

**Cultural Background and Technology
Acceptance: Evaluation of ICT projects
that bridge the digital divide**

Abstract

This study examines the effects of cultural background on the acceptance of Information and Communication Technology (ICT) in developing countries. It is a pilot study attempt to investigate whether cultural background values or other factors such as age, gender and education influence people's attitudes towards and acceptance of ICT. To this purpose, an ICT community development project in the south of India is studied. In the Netherlands, this study is replicated on a smaller scale. From the findings it seems that cultural background values have some influence on the acceptance process of ICT. However, a person's decision to accept technology and participate in an ICT skill development course was found to be influenced more strongly by the level of public promotion of the project. Besides that, actual use in developing countries was found to be related to age of the subjects.

Acknowledgement

Table of contents

Abstract	2
Acknowledgement.....	3
Table of contents.....	4
Tables and Figures.....	6
Chapter 1: Introduction.....	7
1.1 MOTIVE.....	7
1.2 STRUCTURE	8
Chapter 2: Theoretical background	10
2.1 TECHNOLOGY IN DEVELOPING COUNTRIES.....	10
2.1.1 <i>benefits of ICT in developing countries.....</i>	<i>10</i>
2.1.2 <i>problems of ICT projects in developing countries</i>	<i>11</i>
2.1.3 <i>some successful ICT-projects.....</i>	<i>14</i>
2.2 THE EFFECTS, ACCEPTATION AND ADOPTION OF TECHNOLOGY	15
2.2.1 <i>effects of technology in the society.....</i>	<i>15</i>
2.2.2 <i>The importance of acceptance and adoption of technology.....</i>	<i>16</i>
2.2.3 <i>Understanding acceptance and adoption of technology</i>	<i>16</i>
2.2.4 <i>A review of the acceptance models and applications of the TAM..</i>	<i>21</i>
2.2.5 <i>A model for technology acceptance in developing countries</i>	<i>24</i>
2.3 DEFINITIONS OF CULTURE	26
2.3.1 <i>Layers of culture</i>	<i>27</i>
2.3.2 <i>Culture as a constantly changing entity</i>	<i>28</i>
2.3.3 <i>Culture includes communication and language</i>	<i>29</i>
2.3.4 <i>More definitions of culture.....</i>	<i>30</i>
2.3.5 <i>Towards a working definition of culture.....</i>	<i>31</i>
2.4 METHODS TO MEASURE CULTURE.....	32
2.4.1 <i>Cultural models.....</i>	<i>32</i>
2.4.2 <i>Measuring culture and product design.....</i>	<i>36</i>
2.4.3 <i>Measuring culture in a local community.....</i>	<i>38</i>
2.5 CONCLUSION LITERATURE REVIEW	38
Chapter 3: Research methodology	41
3.1 PURPOSE OF THIS RESEARCH	41
3.2 EXPECTATIONS OF THIS STUDY.....	41
3.3 RESEARCH QUESTIONS AND RESEARCH MODEL	43
3.4 AKSHAYA PROJECT.....	45
3.4.1 <i>Background of India.....</i>	<i>45</i>
3.4.2 <i>South India.....</i>	<i>45</i>
3.4.3 <i>Kerala</i>	<i>46</i>
3.4.4 <i>Malappuram.....</i>	<i>47</i>
3.4.5 <i>Akshaya.....</i>	<i>47</i>

