant upon overcoming the economic barrier, as the community will have to obtain the finances needed to invest in ICT equipment and infrastructure.

Safety, along with the social and esteem needs, can be fulfilled by addressing the social, cultural, political and economic barriers. To explain this further, if the money were available for an adequate ICT infrastructure, then the people would be able to access information about medical conditions like malaria. This information would affect their health and safety, but the information would not be of use unless there was also a physical infrastructure, whereby the needed medicine could be delivered to the people of the country, as well as the needed political rights so that the creators of the medicine intellectual property will be protected.

Self actualisation information needs, such as creativity and problem solving, can be fulfilled by addressing the knowledge barrier through the creation of local content for the specific country.

From this perspective, the author can deduce that the efforts and initiatives of developing communities, governments and aid organisations, will benefit from focussing firstly, on overcoming existing economic and spatial & technological barriers, so that the communities' basic physiological needs and basic human right needs are met, before focussing on overcoming other social, cultural, political, and knowledge barriers. In the following section, these barriers will be discussed in more detail.

5.6.1 Economic barriers

The financial barriers that developing communities and countries face are numerous. They can also be viewed as the underlying causes for many of the other barriers, for example, the spatial & technological barrier. Restricted access to technology, as a result of poverty, results in technological barriers. However, if this technological barrier is purely an economic problem, it might be overcome should economic solutions be put in place. These solutions will be discussed in the following chapter.

As a result of contributing factors, for example corruption, tribalism, nepotism, dictatorship, and vote rigging, present in developing communities and countries, the vicious cycle of poverty has only been perpetuated (Onyango, 2000). In Africa, this has resulted in a continent that has 13% of the world's population producing only 1.7% of the world's wealth. According to Onyango (2000), between 1985 and 1995, Africa's *per capita* GDP was declining at the rate of 1.1% per annum overall.

This situation has also not improved over the last few years. In a paper that is part of ongoing research on chronic poverty in South Africa by the Programme for Land and Agrarian Studies (PLAAS) at the University of the Western Cape and the Chronic Poverty Research Centre (CPRC) in Manchester, Du Toit

(2005) paints a very negative picture. The research referred to by Du Toit (2005) in this paper, is based on data collected as part of a process of collaboration with the Chronic Poverty Research Centre (CPRC), a 'development research centre' funded by the British Department for International Development (DfID). According to this data, many of the South African population can be classified as being chronically poor. The Chronic Poverty Research Centre defines these people as "those who experience poverty for extended periods of time or throughout their entire lives, whose children are also likely to remain poor, and who have benefited least or are likely to benefit least from economic growth and national and international development initiatives," (Chronic Poverty Research Centre, 2004).

According to Du Toit (2005), most studies in the field of poverty reduction have focused on the data from the social surveys and censuses that have been put into the field since 1994 by Statistics South Africa. These include the following:

- October Household surveys (conducted every year between 1994 and 1999);
- Household Income and Expenditure Surveys (1995 and 2000) and
- Labour Force Surveys run twice yearly since 2000, and the Census 1996 and 2001.

However, using these statistics can be problematic. One of the biggest problems faced by Statistics South Africa has been the deficiencies of censuses earlier than the late 1990's. These national surveys were not guided by any adequate national sampling frame (Du Toit, 2005), which meant that statistics from the October Household Surveys and Household Income and Expenditure Surveys had to be re-weighted, which can result in conclusions being sensitive to the re-weightings (Fedderke, Manga & Pirouz, 2004).

According to the South Africa Human Development Report of 2003 (UNDP, 2003b), the proportion of people living below the 1995 poverty rate of R354 per adult per month, declined only marginally from approximately 51% to 48%.

At the same time, the number living in extreme poverty – defined as a dollar a day at purchasing power parity – increased from 9.4% (3.7 million) to 10.5% (4.7 million) (UNDP, 2003b). The most optimistic interpretation of these statistics is that poverty in South Africa has remained stagnant and that the benefits of growth have not reached the poor (Whiteford & Seventer, 2000). This notion is supported by President Mbeki's so called 'two economies' debate. According to this debate, many people in South Africa, especially rural South Africa, are still trapped in a 'third world economy' that exists side by side with first world economy more present in the cities (Mbeki, 2003).

