PART IV: RECOMMENDATIONS

CHAPTER 6

RECOMMENDATIONS AND POSSIBLE SOLUTIONS FOR OVERCOMING THE BARRIERS PROHIBITING COUNTRIES FROM BECOMING INFORMATION AND KNOWLEDGE SOCIETIES

6.1 SETTING THE SCENE

In Part I, the introduction & framework, 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 author also provided a theoretical framework upon which the study is based.

The author sketched the theoretical foundation in Part II of the thesis, providing a brief historical perspective of the study domain, Information Science. Important concepts such as data, information, knowledge, global-, western-, and scientific knowledge as well as indigenous-, traditional-, and local knowledge, were defined and discussed, as these concepts form the foundation on which the thesis is grounded. Furthermore, the phenomenon of the global information and knowledge society was discussed, as one of the opportunities presented by globalization. Criteria were identified that can be used as useful tools to measure whether or not a country has become an information and knowledge society. From this definition and supporting literature the author discussed the following criteria, which supply valuable information with regard to what is required for countries and communities to become information and knowledge societies (see 3.5):

- economic criterion;
- technological and spatial criteria;
- political criterion;
- social criterion;
- cultural criterion;

- physical infrastructure criterion and
- knowledge criterion.

In Part III, the practical application, these criteria were investigated further and indicators identified for each (see 4.5). In the first instance, these indicators were applied to developed countries, and it was shown that these countries (Norway and the USA) comply with them and are, thus, information and knowledge societies. In both these countries, a sophisticated ICT infrastructure is available that could enable the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. Furthermore, this interaction and exchange process aids these countries to comply with the other stated criteria of the information and knowledge society.

However, in developing countries such as Niger and South Africa, an effective and efficient ICT infrastructure is not fully available, and could, therefore, not fully enable the interaction and exchange process. In its turn, this exchange process could not, therefore, aid these countries to comply with the other criteria of the information and knowledge society due to the numerous barriers in their way toward this goal. The following barriers were identified:
- economic;
- technological and spatial;
- political;
- social;
- cultural;
- physical infrastructure and
- knowledge.

Thus, it is of the utmost importance that the governments of these developing countries work together with aid organizations to overcome these barriers, so that these nations can become information and knowledge societies and end the marginalization they face from the developed countries.

In this chapter: Part IV, recommendations, a table will be provided to summarize the positions of Norway, USA, Niger and South Africa in terms of their relative information and knowledge society status. This chapter will be concluded with proposed solutions and recommendations that will be provided by the author and that can possibly be used to overcome the barriers identified in the previous chapter.

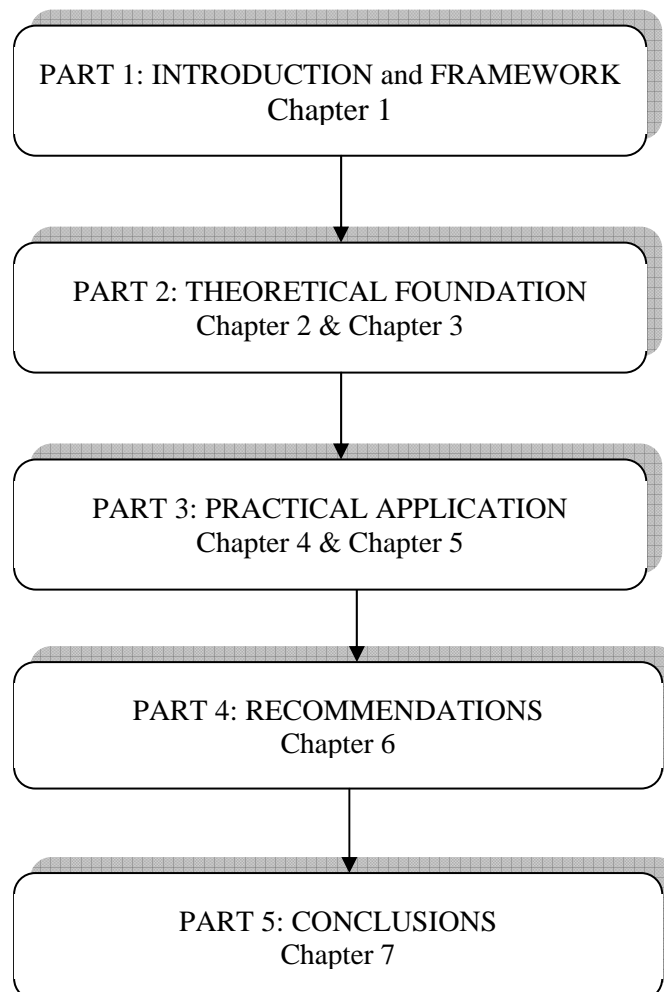Thus, the various parts of this thesis can be seen in the following diagram:

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┌──────────────────────────────────────────┐
│  PART 1: INTRODUCTION and FRAMEWORK      │
│              Chapter 1                    │
└──────────────────────────────────────────┘
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│  PART 2: THEORETICAL FOUNDATION          │
│        Chapter 2 & Chapter 3              │
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│  PART 3: PRACTICAL APPLICATION           │
│        Chapter 4 & Chapter 5              │
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│  PART 4: RECOMMENDATIONS                 │
│              Chapter 6                    │
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│  PART 5: CONCLUSIONS                     │
│              Chapter 7                    │
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Figure 6.1: Outline of the thesis