3.4.6	<i>The concept of Akshaya</i>	48
3.4.7	<i>Akshaya in practice</i>	49
3.4.8	<i>the pilot project</i>	50
3.5	CYBERSOEK PROJECT	51
3.5.1	<i>Background of the Netherlands</i>	51
3.5.2	<i>Background Amsterdam</i>	52
3.5.3	<i>Cybersoek</i>	52
3.5.4	<i>The concept of Cybersoek</i>	53
3.5.5	<i>Cybersoek in practice</i>	53
3.6	METHOD	54
3.6.1	<i>Survey</i>	54
3.6.2	<i>Interviews and observation</i>	62
Chapter 4:	Results	64
4.1	CHARACTERISTICS OF THE SAMPLE	64
4.2	RELIABILITY ANALYSIS	66
4.3	RESULTS	67
4.3.1	<i>Different cultures</i>	67
4.3.2	<i>Effects of external variables</i>	70
4.3.3	<i>Conclusion results</i>	72
4.4	INTERVIEW RESULTS AKSHAYA	72
4.4.1	<i>DC School of Management and Technology</i>	73
4.4.2	<i>Intel</i>	76
4.4.3	<i>Interviews at the Akshaya project office</i>	77
4.4.4	<i>Conclusion Interviews</i>	79
4.5	OBSERVATIONS AKSHAYA	79
4.5.1	<i>The Centres</i>	80
4.5.2	<i>The project office</i>	80
4.5.3	<i>More meetings</i>	80
4.5.4	<i>Conclusion observations</i>	81
4.6	INTERVIEW AND OBSERVATION RESULTS CYBERSOEK	82
4.7	AKSHAYA AND CYBERSOEK COMPARED	83
4.7.1	<i>Age</i>	83
4.7.2	<i>Questionnaire</i>	83
4.7.3	<i>More differences</i>	84
Chapter 5:	Discussion and Conclusion	86
5.1	DISCUSSION	86
5.1.1	<i>The Akshaya project</i>	86
5.1.2	<i>The Cybersoek project</i>	86
5.1.3	<i>The questionnaire</i>	86
5.1.4	<i>Gender</i>	87
5.1.5	<i>Future research</i>	87
5.2	CONCLUSION	87
References	90
Appendix	96

Tables and Figures

Chapter 1: Introduction

1.1 motive

Through experiences in daily life and from many different information sources, most people agree about the existence of many different cultures in this world. However, when it comes to distinguishing one culture from another, the boundaries can be very difficult to define. Things that might be very logical and self-evident in one culture can be offensive or illogical in another culture (Pair, 2002). This implies that the differences between individuals from different cultures can be extensive. On the other hand there are many similarities as well, as can be concluded from the following statement.

“While cultures differ markedly in how they approach the dilemmas, they do not differ in needing to make some kind of response. They share the fate of having to face up to the different challenges of existence” (Trompenaars, 1996).

If culture influences people's behaviour it must be a very relevant topic of investigation in these days of rapid increase in cross-border social, cultural and technological exchange, for which people use the term 'globalisation'. Indeed it is a relevant topic, especially in the area of Information and Communication technology (ICT). Lee (2000) carried out a study on the effects of culture on user interface design. One of the most important influences on interface design is globalisation, in which 'culture' is one of the key factors to make a product successful (Lee, 2000). If you want to sell your product in another culture you need to investigate that culture to understand the requirements of the people belonging to that culture. Individuals from different backgrounds have different expectations and needs, and if you want to be successful in another culture you may have to make some adjustments to meet these demands.

The emergence of the information society is something not only experienced in Europe and North America. The growth of ICT is confronting people all over the world.

“Even if e-readiness in developing countries is lower than in the high-income regions of the world, a number of relatively advanced ICT adopters have been identified in all regions of the world, and no developing country seems to have regressed in its integration into the digital economy” (UNCTAD, 2003).

An example of the growing diffusion of ICT in the world is the development of the World Wide Web, its global reach gets bigger and bigger. Following Marti and Müller (2003) it is clear that the development of a broader coverage of the World Wide Web includes more cultural diversity of the user. Although many cultures are confronted with these new technologies, the technologies themselves are almost always very western-centred.

“The personal computing paradigm, as we know it today, has been defined from a North American perspective. The essentials of the hardware configuration (e.g. keyboard) and the software (e.g. ASCII) are deeply rooted in Western culture and language” (Sacher et al., 2001).

Because of the existence of so many different user groups, the approach of ICT must be very diverse as well. Probably, people from different cultures will handle technological developments in very different ways, but is ‘culture’ in this case the determining factor? Or do other, less obvious, factors play a part in this process as well? And what is known about local cultures in developing countries and technological developments?

Yoo (2003) investigated the impact of ICT investment on economic growth in developing countries and analysed data of 56 developing countries. He showed that IT investment has a significant impact on the level of GDP (gross domestic product) per capita in developing countries. Apparently, it is a good idea for developing countries to invest in IT. This is what development organisations realise as well and the reason why many ICT-projects are set up in developing countries. However, the application of ICT might not always fit in century old traditions or maybe there are more urgent issues to give attention to, such as work and food problems. Despite this, there are many ICT-initiatives in developing countries that aim to help people in education, finding jobs and information. Such projects are organised by institutions like the United Nations. These institutions may also experience problems in setting up ICT-projects in a local culture.

The research described in this thesis will focus on the effects of culture on the acceptance process of ICT-projects in developing countries. Before it is possible to carry out such a research, it is necessary to review this field of research in more detail. In order to do so, the following chapters will review existing research in the areas of developing countries and ICT, the process of acceptance and adoption of ICT, definitions of culture and methods to measure culture.