When revisiting Maslow's (1970) hierarchy of information needs, the financial barrier becomes very important. Four million people living under harsh conditions, earning less that one dollar a day, will hardly be concerned about satisfying needs other than their own basic physiological needs: i.e. water, food, shelter, clothing. Only if these needs can be met, and this economic barrier overcome, can attention be given to the other needs: those of safety, social, esteem and self actualisation.

The author directly experienced the harsh reality of the physiological needs over all others, through involvement in the rural information resource centre in a small village called Apel. Apel is an isolated community of about 20,000 people, situated about 60km southeast of Pietersburg, in Sekhukuneland, South Africa. In this village, the Universal Service Agency (U.S.A) established a telecentre. Unfortunately, this telecentre faced numerous financial barriers and could never become self-sustainable. One of the first problems encountered was the theft of the computer equipment. On the first occasion, the thieves were apprehended when they tried to resell a personal computer worth approximately R4000, for less than R100. The attempted resell value sought by the thieves indicates the value this equipment had for them. The reason they stole the equipment in the first place was so that they could purchase food. Possible solutions to these problems and ways to possibly overcome the economic barrier will be discussed in the following chapter.

It is the opinion of the author that the economic barriers seriously impede the countries' ability to interact and exchange data, information, and knowledge between their local knowledge system and information in the global knowledge system. As mentioned previously, a significant level of financial help need to be invested within a country's ICT infrastructure for this infrastructure to be effective. If there are prevailing economic barriers within the country, such as high poverty rates, and high unemployment rates then there is no money available. This results in no infrastructure being available and the citizens of the country cannot benefit from the advantages associated with the use of ICT.

For example, the overall GDP of a country can be improved by the introduction of e-commerce business ventures. However, due to economic barriers such as high poverty rate and high unemployment rate, there is no money to invest in an effective ICT infrastructure. Without the investment, business ventures cannot take place and the economic condition of the country cannot be improved. The interaction and exchange process is impacted in the same way. If there is an efficient ICT infrastructure available, then economic barriers, such as the unemployment rate of a country, can be improved through the exchange of data, information, and knowledge between the country's local knowledge system and the global knowledge system. This can be achieved through the use of ICT, for example, the internet. Through utilising the Internet as an exchange platform, local job opportunities for example jobs in the local tourist market, can be made available on the World Wide Web, where people of other communities and countries can see and access this opportunity. If this exchange of data, information, and knowledge does not take place, then people in the community and in neighbouring communities will not be aware of these opportunities and, therefore, not benefit from them. In a similar fashion, members of a local community can access job opportunities offered in the rest of the world, thus improving work opportunities and improving the overall employment rate of the specific community or country. Unfortunately, the opposite of the above scenario is also true. Due to the impeding economic barriers such as the high poverty rate, and high unemployment rate, then there will not be enough money in the

country to invest in an ICT infrastructure and the interaction and exchange process cannot take place and, thus, not contribute to the economic situation of the country.

5.6.2 Spatial & technological barriers

Probably the most discussed barriers preventing developing countries from reaching the information and knowledge society are those associated with spatial and technological issues. These dominate the physical path towards the information and knowledge society – the information superhighways: ICT and existing technological infrastructure. These highways are the key enablers for developing communities to access and use information. However, these same highways are problematic or non-existent within developing communities and countries.