6.2 SUMMARY OF DEVELOPED AND DEVELOPING COUNTRIES COMPLYING WITH CRITERIA OF INFORMATION AND KNOWLEDGE SOCIETY

As was shown in chapter 4 (see 4.5), both Norway and the USA comply with the majority of the criteria of the information and knowledge society. Norway complies completely with six out of the seven stated criteria, with only partial compliance with the physical infrastructure criterion. The USA complies completely with five out of the seven, and partially to the social and cultural criteria. It was concluded in chapter 4, that both these countries are information and knowledge societies. However, the same cannot be said for Niger and South Africa. Niger does not comply with six of the seven stated criteria, and only slightly complies to one of the stated criteria. South Africa, on the other hand, is in a much better position, complying fully with three out of the seven criteria, partially complying with a one more, and complies to a limited extend with the remaining three. Thus, it was concluded in chapter 5 (see 5.5) that Niger is still very far away from attaining the goal of becoming an information and knowledge society, whereas South Africa is nearly half way there.

The status of these countries with regard to complying with the criteria of the information and knowledge society can be summarized in the following table:

Table 6.1: Summary of developed and developing countries complying with criteria of information and knowledge society

Criteria	Does not comply at all	Slightly complies	Partially complies	Complies completely
Economic	Niger	South Africa		Norway USA
Spatial & Technological	Niger	South Africa		Norway USA

Political	Niger			Norway USA South Africa
Social	Niger	South Africa	USA	Norway
Cultural		Niger	USA	Norway South Africa
Physical infrastructure	Niger		Norway	USA South Africa
Knowledge	Niger		South Africa	Norway USA

This table can be used by aid organisations and governments to see where the principal barriers are that inhibit the progress of their country towards becoming an information and knowledge society.

With regard to Niger, taking Maslow's (1970) hierarchy of information needs into account, more assistance needs to be given to the country to improve their overall economic position and, thus, overcome the economic barrier. Attention must also be given to overcoming the spatial and technological barriers as this infrastructure can be used to provide information to the citizens of Niger that will help fulfil their basic physiological needs: information on how to purify water, for example. As was shown in the discussion on Niger in chapter 5, overcoming the spatial and technological barrier will also enable the interaction and exchange of data, information, and knowledge between their local knowledge system and the global knowledge system. In turn, this will assist the country to comply with the rest of the stated criteria. For South Africa, it can be deduced from the above table, that similar attention needs to be given. The economic and spatial & technological barriers present need to be overcome, as does the social barrier, for South Africa to become an information and knowledge society in future.

Norway needs to address the issues pertaining to the physical infrastructure within the country and the USA seriously needs to overcome the health and mortality issues prevailing in the country, which prevents the country from complying completely with the social criteria. The government of the USA also needs to address issues pertaining to the rights of Indigenous people within the country, as this hinders their complying with the cultural criteria of the information and knowledge society.

In the following section, the central problem statement of this thesis will be provided in a diagrammatical representation as a way to summarise all the previously discussed issues and problems pertaining to this thesis. Based upon this representation, the author will then provide possible solutions and recommendations that can be implemented to overcome the barriers in the way of developing countries becoming information and knowledge societies.