1.2 Structure

In order to investigate the role of culture in the acceptance process of ICT-projects, first the definitions of the factors ‘ICT-project’ and ‘culture’ have to be clear. Subsequently, existing studies should be studied thoroughly to find elements for the best suitable research model. With this model, a case study will be carried out in India. The results of this study will be compared to the results of a control group in the Netherlands in order to determine the relevant cultural factors.

The literature review (chapter 2) helps to explain what culture is and why culture could play a role in the acceptance of ICT-projects. The following chapters describe the approach and results of this research.

Chapter 2 starts with the rise of new technologies in developing countries. Many ICT-projects are launched in developing countries but what are the benefits of these projects? Furthermore, some examples of success and failure will be discussed.

Paragraph 2.2 will aim to answer the question: 'what are the effects of new technologies?' The very rapid introduction of new technologies causes many people get in touch with these developments. A lot of research about the acceptance and adoption of new technologies has been carried out. Research models of technology acceptance will be extensively discussed in this chapter and a model especially for this research will be developed.

Paragraph 2.3 describes the meaning of the concept 'culture'. Many researchers attempted to formulate a good definition of culture to suit their own area of research. This section shows an abstract of their findings. Through analysing and evaluating their definitions, a working definition for the purpose of this study will be formulated.

The question 'How to measure culture' will be reviewed in *paragraph 2.4*. In order to carry out an investigation on the effects of culture, you first have to measure culture and the effects of culture. But how to measure this? Some researchers created cultural models, which can help analyse the effects of culture, but of course there are more possible methods to measure culture. Finally, this chapter will also discuss cross-cultural research.

Chapter 3 starts with defining the goal of this research. Subsequently, a research model and technical design will make the approach to carry out this research clear. The development of the questionnaires, used for this research will be discussed in detail as well.

Chapter 4 describes the investigated ICT-project in India. The results of the questionnaires, interviews and observations will be presented and analysed. Subsequently, a control group in the Netherlands will be evaluated. Finally, the two groups will be compared.

Chapter 5 contains the discussion and conclusion of this study. First of all the shortcomings of this study and recommendations for future research will be discussed. Next, the central research question and the sub-questions will be answered. Finally conclusions are drawn and recommendations are made.

Chapter 2: Theoretical background

2.1 Technology in developing countries

In developing countries the diffusion of Information and Communication Technology (ICT) is currently in full swing, as a result of many initiatives to bring ICT to the common people. The rise of ICT is therefore something not only experienced in Europe and North America. All over the world, people are confronted with new technologies, with no exclusion of third world countries. ICT can offer a economical, social and cultural opportunities for developing countries. Fair Trade, for example, offers ways to operate successfully on economic (global) markets, especially for small market players. Furthermore, the Internet offers opportunities for education, science and health improvement. However, the introduction of ICT requires a certain amount of adaptability from people. In Europe and North America this process of adoption and acceptance is at a very different stage; people have had many years to get used to these new technologies and have give them a place in their lives. In many other cultures however, people still have to find a way to combine their traditional way of living with new technologies such as computers and the Internet. It is possible that different cultures have different problems with adopting these technologies.

2.1.1 *benefits of ICT in developing countries*

When considering developing countries and humanitarian projects, it seems logical to suppose that these projects are about supplying food, clothes and support to build schools, water supplies, etc. The last couple of years these projects have also included ICT initiatives, and at the moment there are hundreds of such projects in developing countries. Below a few examples to emphasise the importance of these initiatives.

A large number of organisations play an active role in the diffusion of ICT in developing countries. The spread of ICT is currently a very popular point of attention; large-scale as well as small-scale projects are organised by institutions such as the United Nations, which consider bridging the 'digital divide' between developed and developing countries as an important point of concern. In order to obtain a higher level of agreement about this topic, in December 2004 a worldwide meeting was organised in Geneva. This World Summit on the Information Society (WSIS) aimed to upgrade lives through a more egalitarian sharing and shaping of ICT. The second phase will take place in Tunis from 16 to 18 November 2005.

In 2000 at the G-8 Okinawa Summit, the Digital Opportunity Initiative (DOI), a public private partnership of Accenture, the Markle Foundation and the United Nations Development Programme (UNDP), was launched. The DOI undertook a detailed examination and wrote a report about the experiences of the deployment of ICT in a broad range of developing nations.