This potential lack is a huge concern for the development of these communities and countries. Jimba (1998) is of the opinion that hardly any nation can now develop without adequately organizing its information infrastructure. The most important building block of such an infrastructure is the telecommunication system of the developing community or country, and these statistics do not paint a very positive picture. At the Global Information Conference in Brussels, Belgium, in 1995, Africa's telecommunication situation was summarized as follows: there are more telephone lines in New York City that in the whole of the African continent (Afullo, 2000:206). This situation has only marginally improved over the last decade. According to the World Telecommunication / ICT Development Report 2006 (ITU, 2006b), the following statistics are relevant to summarise the telecommunication situation present in Africa. To provide a point of comparison and place these statistics into context, statistics will also be provided for Europe, the Americas, and Asia. These statistics will be categorized into mobile penetration, internet penetration, and broadband subscribers (ITU, 2006):

Mobile penetration rate 2004:

- Europe - 71%

- The Americas – 43%
- Asia – 19%
- Africa – less than one in ten people subscribe to mobile

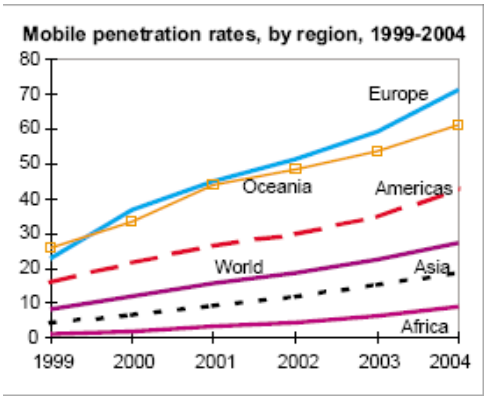


Figure 5.30: Mobile penetration rates by region, 1999 – 2004

Of the three categories, the category concerning mobile penetration within the developing world has significantly improved in the past three years. According to the ITU ICT Eye (2007), the following are the most current statistics pertaining to mobile subscribers:

Table 5.49: Mobile penetration 2006

	Mobile cellular subscribers 2001 (000)	Mobile cellular subscribers 2006 (000)	Per 100 inhabitants 2006	As a % of total telephone subscribers 2006
Africa	**25'309.4**	**198'200.9**	**21.59**	**87.1**
Americas	**223'417.3**	**558'051.0**	**61.95**	**65.6**
Asia	**341'212.4**	**1'136'885.9**	**29.28**	**64.8**
Europe	**357'147.5**	**767'601.2**	**94.29**	**70.4**
Oceania	**13'701.2**	**24'074.6**	**72.57**	**66.5**

As can be seen from the information within this table, the mobile situation within Africa has significantly improved since 2004, showing that this digital divide is slowly shrinking. Although the situation is slowly improving with regard to the mobile penetration within Africa, a huge digital divide is still present when the number of mobile subscribers in Africa is compared to the number within Europe.

Internet penetration rate 2004:

- The World – 13.2%
- Europe - 31.1%
- The America's – 28.2%
- Asia – 8.1%
- Africa – 2.6%

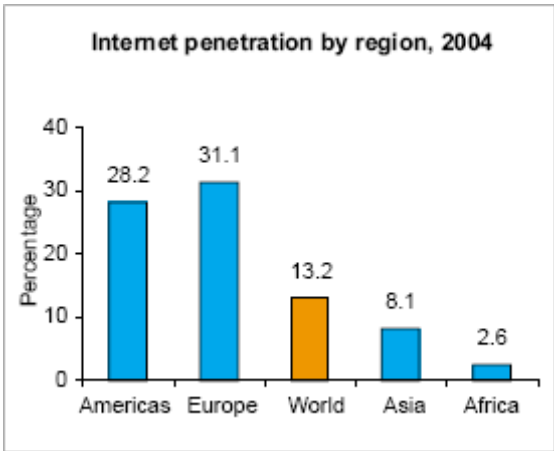


Figure 5.31: Internet penetration rates by region, 2004

By the end of 2004, it was estimated that there were, approximately, 840 million internet users in the world, equating to 13.2% of the total population. From this total, only 2.6% users were living in developing countries within Africa.