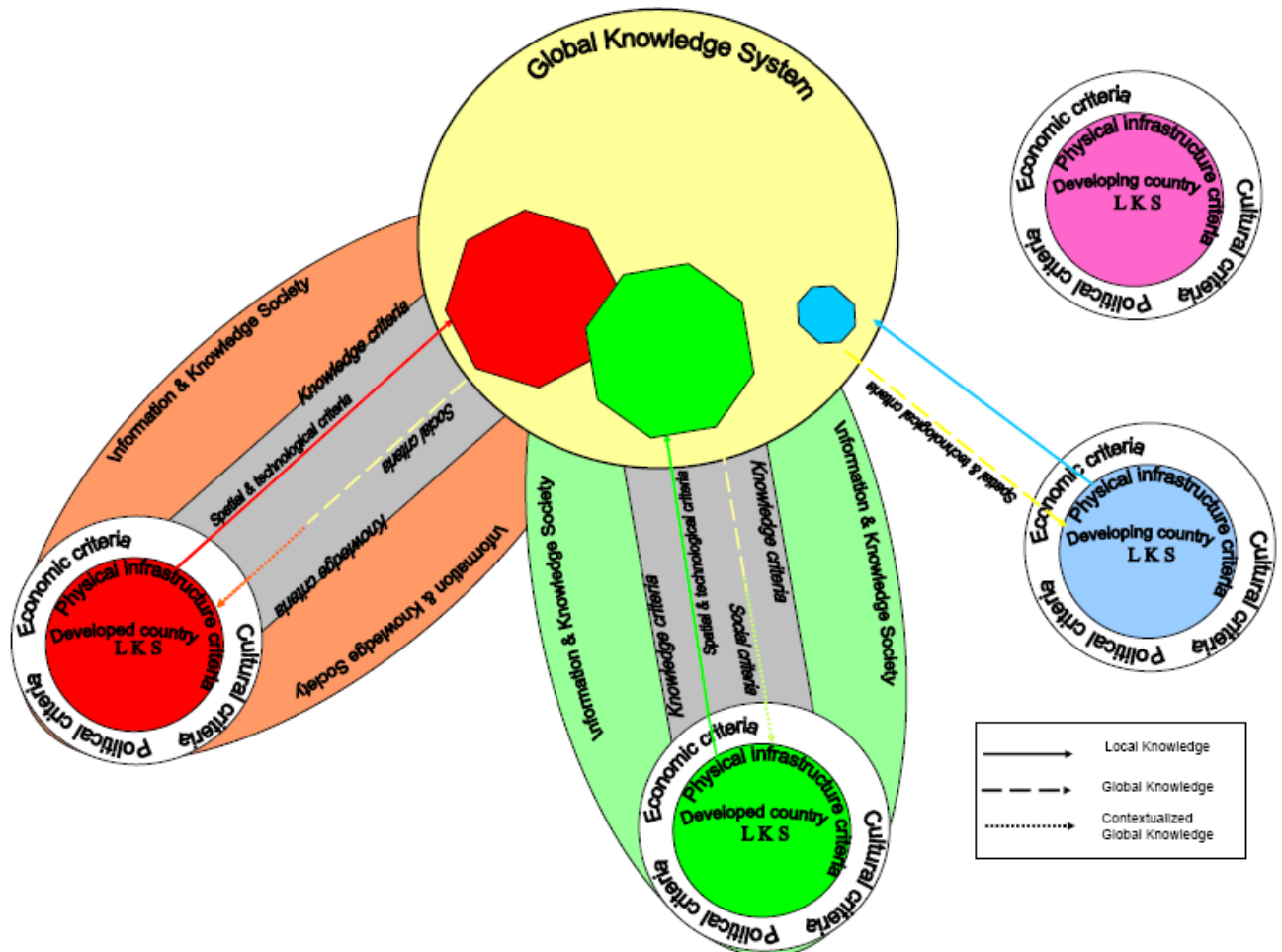## 6.3 DIAGRAMATICAL REPRESENTATION OF CENTRAL PROBLEM STATEMENT

Figure 6.2: Diagrammatical representation of central problem statement

In the figure above, the problem statement, and issues pertaining to this problem statement, can be clearly seen. The figure shows that developed countries, such as Norway and the USA (indicated by the red and green circles) are information and knowledge societies as they comply with all the stated criteria of such a society. However, these countries do not function in isolation, and function within a bigger economic, political, and cultural environment, where the economic, political and cultural criteria play a significant role. Within a developed country, an effective physical infrastructure is present, which can contribute to industries such as tourism, which, in turn, stimulate the bigger economic environment in which this developed country functions. Furthermore, an effective and efficient ICT infrastructure is available, through which the citizens of the country can

access the global knowledge system (indicated by the big yellow circle). This infrastructure is also used to transfer locally created content (indicated by the red and green solid arrows) from the developed country's local knowledge system (LKS) to the global knowledge system, where it can be accessed globally. In turn, data, information, and knowledge from the global knowledge system can be accessed through the technological infrastructure by the citizen of the developed country (indicated by the big dashed line).

However, this global information is not always in a language can be understood by citizens, or in a context that is useful. Fortunately, due to the various factors found in the social criteria to which the developed countries comply, such as high literacy, and the number of years of compulsory education, these citizens are able to contextualise this information, and make it relevant to their local situation and environment. Thus, this information becomes contextualised global information (indicated by the small dashed yellow arrow). This contextualised global information becomes part of the developed country's local knowledge system (indicated by the small dashed yellow arrow's colour changing more and more to the colour of the developed communities LKS). In this way, a two-way exchange of data, information, and knowledge between the developed country's local knowledge system, to the global knowledge system is established (indicated by the broad grey channel). This interaction and exchange process further aids the developed country to comply with the other stated criteria of the information and knowledge society. When all the criteria have been complied with, it can be concluded that these developed countries have become information and knowledge societies (indicated by the light red and green oval shapes). Thus, this information can be used to further the development of the country, and, in this way, the country can benefit from all the advantages the information and knowledge society brings, indicated by the overlapping of the red and green ovals with each other along with the yellow global knowledge system.

For developing countries however, it is not as easy to become information and knowledge societies. As was shown in chapter 6 (practical application), developing countries, such as Niger and South Africa, have an ICT

infrastructure that is very inefficient or non-existent. This deficient infrastructure, such as in the case of Niger, is not adequate for utilisation by the citizens of these countries to transfer their local knowledge to the global knowledge system. In the same way, due to the non-existence of this infrastructure, global information from the global knowledge system that possibly could be used for the fulfilling of their basic physiological needs cannot be accessed. The pink circle depicts this situation. In developing countries such as these, a two-way interaction and exchange of data, information, and knowledge cannot take place. This marginalises them even more, as this interaction and exchange process cannot aid the developing country to comply with the rest of the stated criteria of an information and knowledge society. The ultimate goal of becoming and information and knowledge society is thus an unattainable dream. This is depicted by the pink circle standing in complete isolation, away from other countries as well as from the global knowledge system.