They conclude that ICT appears to be an essential component of development initiatives and can act as a powerful overall enabler of development.

Also organisations such as the UNESCO (United Nations Educational Scientific and Cultural Organisation) discern ICT as very important; this organisation gives high priority to the development of ICT in developing countries and sees many opportunities for ICT: it can play a role in economic development, social transformation, political empowerment and cultural enrichment. UNESCO started projects all over the world. In 2003 e.g. they carried out a research to study the impact of information and communication technologies, which resulted in a handbook to innovate and research ICT applications for poverty eradication. According to this report ICT links to empowerment in extremely diverse ways, which can lead to poverty reduction.

Of course there are objects from people who think that ICT does not belong in the needs of poor people. Sarker (2002) goes further into this matter and explains the relation between information and development. He noticed the following four points:

- Information leads to resources;
- Information leads to opportunities that generate resources;
- Access to information leads to access to resources;
- Access to information leads to access to opportunities that generate resources

ICT offers access to a lot of information (for example through the Internet and computer software) and can be, considering these four points, very important in the lives of poor people. They need information to get more developed and ICT can help them to reach that goal.

“Now, for the poor without any access to this information would mean more acute form of deprivation of resources that are important for their livelihoods, education, health, survival etc. and would mean recessions in perpetual ways of poverty” (Sarker, 2002).

The access to information is a point of worldwide attention. In December 2004 many countries agreed with a plan of action, which includes this point, at the World Summit on the Information Society (WSIS) conference in Geneva. ICT-projects are a way to realise this point of attention. In this case technology is used to provide the access to information.

2.1.2 problems of ICT projects in developing countries

Despite of all these initiatives, projects do not always succeed at once. Following a report (2003) of the United Nations Conference on Trade and Development (UNCTAD), the main

failing to make a project a success lies within the lack of awareness of what ICT could offer. They see an important role for governments in informing their people. Other problems are:

“Insufficient telecommunication infrastructure and Internet connectivity, expensive Internet access, absence of adequate legal and regulatory frameworks, shortage of requisite human capacity, failure to use local language and content, and lack of entrepreneurship and a business culture open to change, transparency and democracy” (UNCTAD, 2003).

Apparently there are a lot of problems with which developing countries are confronted. The government and/or project developers should inform people extensively about the opportunities of ICT. When people are enthusiastic and see the advantages of the new technologies, it might be possible to overcome the technical, social and political problems. But sometimes it is a frustrating process: Aditya Dev Sood, founder and director of the Centre for Knowledge Societies in India, speaks from experience:

“We must face the frustrations of intermittent, inconsistent electrical power, archaic, scarce and unreliable telephony and net-connectivity, neo-feudal politico-business consortia that hinder or hijack development efforts, deeply ingrained ideologies of caste-hierarchy, gender inequality, and religious-communal difference, as well as significant deprivations of basic human needs. These limitations cast grave doubts over the optimism of those attempting to use emerging technologies for development” (Dev Sood, 2003).

From this point of view it is clear much more obstacles than just technical ones exist. Fortunately, still many people see the positive aspects of technical projects for development. Still, it is important to be realistic: ICT is not beatific in all situations. ICT is not magic that can solve all problems, but when used in the right way it can help with peace and development and build a nation that is responsive to the needs and demands of its entire people (Hattotuwa, 2003). In short, implanting ICT in another culture cannot be done gratuitous. It takes time before it takes its place in society. Concluding from the negative experiences mentioned above, it seems to be important to give, next to technical care, attention to the cultural background of the local people.

Kenneth Keniston (2002) points out that, despite the hope that ICT could close the gap between the rich and poor, a lot of ICT-projects do not succeed. Keniston's research focuses on India. This country has the hope that ICT can be used in a double capacity. First to enhance India's international economic position by the successes of the software industry, and second by bringing IT programs to the masses (Keniston, 2002). The hope that bringing ICT to masses can overcome problems like poverty, illiteracy, disease, unemployment,

corruption and social inequalities is not based on proven facts. Almost nothing is known about the success factors for grassroots ICT projects in developing nations. Keniston concludes that there has rarely been any study of these projects, moreover the projects do not learn from each other because they are seldom in contact. From descriptions and visits of projects Keniston formulated 18 hypotheses that he is currently testing. Below three of his hypothesis:

- *The wheel is constantly reinvented*: One can identify at least four dozen *grassroots* projects in India. The people in these projects are not usually in touch with each other, rarely publish or write anything about what they are doing, and – if they are public officials - are constantly transferred.