Broadband penetration rate 2004:

- Europe - 27.7%
- The America's – 30.5%
- Asia – 41.1%

- Africa – 0.1%

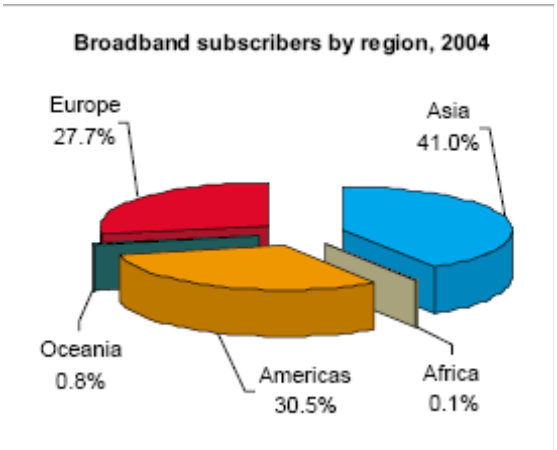


Figure 5.32: Broadband subscription by region, 2005

These statistics suggest that there is still a huge digital divide in terms of ICT levels that exists between the developed continents like Europe, the Americas, and Asia, and the developing countries in Africa. These statistics are supported further when looking at the spatial and technological indicators of Niger and South Africa (see 5.5.2) and the same indicators for Norway and the USA (see chapter 4, 4.5.2). As the discussion on Niger and South Africa has shown, the governments of these countries will have to address these deficient ICT infrastructures if they want to become information and knowledge societies. As mentioned previously, these spatial & technological barriers prevent the interaction and exchange of data, information, and knowledge between the countries local knowledge system and the global knowledge system. If the ICT infrastructure within the country were ineffective and deficient, then the citizens of the country would not have access to a computer or internet connection through which to utilise the internet as a platform for the interaction and exchange process. In the same way, if there were no broadband connections available, citizens in the country would be discouraged from transferring their local knowledge to the global knowledge system, as it would simply take too much time using a normal dial-up connection. Furthermore, this will have an impact upon the affordability of the information and connection as a dialup connection is charged per second that the user is connected, which would discourage citizens even more from

transferring their local knowledge to the global knowledge system. In this way, the spatial and technological barrier prevents citizens from benefiting from the advantages associated with the use of ICT and, thus, prevents them from becoming information and knowledge societies. Further barriers preventing them from becoming information and knowledge societies are the problems pertaining to the political barrier, which will be discussed in the following section.

5.6.3 Political barrier

As could be seen in the discussion pertaining to the political criterion of the information and knowledge society, a country can only become an information and knowledge society if it has the necessary infrastructure and levels of democracy to ensure the information-based rights of citizens. The information-based rights are those such as freedom of information, freedom of expression and intellectual property rights (see chapter 4, 4.5.3). Unfortunately, obtaining democracy is still a very big problem especially for many developing countries within Africa as can be seen in the following Map of Freedom, which shows which nations are Free, Not Free or Partially Free:

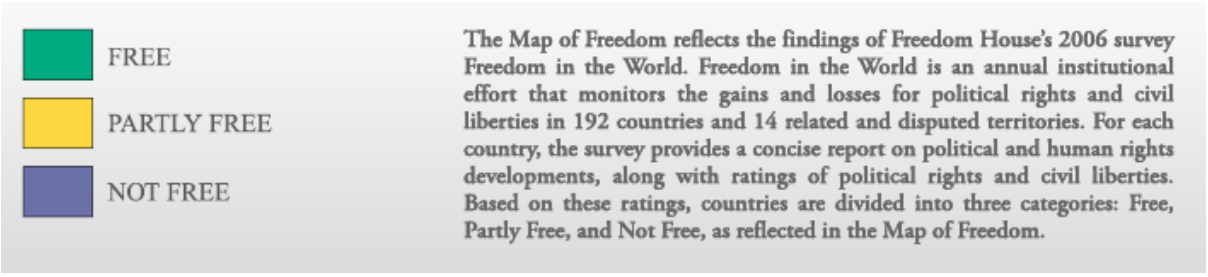


Figure 5.33: Map of freedom

As can be seen in this map, the majority of countries within Africa are regarded as being either partly free or not free at all. The author is of the opinion that this political barrier will greatly impede the interaction and exchange of data, information, and knowledge from the countries' local knowledge system and the global knowledge system. As previously mentioned, the information-based rights of citizens, such as freedom of information, freedom of expression and intellectual property rights play a very important role in the interaction and exchange of data, information, and knowledge between the countries' local knowledge systems and the global knowledge system. If the citizens in a country do not have the right to access information as well as the right to freedom of expression, these citizens will not take part in the interaction and exchange process due to fear of prosecution. The exchange of their data, information and knowledge from their local knowledge system with knowledge from the global information system will be inhibited, the more so if they do not have the rights to access the global information system. These statements can be illustrated by the following example. In a country where there is no freedom of expression, a citizen will not have the freedom to exchange his/her thoughts and beliefs concerning his/her political view on for example a political discussion forum on the internet, for fear of being traced and prosecuted. In a country where there is no right of freedom of access to information, a citizen will also not have the freedom to partake within this interaction and exchange process utilising the internet as exchange platform as they might not have the right to access the internet. Furthermore, if there are no intellectual property rights in place within the country, the citizens of that country would not share their local knowledge with the rest of the world in the global knowledge system, because their

intellectual activities as creators would not be protected. For example, a local medical practitioner will not share a local cure to an illness in the global knowledge system as this cure would not be protected by intellectual property rights and would thus be able to be copied and used by others with no financial or other form of recognition for the original creator. Thus, these political barriers impede upon the interaction and exchange process, and prevent the country from complying with this criterion and becoming an information and knowledge society.

The author is furthermore of opinion that although intellectual property rights are meant to protect the intellectual property of the creator, these rights often impede or restrict access to the information, and become an additional barrier for developing countries to overcome. This sentiment is echoed by Britz & Ponelis (2006). According to these authors, intellectual property rights are legal mechanisms that make information excludable. This information can play an important role in the education of society, especially information contained within scholarly journals. When reflecting upon this scholarly information and the intellectual property rights that are applicable on it, various moral issues come to light. For example, the intellectual property rights of this information are usually held by the publishers of the scholarly journals. Due to the stricter control of access to these journals through high pricing, developing countries cannot afford to access the vital information contained within these journal. This brings the following moral question to the front, namely is the high pricing of scholarly information justifiable? Advocates of this ethical and moral point of view (Eysenbach, 2006; Fournier, 2005; Harnad, 2005) often look at open access as an answer to this ethical question. In essence, open access is free, immediate, permanent, full-text, online access, for any user, web-wide, to digital scientific and scholarly material, especially research articles published in peer-reviewed scholarly journals. As ethics falls outside the scope of this thesis, the author will not discuss these issues in further detail.

5.6.4 Social barriers

As the social barriers have an impact on all aspects of human life, they are very complex. Firstly, social barriers prevent a good quality of life, for example, prevailing illnesses that will have an impact upon the life expectancy and mortality of the citizens. These barriers also include lack of access to medical practitioners and medical facilities. Secondly, social barriers prevent the citizens from obtaining a good quality education, i.e. literacy rates and problems pertaining to the education system in the country. They also inhibit the availability or access to modern public service such as e-government, e-health and e-learning initiatives. Social barriers that are of particular interest to this study prevent the affordability, availability, and accessibility of information, and include language barriers that prevent citizens from accessing and understanding the information.

All these social barriers have an impact upon the interaction and exchange process. If the citizens in the country are too sick to access information from the global knowledge system, then the interaction and exchange process will not take place. Furthermore, if the citizens are illiterate and/or on a very low education level, then they will not be able to harness the power of ICT and will also not be able to take part in the interaction and exchange process. These barriers will also prevent citizens from accessing initiatives like e-government, e-health and e-learning through which, data, information, and knowledge can be exchanged. For example, local medical knowledge from the local knowledge system will not be able to be transferred to the global knowledge system where it would be able to help other people. In terms of barriers pertaining to affordability of information, if people cannot afford the cost of access to a computer or internet connection, then the interaction and exchange process will also not take place. Furthermore, if people cannot understand the information from the global knowledge system due to the language barriers, then they will also be discouraged from taking part in the interaction and exchange process, as the information obtained from the global knowledge system would be of little value to them.