In developing countries where an ICT infrastructure does exist, yet is just very inadequate, such as in the case of South Africa, information from the global knowledge system can be accessed. This situation in depicted by the blue circle. However, in this case, although this ICT infrastructure can be used to access global information, this global information is not, necessarily, contextualised and made locally relevant to the developing country's unique situation, as most of the citizens will not have the necessary skills to do this. Such countries do not comply to the social criteria of the information and knowledge society, and so factors, such as literacy rate, education level, health, language, therefore inhibit the contextualisation of the global information. These factors also play a role in the transfer of local content and knowledge to the global knowledge system. Due to the barriers associated with the inadequate ICT infrastructure, combined with the issues pertaining to the social barriers, this seldom takes place and in the rare cases where it does, the local knowledge contributed to the global knowledge system is very little (as indicated by the small blue hexagon). Thus, in cases like these, the two-way interaction and exchange of data, information, and knowledge, that constitutes the knowledge criterion does not take place and, thus, as in the

case of South Africa, these countries will find it difficult to become information and knowledge societies. The end result of this can clearly be seen in the figure, where there is very little or no locally created content and knowledge available in the global knowledge system. It is of the utmost importance for these developing countries to overcome the existing barriers that prohibits them from becoming information and knowledge societies. In the following section, the author will provide possible solutions and recommendations that can be used to overcome the stated barriers.

6.4 PROPOSED SOLUTIONS AND RECOMMENDATIONS TO EXISTING BARRIERS PROHIBITING DEVELOPING COUNTRIES FROM BECOMING INFORMATION AND KNOWLEDGE SOCIETIES

From the discussion pertaining to Niger and South Africa in chapter 5, it can be inferred that there are a large number of barriers that can lead to a developing country not complying with the stated criteria of the information and knowledge society. For this reason, the author will provide only a selected number of proposed solutions and recommendations that are most relevant in the context of this thesis. As matters pertaining to finances and the economic situation of these countries are the biggest barriers to overcome, the author will start this section with solutions and recommendations to overcome the economic barrier. Once this barrier has been overcome, other barriers will, in turn, be easier to bridge.

6.4.1 Overcoming the economic barrier

One of the biggest factors concerning the economic situation of developing countries is the amount of external debt these countries have to the richer developed countries and multilateral agencies. However, as eradicating extreme poverty and hunger is the first of the eight millennium development goals (UNDP, 2003a), multilateral agencies such as the IMF and World Bank have implemented various programmes to eliminate the external debt of developing countries. Initiatives such as the Multilateral Debt Relief Initiative (MDRI) and the Heavily Indebted Poor Countries (HIPC) Initiative are both

initiatives that hope to assist these countries to reach this millennium goal. These initiatives are also based upon economic and social reforms. Countries that wish to make use of these initiatives must undertake social and economic reforms and establish comprehensive long-term strategies for sustainable growth. In and of themselves, these strategies, such as improving failing health systems, and improving education systems, will help to overcome other issues such as the social barrier. However, cancelling the debt of these countries is just a short term solution, and will not prove to be successful in the long run. Similarly, it is also not the author's objective to resolve problems that have existed since the dawn of time. However, the author will based on the context of this thesis, provide possible solutions and recommendations that could improve the economic conditions of these countries in a more sustainable manner.

It is the author's opinion that applying for and complying with the economical and social reform that is needed to obtain debt relief, is the first step on a very long and winding road to eradicating poverty in the developing countries. With such debt relief initiatives in place, these countries can use the money that would have been spent on debt repayment, on other critical areas within the country, such as the failing health systems. It would be very difficult for governments to decide where the money should be spent first, as there are so many critical areas that need attention in these countries. The author is, therefore, of the opinion that there is no one right place to start, seeing that even if an excellent argument can be made to start by investing money in the health system, an even better counter argument can be made to start by investing in areas such as water and sanitation. Furthermore, it is also important to note that the development of these various areas within the developing countries does not take place in a certain chronological order, but rather, all the areas need to develop simultaneously. In the same way, overcoming the various barriers must not be seen as a chronological process, but as a continuing process that takes place simultaneously at all points. As the central focus of this thesis is the interaction and exchange process of data, information, and knowledge, the author will concentrate on the improvement of the ICT infrastructure, so as to enable this interaction and

exchange process. Thus, it is important to note that the author is not of opinion that this is more important than fulfilling the basic physiological needs of hunger, thirst and shelter.