- *Credibility*: You cannot *believe* a lot of what you are told. A number of projects that are publicised turn out, on a site visit, to be closed, or not yet to be in operation, or to have deteriorated from their stated original goals.

- *Wishful thinking*: *The IT for the masses* and *bridging the digital divide* movement has an inordinate amount of exaggeration and wishful thinking. But there are in fact real cases of ICT projects that actually help poor people in India to meet their basic needs and assert their fundamental rights. We need to define the characteristics of those projects and try to spread the word about what works and what does not.

(Keniston, 2002)

Concluding, you could say a researcher or organisations should start documenting all initiatives and informing new initiators about existing projects. It is a pity people are making the same mistakes again; good documentation can prevent projects from failure. So, besides catching up in documentation of existing projects it is also important to convince new initiators to document their actions and get in contact with other initiatives.

Richard Heeks (2003) noticed that many e-government projects in developing countries fail. He distinguished the costs and benefits of failures, and identified six categories of potential costs of e-government failure: direct financial costs, indirect financial costs, opportunity costs, political costs, beneficiary costs and future costs. Besides the costs, Heeks also identified some benefits the failure of the project can provide: application learning, e-government learning, situational learning, skills acquisition and laying infrastructural foundations. The problem is that most initiatives do not even generate these benefits; there is no learning, because knowledge about the failure is not captured, transferred or applied. Following Heeks four steps must be taken for a learning approach: (1) recognition, (2) capture knowledge, (3) transfer knowledge, and (4) apply knowledge.

The findings of Heeks correspondent with the remarks of Keniston: both researchers see a problem in the lack of information about existing or failed projects. It is a pity that failures of ICT projects are not always recognised and captured. Failures can serve as information and

can prevent making the same mistakes again. It would be helpful if failures would be mapped and finally result in guidelines for future initiatives. If ICT-projects do not fail due to common problems anymore, much more successful initiatives could exist.

2.1.3 some successful ICT-projects

Besides the negative remarks above, there are many successful ICT-projects in developing countries. For example the Warana Wired Village Project in India, which was a pilot to bring the benefits of ICT to rural India. Bobde et al. (2002) evaluated this project. In general the project was a great success, but many details have to be taken into account. Because most of the local people are really poor, they can only appreciate the use of ICT if it helps reduce their drudgery and helps to address their basic needs. Another aspect is language: it is important to provide applications in the local language, since the local people do not sufficiently master the English language. It is also wise to take into account that the availability of electrical power is not very reliable and that it is important to have a good communication infrastructure for promoting such projects. The project in Warana made an effort to consider all these aspects and that is the main reason why many locals adopted the ICT applications that were offered. The project started in 1998 and is today (2005) still very successful and an inspiration for other initiators.

More examples of successful ICT projects are given in a publication of The Global Knowledge Partnership (GKP), which is a worldwide network committed to harnessing the potential of information and communication technologies for sustainable and equitable development. In November 2003 the GKP published 'ICT Success Stories in Development', and distinguished three categories: youth, poverty and gender. An example is the project Digital Divide Data (DDD) Cambodia that tries to connect young people, who are struggling to survive in one of the world's least developed nations (GKP, 2003). This project has great benefits; it succeeds in reaching poor young people who dropped out of school, and provides training and job opportunities. This successful project received numerous recognitions and awards.

Another example of a successful project is E-seva (e-services) in India. This project established web enabled rural kiosks to provide a range of services for the citizens. Through these kiosks people can carry their grievance to the authorities instead of going there themselves (GKP, 2003). This project helps to bridge the digital divide, improves women's positions and brings the government closer to the people. The centres are totally run by women self-help-groups. This project is a great success as well.

Through these successful projects it appeared that several aspects need to be taken into account when starting an ICT-project in a developing country. First of all it is important to be trusted by the people of the local community. This can be attained by involving local people in

the development of the project. Secondly, it is necessary to study the needs of the locals and indicate the target group. From that moment on you can concentrate on reaching these people, possibly with the help of other locals. Third, you should take into account that most people you want to reach are poor and not able to pay for the services. Besides that, most people will only understand the local language, so a local content has to be available. All these aspects can contribute to a successful ICT initiative.

2.2 The effects, acceptance and adoption of technology

Now we have seen that technologies can have far reaching consequences for people and countries, it is interesting to know how people handle these developments and what kind of role 'culture' plays in this process.