5.6.5 Cultural barriers

As mentioned previously, of all the criteria of the information and knowledge society discussed in the previous chapter, those which entail changes in cultural values or morals are the most difficult to identify. This also applies to the barriers that impede upon these values and morals. Cultural barriers firstly impede upon the citizens' ability to establish a culture of universal access to information and communication technologies. These barriers include the economic barriers such as high poverty rate, and high unemployment rate, as well as the spatial and technological barriers such as low computer penetration, low broadband penetration, and low internet penetration. Secondly, there are barriers that prevent the establishment of, and accessibility to, digital library initiatives that would include the social barriers discussed above. Further barriers include the unavailability of rights that would protect indigenous peoples, their knowledge, and their culture. Lastly, there are tourism barriers that prevent the country from benefiting from the tourism industry. Such barriers would include continuing ethnic violence, crime, and any other barriers that would prevent tourists from visiting the specific country.

These barriers further impede the interaction and exchange process of data, information, and knowledge between a local knowledge system and the global knowledge system. If there were numerous spatial and technological barriers present in the country combined with the barrier of no universal access, then the citizens of the country would not be able to take part in the interaction and exchange process. Accordingly, if there were numerous technological barriers present, as well as policy barriers preventing the establishment and use of digital libraries in a specific country, then the local knowledge of the country would not be able to be made available within such a library and the cultural diversity of the country would not be preserved. Furthermore, if there is no protection for the rights of indigenous people, their knowledge or their culture, then these people would not be inclined to share their local knowledge with the rest of the population by utilising the internet as a platform. In this way, the interaction, and exchange of data, information, and knowledge would not take

place and the indigenous knowledge of the people would not be present in the global knowledge system. Accordingly, this information would also not draw tourists to the specific country and the country would not benefit from this industry.

5.6.6 Physical infrastructure barriers.

As mentioned previously, these barriers do not affect the interaction and exchange of data, information, and knowledge directly, but have an impact upon the other barriers, which do have a direct impact upon the interaction and exchange process. As mentioned above, barriers pertaining to the physical infrastructure of the country include the low number of vehicles available in the country. The non-existence of roadway or the bad condition of the existing roadway are further barriers that would prevent the country from becoming an information and knowledge society. Furthermore, if there is no or at least a very low geographic distribution of railway and other transport infrastructure, such as airports, then that will also be a barrier for the country to become an information and knowledge society. These barriers have a direct impact upon the economic condition of the country as the physical infrastructure is used for the distribution of people and resources, which can contribute to the countries GDP. Thus, if there are prevailing physical infrastructure barriers, then the economic barriers, such as low employment and high poverty rate will be further aggravated. The last barrier that also affects the import and export of goods and resources from the country and, thus, the overall economic condition of the country, is the availability of warehouses for the storage of these goods. This barrier will inhibit the import and export of more goods and resources if there are not enough storage facilities within the country. This will affect the economic condition in the country, which will affect the overall standard of living within the country. In turn, this will determine whether or not the country can become an information and knowledge society.

5.6.7 Knowledge barriers

According to the Okinawa Charter on the Global Information Society (2000), the resilience of a society depends on democratic values that foster human development, such as the free flow of information and knowledge, mutual tolerance, and respect for diversity. Thus, any barrier that would inhibit this free flow of information in the interaction and exchange process will prohibit the country from becoming an information and knowledge society. The last group of barriers, thus, pertains to the ability of the citizens within the country to access information that is available within the global knowledge system, and also relates to the social barriers discussed above. Within an information and knowledge society, the citizens need specialized skills to access and utilise information. Basic literacy skills, as discussed under the social barriers, are not adequate and more specialized skills, such as computer and information literacy, are required, therefore. The lack of these skills, thus, constitutes a big barrier for countries to overcome if they are to become information and knowledge societies.