Thus, after a country has fulfilled the requirements, applied for, and received debt relief, the ICT infrastructure of the country must be improved. In turn, this will create more job opportunities within the country as a whole, since new industry will be established. This will thus reduce the poverty of the citizens of the country and increase their standard of living. In addition, through the utilisation of this infrastructure, services such as e-commerce can be developed that will further contribute to the country's national GDP. Although the majority of citizens of the developing countries will not benefit immediately from initiatives like these, these initiatives need to be put in place to ensure the sustainability of this infrastructure. On a grassroots level, there are also initiatives that can be implemented. Such initiatives will allow the normal citizen of the country will feel the benefits of the improvement of the ICT infrastructure. One such example is the marketing and selling of the local culture of the country, including readily existing arts, crafts, and music to the international community through the utilisation of this infrastructure. For example the Trading Post is a website advertising souvenirs and handcrafted artworks that are exclusive to the local people of Bushmans Kloof in South Africa   (http://www.bushmanskloof.co.za). This will improve the economic situation of the citizens of the country, which, in turn, will have an effect on other barriers such as the social barrier. When citizens have access to more finances, social aspects such as health and education will also be improved. Thus, through the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system, the economic position of even the poorest citizens can be improved.

On a higher lever, the overall economic condition of the country can be improved by the marketing of the country in terms of improved tourism. Through the utilisation of the ICT infrastructure, the cultural diversity and heritage of the country can be used as a marketing tool, to draw more tourists to the specific country. In its turn, this will also help to overcome the cultural

barrier. As a consequence of increased tourism, the GDP of the country will also increase, as will employment opportunities in the country. A lower unemployment rate in the country will have a positive effect on the overall poverty rate and, thus, will effect the overall standard of living of citizens within the specific country.

Thus, it can be seen that through the improvement and establishment of an effective and efficient ICT infrastructure, which will enable the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system, the economic situation of citizens as well as the country as a whole can be improved.

6.4.2 Overcoming the spatial & technological barrier

Unfortunately, in order to overcome the spatial and technological barriers faced by developing countries a large amount of money is required. The ICT infrastructure within developing countries needs to be improved if they want their dream of becoming an information and knowledge society to come to fruition. The first step in this process is the establishment of a National Information and Communication Infrastructure policy. To assist developing countries within Africa, the United Nations Economic Commission for Africa (ECA) has developed a National Information Communication Infrastructure policy for its member states. The ECA assist these countries to deploy, harness, and exploit ICT for their socioeconomic development. For the citizens of these countries to have access to affordable telephones, computers, internet, and broadband services, these countries need to adopt concrete measures. These include developing sound regulatory frameworks for service providers and telecommunication providers as well as human resource capacity building. The policies, plans, and strategies required to achieve this, form part of a National Information Communication Infrastructure Policy. Thus, in the case of developing countries who have not yet implemented such a policy, the first step in overcoming the spatial and technological barriers is to adopt such a strategy.

However, the establishment and adoption of such a policy takes time, and even more time is needed for the establishment of the physical ICT infrastructure. To provide the citizens of developing countries with a more immediate form of affordable access to services such as telecommunication services, computer, and internet services, a telecentre or information resource centre is often seen as the solution. Providing universal access to ICT services in this way also helps overcome the cultural barrier, as universal access is one of the indicators of the cultural criterion. The term 'telecentre,' however, causes significant confusion, due to the myriad types of centres that exist. As the discussion on achieving universal access within South Africa has shown (see chapter 6), there are Multipurpose Community Centres, American Telecentres, Public Information Terminals, and Citizens' Post Offices in South Africa alone. All the various types of centres are referred to as 'telecentres.' However, the author would like to concentrate on the two main types of centres, which are the small entrepreneurial phone-shops and the bigger, donor-funded, resource centres. Research in South Africa has proven that the smaller entrepreneurial phone-shops are sustainable, however they can only provide basic telecommunication services and do not offer any computer or internet services. Only the bigger, donor-funded, resource centres offer these services, but these have been proven to be unsustainable, as various such initiatives in South Africa have shown.

According to the author's own experience of being involved in one such telecentre (situated in a village called Apel in Sekhukhuneland, Northern Province, South Africa), there are various reasons that contribute to the failure of these types of telecentres. The first reason is that the mangers of these centres never have a stake in them. In other words, due to the donor funding, the manager of the centre is not running the centre to provide income for the donors. This stifles the mangers' collective entrepreneurial spirit and results in centre managers just staying on for the period that the donor money provides sustainability before moving on to the next donor-funded centre. What is lacking in these centres is one individual within the community who has the willpower and ambition to truly drive such a centre. Such individuals have

been referred to by authors such as Fuchs (1998), Dorsey, Hess & Fuchs (2000) and Roman & Colle (2002), as the 'local champions'.

Furthermore, the whole approach to the establishment of these centres needs to be re-addressed. The author is of the opinion that these centres should not be established in isolation (as in the case of Apel), but should instead form part of the existing local community infrastructure. These centres should be established within the local churches, clinics, schools, and libraries. This fact was also supported through the author's own experiences in visiting various telecentres in Hungary. These 'telecottages,' as they are referred to in Hungary, all form part of existing facilities, such as community health clinics, and community centres, and they are all sustainable.