2.2.1 effects of technology in the society

Obviously, technology can have far-reaching consequences in many areas. The last decades in Europe and North America were pretty intense in this field. The Computing Research Association (1995) showed the far-reaching effects of new technologies.

"The workshop found that recent breakthroughs in the speed communications capability and storage capacity of digital information devices would have far-reaching and unforeseen effects on families, communities, institutions and democratic processes" (CRA, 1995).

Apparently, it is very difficult to predict the reception of new technologies, but the fact they have great impact is clear. In the last ten years social implications of the information society have become an issue of discussion in Europe and North America. Valerie Frissen (2000) researched the digital divide in the Netherlands in order to advise the government about the problems of the information society in this country. According to Frissen a discussion exists about the threat of dichotomy and exclusion, which means a group of people could be excluded from ICT. This could cause a gap between the information-poor and the information-rich. The forerunners in the use of ICT are mostly young and high-educated people with high incomes; the strugglers are mostly women, ethnic minorities and the unemployed. Frissen concludes that many factors can influence the access to ICT. There are of course differences in access, but they do not necessarily have to cause a dichotomy. Frissen thinks we must not overestimate the consequences of ICT, although it takes a very important place in society. In short, ICT has very great consequences, but the consequences are not always predictable; time will learn the real effects and the new situation society has to deal with.

2.2.2 The importance of acceptance and adoption of technology

The moment that or situation in which people welcome a new technology into their lives is of course very important for the developers of that technology.

"Understanding the factors which influence the adoption and use of Information Technology by individuals is one of the important issues which continues to interest Information Systems researchers. If an information system is not used, it can not improve the efficiency nor effectiveness of an individual" (Thompson, 1997).

Many factors influence the process of adoption. Adoption can be related to many different factors including household-specific characteristics, community-level factors, institutional arrangements and policies (Ajayi et al., 2003). These factors are important to take into account when you want people to adopt your product. It gets even more complicated when different cultures are involved, since the factors will probably be different as well.

Mante-Meijer and Ling (1999) researched the adoption and use of ICT services in Europe, especially the acceptance of mobile broadband services. They say adoption and use are related to the person as (potential) user, in the context of his or her everyday life experiences. It is important to know what a person needs and wants in his daily life, because on this basis he decides to adopt or not. In addition, people are living in a changing world with changing demands. To understand the differences in adoption and use we need to understand the difference in the every day life context (Mante-Meijer & Ling, 1999).

In short, it is important to pay attention to the culture and everyday life environment people belong to, because their system for determining whether to adopt may be different.

2.2.3 Understanding acceptance and adoption of technology

Many researchers tried and are still trying to describe the process of acceptance and adoption. They all have in common that they describe a process; therefore acceptance and adoption cannot be described in just one sentence. Confusing is that the terms acceptance and adoption are often jumbled together, so it is hard to distinguish the two. Below both acceptance and adoption will be reviewed.

There are a few theories that can help understand the process of acceptance and adoption. First of all, the theory of Diffusion of Innovation (DoI) developed by Everett Rogers (1962). In his book 'Diffusion of Innovation' Rogers defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Subsequently, he defines the adoption process as the mental process through

which an individual passes from first hearing about an innovation to final adoption. This adoption process can be split up into five stages:

1. Awareness: in this stage the individual is exposed to the innovation.
2. Interest: also called the information stage. In this stage the individual gets interested in the innovation and seeks additional information.
3. Evaluation: the individual mentally applies the innovation to his present and anticipated future situation, and decides whether or not to try it.
4. Trial: in this stage the individual makes full use of the innovation.
5. Adoption: in this stage the individual decides to continue the full use of the innovation.

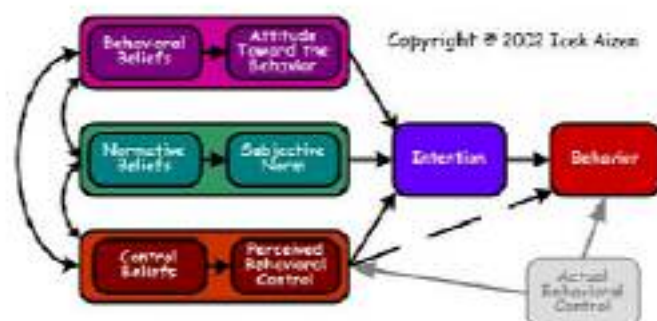
In any stage of the adoption process an innovation may be rejected, this means a decision not to adopt the innovation. Discontinuance, on the other hand, cannot be seen as a rejection because it occurs after adoption. Following Rogers, adoption can be seen as a real process, which takes place in phases. The decision to adopt an innovation is not made in a minute. For innovators it is very wise to be aware of these stages of the adoption process.