Furthermore, this free flow of information as represented by the interaction and exchange of data, information, and knowledge, also relies on an efficient ICT infrastructure through which information can be easily and readily disseminated. Spatial and technological barriers such as low penetration of computers, low internet penetration, and low broadband penetration will prevent this free flow of information and the interaction and exchange process will not take place.

In addition, the availability and accessibility of locally generated content in the global knowledge system is very important for the country to become an information and knowledge society. As mentioned previously, UNESCO is of the opinion that the stimulation of the development of and access to diverse content is crucial for the development of information and knowledge societies. Thus, the non-existence of locally developed content is a barrier that would prevent the country from becoming an information and knowledge society. This barrier will further also prevent the successful interaction and exchange

of data, information, and knowledge from the local knowledge system with information within the global knowledge system, as the citizens will be intimidated by the non-existence of local information and, thus, not be inclined to partake in this process.

As can be seen in this discussion, there are numerous barriers that prevent the interaction of data, information, and knowledge from the countries' local knowledge systems with the global knowledge system and, thus, prevent the countries from becoming an information and knowledge society. It is of the utmost importance that these barriers be overcome, so that the countries can comply with the stated criteria of this society. Only then, will these countries be able to take advantage of all the rewards and benefits that arise from being an information and knowledge society, as discussed in chapter 3 (see 3.6.2). Possible solutions to these barriers and recommendations will be provided in the next chapter of this thesis.

5.7 CONCLUSION

As was shown in this chapter, least developing countries such as Niger have not progressed far down the path towards becoming an information and knowledge society, due to many factors including economic, social and technological barriers. Although the situation within South Africa, a developing country, is significantly better than that of Niger, South Africa currently also does not comply with all the criteria of an information and knowledge society. The barriers in the path towards becoming an information and knowledge society are the criteria of this society with which the developing and least developing country does not comply. As was argued in this chapter, all these barriers impede on these countries ability to share their own indigenous or local knowledge with the rest of the world, as well as inhibiting the countries' ability to receive, understand and contextualise information from the global knowledge system. This prevents the interaction and exchange of data, information, and knowledge between the countries' local knowledge systems and the global knowledge system. This limited or non-existent interaction between the countries' local knowledge systems and

the global knowledge system will have to be rectified, so that the developing country can become an information and knowledge society and share in all the advantages thereof, as discussed in chapter 3.

In this chapter, the concepts 'developing' and 'least developed' were discussed and the author investigated whether developing countries can truly benefit from globalisation. However, it was shown that this process is reliant upon a sophisticated ICT infrastructure that is inefficient or non-existent within developing countries, as in the case of Niger and South Africa. This inefficient ICT infrastructure or digital divide can be viewed as a challenge faced by many developing countries and was discussed in detail in this chapter. It was further shown that one of the big consequences of this divide is that it deters the developing countries from becoming information and knowledge societies. This deterrence of developing countries and communities from becoming information and knowledge societies, and reasons for this deterrence were discussed by the author by applying the indicators of the criteria of the information and knowledge society, as identified in chapter 4 (see 4.5) to Niger and South Africa respectively. The discussion showed that Niger does not comply with most of the indicators and is, accordingly, not an information and knowledge society. It was clear from this discussion that South Africa is in a much more favourable position than Niger with regard to becoming an information and knowledge society in the future, due to the fact that South Africa complied with many of the indicators of this society, although sometimes just slightly or partially.

The chapter was concluded with a short discussion relating to the barriers that a developing country has to overcome in order to become an information and knowledge society in future. In the following, concluding, chapter of this thesis, a visual representation of the problems encountered by developing countries will be provided, as well as a short summary of the current situation of the four countries used in this thesis, namely, Norway, USA, Niger and South Africa. The thesis will be concluded by providing possible solutions and recommendations to overcome the above-mentioned barriers. In this way, developing countries will be able to overcome these barriers, become

information and knowledge societies and not suffer further marginalisation by the developed countries.