In addition to establishing these resource centres using already established facilities, the author is of the opinion that the value of these centres must be shown to the local citizens in a way that allows them to see and feel the benefits of using this ICT infrastructure. When these citizens realise the potential value of utilising this ICT infrastructure, then they will be much more inclined to use these services. For example, through the interaction and exchange of data, information, and knowledge between the citizens' local knowledge system and the global knowledge system, these citizens can market and sell their local produce, arts, and crafts utilising the internet as exchange platform, and feel the economic benefit of this exchange process. In this way products of their local knowledge can be made available in the global knowledge system. By demonstrating the value of this infrastructure and the interaction and exchange process, it becomes easier to overcome the economic barriers, as the standard of living will increase when citizens start earning more money and, thus, poverty will decrease along with unemployment.

Thus, establishing telecentres, in conjunction with a local champion within the community, within an existing infrastructure such as a library or clinic, and in such a way that the value of this technology is demonstrated to the local

community, is one proposed solutions for overcoming the spatial and technological barrier within developing countries.

6.4.3 Overcoming the political barrier

As can be seen from the discussion pertaining to Niger's complying with the political criteria, although many developing countries have legislation protecting the information-based rights of their citizens, these laws are not practically executed. This can be seen, specifically, in the right to freedom of expression which is often not respected by the governments of developing countries, leading to the arrest and prosecution of citizens who dare to express opinions that are not in line with the ruling government of the time. This also has an impact upon the methods of information distribution within the country. If governments of these developing countries ensure the protection of information-based rights of their citizens, more distribution channels such as newspapers would feel free to operate within the country. This will also help to overcome the social barrier, in terms of improving the methods of information distribution. Thus, the first step for developing countries' governments is to ensure high levels of democracy by establishing information-based rights within their constitutions, if this is currently lacking. Where these rights already exist, then governments have a challenge to practically execute them by protecting and respecting these rights of their citizens.

Furthermore, governments of developing countries need to increase the citizens' participation within the political processes of the country. This can be achieved by utilising the ICT infrastructure and implementing initiatives such as e-government and e-voting. By creating modern public services like these, citizens will be encouraged to take a part in the political processes of the countries. In its turn, this will also help to overcome some of the social barriers. Citizens, who have been unable to vote due to geographical limitations, will finally be able to partake in the political process and, in this way, voter turnout will also be increased. Thus, it can be seen that through the utilisation of e-government and e-voting initiatives, interaction and

exchange of data, information, and knowledge from the local knowledge system and the global knowledge system will be enabled and stimulated. For example through the utilisation of an existing ICT infrastructure, citizens will be able to partake in international or national political discussions using the discussion forums and blogs made available via the e-government initiatives. During these discussions, local political knowledge of the citizens can be exchange with global political information of other people in the global knowledge system and can these citizens thus become aware of important global political issues. This interaction and exchange process will thus result in more citizen participation within the political processes of the country which will ultimately aid the country to become an information and knowledge society.

6.4.4 Overcoming the social barrier

Of all the barriers to overcome, the social barrier is the most complex as it pertains to nearly all aspects the life of a citizen. In the first instance, the social barrier is overcome through reforms that will allow the country to qualify for debt relief. This relief comes from initiatives such as the HIPC and the MDRI from the World Bank and the IMF. Such reforms include strategies that need to be put in place by the government of the developing country for the improvement of the health system and education system within the country. Overcoming the social barrier through these reforms will also improve the quality of life in the country.

The author is of the opinion that the quality of life for most citizens can also be improved through the utilisation of e-health initiatives. E-health initiatives will stimulate the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. In this way, the local citizens can make local information pertaining to local health remedies available on the global knowledge system where other countries and communities can access it and benefit from it. Citizens who, in the past, have been too far removed (geographically) from any health services will, in

this way, also benefit from medical advice obtained through the exchange process.

In the same way, the education level of a country's citizens can be improved through the utilisation of e-learning initiatives. Using the ICT infrastructure, citizens can improve their current education level as well as their literacy level. With the necessary infrastructure in place, citizens of developing countries can access digital libraries, such as the International Children's Digital Library, and improve their literacy rate. Furthermore, this will have a direct impact upon other barriers, such as the economic barrier. Citizens with a higher education level will be able to find employment much easier, and that, in its turn, will reduce the unemployment rate and decrease the poverty rate within the country.

With regard to the barrier presented by a lack of usable content, many initiatives exist that seek to overcome this. Firstly, the language barrier is significant with regard to information in the global knowledge system. In the past few decades a great deal of research has been done in the area of Cross Language Information Retrieval systems. With the use of these systems, a search query can be entered into a search engine in the natural indigenous language of the citizen. This query is then translated by the system into the language of the database of documents. In the case of the internet, this would be, for the most part, English. Although CLIR is only one step in translating the query, initiatives such as these make it easier for citizens to obtain access to more relevant information available on the internet. The author is of the opinion that once these systems become easier to use and more widely available to developing countries, citizens of these countries will be more inclined to utilise the ICT infrastructure for the retrieval of global information. This information could, in turn, be used to fulfil their physiological needs: information concerning new methods to purify water, or dry food and vegetable for storage, for example. In addition to initiatives and systems like these, the author is of the opinion that governments of developing countries need to invest into creating more local electronic content that is in the language their citizens can easily understand. This will also have an impact

upon the knowledge criterion, as the creation of more local content will stimulate the interaction and exchange of data, information, and knowledge between the local knowledge system and the global knowledge system. If citizens in the country were less intimidated by the language barrier, then they would be more inclined to participate in the interaction and exchange process, and the local contribution to the global knowledge system would continue to grow.