Like in every model or theory some weak aspects exist. Kalle Lyytinen and Jan Damsgaard (2001) researched the weaknesses of the theory of DoI in case of a complex and networked technology. They question the overall suitability of this theory. In the DoI, interaction takes place in a relatively homogeneous space, but in the case of complex technologies, the diffusion areas are not that homogeneous and the parameters that influence the adoption decisions fluctuate over time. This research also showed that the diffusion process does not always pass the stages described in the theory of DoI. There are some positive remarks about the theory of DoI as well, but this research points out that the DoI theory falls short in case of complex networked technologies.

A second theory that can help to understand the acceptance and adoption process is the Theory of planned Behaviour (TpB, see figure 1) developed by Icek Ajzen (2002). According to this theory human action is guided by three kinds of consideration:

“Beliefs about the likely outcomes of the behavior and the evaluations of these outcomes (behavioral beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors (control beliefs)” (Icek Ajzen, 2002).

Many researchers applied the theory of Ajzen in their research (Hounsa et al. 1993, Terry and



O’Leary 1995). For example, Cheung et al. (1999), who examined the applicability of TpB in understanding and predicting wastepaper recycling. Their results support the applicability of TpB in understanding the recycling of wastepaper. The relations between the underlying beliefs and the corresponding direct measures were as posited. Despite the supporting evidence for the original TpB, the results also suggest several modifications that deserve further examination. In general most studies succeeded in predicting behaviour with the help of the TpB, but some modifications were sometimes desirable.

A third theory is the Technology Acceptance Model (TAM, see figure 3) (Davis, 1986, 1989). This model tries to find out why users accept or reject a technology. To do so TAM provides a basis for tracing the impact of external variables on internal beliefs, attitudes and intentions. The two most important variables following Davis are ‘perceived ease of use’ and ‘perceived usefulness’. Following Hung-Pin Shih (2004) several studies showed that ‘perceived usefulness’ has the greatest impact on the individual intention to use. However, in Davis’ own research, using TAM to test Internet use, ‘perceived ease of use’ appears to be more important. TAM is based on the Theory of Reasoned Action (TRA, see figure 2) of Fishbein and Ajzen (1975). This model tries to predict the behaviours of people in specific situations.

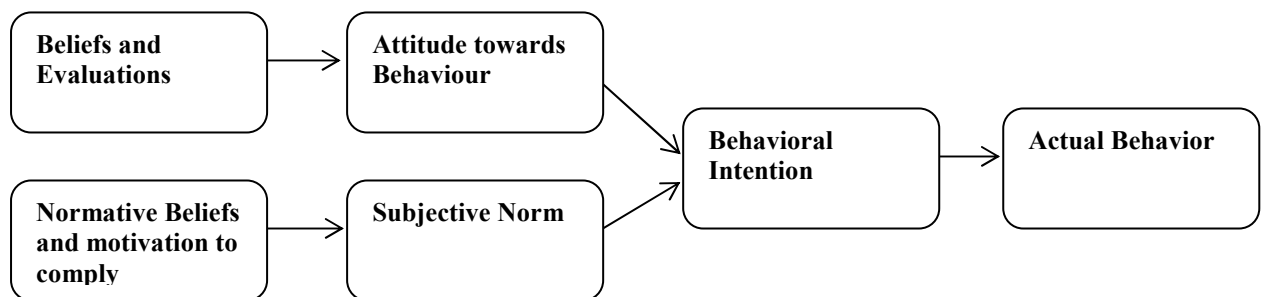
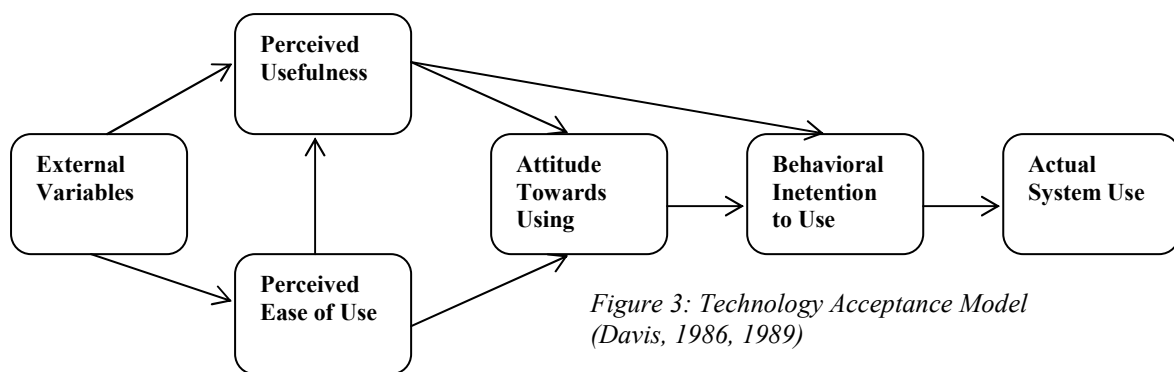