Pertaining to the problems of the affordability of usable information, access to telecommunication infrastructures such as an affordable internet connection can be achieved through the telecentre initiatives discussed under overcoming the spatial and technological barrier. These centres will enable citizens to participate in the interaction and exchange process at a price that is affordable to them. With regard to the problems pertaining to information being readily available and disseminated within the country, the author is of the opinion that by increasing the amount of local internet hosts in the country, more local information will be able to be made available. Thus, information would be more accessible to the citizens of the country in a language they can easily understand. Furthermore, this will have an impact upon the knowledge barrier and the spatial and technological barrier, as the more local internet hosts there are within the developing country, the more local content will be available to its citizens. Increasing the number of internet hosts within the developing country will further extend and improve their ICT infrastructure. Although there are still numerous social barriers that need to be overcome, the author is of the opinion that these possible solutions and recommendations will be a good start in overcoming the most visible of the social barriers.

6.4.5 Overcoming the cultural barrier

Possible suggestions to overcome the cultural barrier have already been discussed as the cultural barrier is so interwoven with the other aspects in the citizens' life. Creating a culture of universal access to telecommunication facilities can be overcome through the implementation of telecentres as

discussed under the spatial and technological barriers. Furthermore, increasing tourism through the marketing of the cultural heritage of the specific developing country is another solution to overcoming the cultural barriers present within developing countries.

The governments of developing countries need to address certain aspects in order to overcome some of the cultural barriers. Perhaps the largest of these revolves around the protection of the rights of the indigenous population, their culture, and their knowledge. Through ratification of these international human rights, the indigenous population within the country will feel free to participate in the interaction and exchange process seeing that they would be assured that their intellectual indigenous knowledge would be protected. Furthermore, this will have an impact upon the political barrier as well, as the indigenous citizens will also feel more inclined to take their part in the political processes within the country that they previously did not have access to. Initiatives need to be put in place where knowledge of the indigenous population, as well as the knowledge of the citizens within the country, can be protected for future generations to come. By building indigenous/local knowledge digital libraries and populating these libraries with locally generated content, it can be ensured that this knowledge is not lost but rather assimilated within the bigger global knowledge system. Thus, through the interaction and exchange of local knowledge from the developing country, locally generated content can be added to libraries such as these. As these libraries are available via the internet, other people within the global knowledge system will also be able to access this locally generated content, and the diverse culture of these developing countries will be preserved within an information and knowledge society.

6.4.6 Overcoming the physical infrastructure barrier

As previously mentioned in chapter 4, since the physical infrastructure criterion does not have a direct impact upon the interaction and exchange of data, information, and knowledge from a country's local knowledge system with data, information, and knowledge in the global knowledge system, the

barriers pertaining to this criterion can also not be solved through this interaction and exchange process. Overcoming this barrier is, however, still important, as it has a direct impact on some of the other barriers 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 barriers can influence the economic barrier as the import and export of goods will have some bearing on the GDP of the country as well as the quality of life. Through the import and export of resources and services, the overall GDP of the country can be improved, and this can contribute to overcoming the economic barrier. In the same way, the increase in tourism can stimulate a growth in national GDP, which will create more employment opportunities and, thus, reduce poverty and unemployment in the specific country. However, these possible solutions to help overcome the economic barrier are all dependant upon a good physical infrastructure. Without such an infrastructure, there will be no accessible roads or other means of transport, whereby resources, goods, and tourists can travel. Thus, it is of the utmost importance that developing countries overcome this barrier that prevents the country from becoming an information and knowledge society.

Overcoming the physical infrastructure barrier is, however, also dependant upon overcoming the economic barriers present within the country as building and improving this infrastructure cost money. Fortunately, there are many programmes and initiatives available for developing countries, where the finances may not be available to spend on infrastructure improvement. These initiatives and programmes are funded by multilateral agencies such as the European Commission and the World Bank. One such initiative is the Sub Saharan African Transport Policy (the SSATP). The SSATP's primary objective is to facilitate policy development and related capacity building in the transport sector in Sub-Saharan Africa. Through workshops, sound transport policies are developed that can lead to safe, reliable, and cost-effective transport. In turn, developing countries, which seek to become members of this programme, are expected to commit to ensuring that their transport sector strategies are fully anchored in poverty reduction strategies. This initiative

will, thus, help overcome the physical infrastructure barrier, as well as the economic barrier. Other initiatives that developing countries can make use of to help overcome this barrier include the AU/NEPAD short term action plan for infrastructure as well as the UN's Almaty Programme of Action that specifically looks at development of the transport infrastructure in land-locked developing countries. Thus, it is the author's opinion that by enhancing cooperation with organisations such as the World Bank, AU, NEPAD, and the UN, developing countries can partake of the programmes, plans and initiatives that are all aimed at improving the regional infrastructure, as this infrastructure is critical for sustaining economic development and trade within developing countries.

6.4.7 Overcoming the knowledge barrier

The last barrier that developing countries need to overcome so that they can become information and knowledge societies is the knowledge barrier. This barrier pertains to the interaction and exchange process of data, information, and knowledge from the local knowledge system with data, information, and knowledge in the global knowledge system. Thus, to overcome this barrier, this process needs to be enabled. As this interaction and exchange process is dependent upon an effective and efficient ICT infrastructure, one solution to overcome this barrier is to improve and establish an effective and efficient ICT infrastructure. This process is, however, also dependant upon sophisticated information literacy and computer literacy skills. Thus, attaining these necessary skills can help overcome the knowledge barrier. Furthermore, these skills will assist the citizens of the country to harness the power of the ICT infrastructure through making use of available eCommerce, e-learning, e-health and e-government initiatives. Citizens with these skills will be able to find employment much faster, reducing the unemployment rate and increasing the standard of living within the country. Such skills will also enable the citizens to access information on various topics including politics, and health, which will, in turn, help to overcome the economic, political and the social barrier. The citizens of the developing countries can obtain these skills through training provided by the telecentres as well as in international digital

libraries, which often offer basic information and computer literacy courses via their digital library webpage.

The last recommendation to overcome this barrier has already been discussed under overcoming the social barrier, namely creating local content. Through the creation of this content, local citizens will be more inclined to participate in the interaction and exchange process. Governments of developing countries need to facilitate this creation process, through incentives and programmes that will encourage and reward citizens for creating local content.

Thus, the knowledge barrier can be overcome by ensuring that that the country has an effective and efficient ICT infrastructure, and by ensuring that the citizens have the necessary information and computer literacy skills to take part in the interaction and exchange process. Through incentive programmes, the governments of these countries need to encourage the creation of local content that can be accessed and exchanged during the interaction and exchange process. With these recommendations and solutions in place, the developing country will overcome the knowledge barrier that currently prohibits them from becoming an information and knowledge society.

Thus, the various proposed solutions and recommendations would ensure that the barriers inhibiting the transformation of countries into an information and knowledge society would be overcome. In the following table, these solutions and recommendations are summarised:

Table 6.2: Summary of proposed solutions and recommendations to overcome the barriers of the information and knowledge society

Proposed solution and recommendations	Barriers overcome
Applying for and meeting the social and economic reform necessary for Debt relief	Economic barrier

through initiatives such as HIPC and MDRI	Social barrier
Improving and establishing an effective and efficient CT infrastructure	Spatial and technological barrier Knowledge barrier
Enabling the interaction and exchange process to facilitate e-commerce	Economic barrier
Marketing and selling of cultural diversity in terms of cultural arts and crafts	Economic barrier Cultural barrier
Marketing of developing country to improve tourism	Economic barrier Cultural barrier
Establishment of NICI policies, strategies and plans	Spatial and technological barrier
Establishment of telecentres in conjunction with a local champion within the community and within an existing infrastructure such as a library or clinic, in such a way that the value of this technology is demonstrated to the local community	Economic barrier Spatial and technological barrier Cultural barrier
Ensure high levels of democracy by establishing information based rights within their constitutions	Political barrier Social barrier
The practically execution of the information based rights by the protection of these rights of their citizens.	Political barrier
Increase the citizens participation within the political processes of the country, through the use of e-government and e-voting initiatives	Political barrier Social barrier
Establishment of e-health initiative	Social barrier
Establishment of e-learning initiatives	Social barrier

	Economic barrier
Use of CLIR systems	Social barrier
Creation of local electronic content	Social barrier Knowledge barrier
Increasing the number of internet hosts within the country	Social barrier Spatial & Technological barrier Knowledge barrier
Protecting the rights of indigenous people, their culture and their knowledge	Cultural barrier Political barrier
Building Indigenous knowledge digital libraries	Cultural barrier
Enhancing cooperation with organisations such as the World Bank, AU, NEPAD, and UN, to partake in infrastructure development programmes such as SSATP	Economic barrier Physical infrastructure barrier
Attaining the necessary information – and computer literacy skills	Knowledge barrier Economic barrier Political barrier Social barrier
Establishment of incentive programmes etc that will encourage the creation of local content	Knowledge barrier Cultural barrier

6.5 CONCLUSION

In this chapter of the thesis, a visual representation of the problems encountered by developing countries was provided by the author, as well as a short summary of the current situation of the four countries used in the practical application of this thesis, namely, Norway, USA, Niger and South

Africa. As was shown in the previous chapter, there are numerous barriers that prohibit developing countries from becoming information and knowledge societies. The barriers in the path towards becoming information and knowledge societies are the criteria of this society with which the developing and least developing country does not comply. These barriers include economic, spatial and technological, political, social, cultural, physical infrastructure and knowledge barriers. This chapter was concluded by the provision of possible solutions and recommendations that can be used to overcome the above-mentioned barriers. By the implementation of these solutions, developing countries will be assisted to overcome these barriers and become information and knowledge societies.

This thesis will be concluded by the following chapter, where the author will re-address the central problem statement of this thesis as well as the resulting sub-problems. Various topics for further research will also be identified.