Figure 2: Theory of Reasoned Action (Fishbein and Ajzen, 1975)



Davis described the variables of the TAM as follows:

- *External Variables (EV)* <> include system design characteristics, user characteristics, task characteristics, nature of the development or implementation process, political influences and organisational structure.
- *Perceived usefulness (PU)* <> user's subjective probability that using a specific application system will increase his or her job performance within an organisational context.
- *Perceived ease of use (PEOU)* <> the degree to which the user expects the target system to be free of effort.
- *Attitude towards using (A)* <> user's desirability of his or her using the system.
- *Behavioural intention to use (I)* <> the user's attitude and the perceived usefulness influence the individual's behavioural intention to use the system.
- *Actual system use (U)* <> individual behavioural intention to use the system.

TRA is a model developed from a psychological point of view; Davis used this model and made it more compatible with behaviour in the sphere of technology, which resulted in the TAM. The TAM is nowadays a widely accepted IT acceptance model. TAM is used in very different settings, for example to test the acceptance of: online games (Hsu et al., 2004), Internet utilisation behaviour (Shih, 2004), online shopping (Vijayarathy, 2004), technology in New Zealand dairy farming (Flett et al., 2004), online learning (Saadé et al., 2003), Internet banking (Lai et al., 2005) and so on. Most researchers do agree that the TAM is a very useful model, but they also note that it is often too limited and suggest adding more variables (Legris et al. 2003, Mathieson et al. 2001, Lee 2002).

Some people suggested that culture is a very important factor in the TAM. Mao and Palvia (2001) tested the TAM, just like many others have tested it before, such as Adams (1992), Chau (1996), Chin and Todd (1995), Segars and Grover (1993). Most studies were conducted in North America and not yet in other countries. When TAM was tested in other countries the

results vary on TAM's predictive power. Straub (1994, 1997) suggested the factor culture for explaining the different patterns in IT usage.

"However, existing studies have not established clear relationships between cultural variables and IT adoption and usage determinants" (Mao & Palvia, 2001).

However, Evers and Day (1997) actually did such a research. They researched Davis' model in a cultural context to find out the role of culture in interface acceptance. Their findings demonstrate that groups differ in their preferences in design features and also in their acceptance process.

The theory of the Technology Adoption Life Cycle (TALC) is a model that grew out of social research in the late 1950s about how communities respond to discontinuous innovations. The books 'Crossing the chasm' (1991) and 'Inside the Tornado' (1995) of Geoffrey Moore give a good understanding of the technology adoption life cycle and its implications.

"Truly discontinuous innovations are new products or services that require the end user and the marketplace to dramatically change their past behavior, with the promise of gaining equally dramatic new benefits" (Moore, 1995).

Moore divided the adopters into five groups: Innovators, Early Adopters, The Chasm, The Pragmatist Early Majority and Pragmatist Late Majority and Laggards (Traditionalists). This theory is often used for marketing strategies.

Of course there are many more researchers who carried out a research according to technology acceptance. Numerous models have been developed. So many, that some researchers thought it necessary to make an overview. Venkatesh et al. (2003) evaluated eight models of user acceptance and formulated a unified model that integrates elements across the eight models. The roots of the models lie in all kinds of disciplines, like Psychology, Sociology and Information Systems (IS). In IS research several types of research exist. One type of research focuses on individual acceptance of technology and other types have focused on implementation success at the organisational level and task-technology fit. The following eight models were evaluated by Venkatesh et al. (2003):

1. TRA – Theory of Reasoned Action
2. TAM – Technology Acceptance Model
3. MM – Motivational Model
4. TPB – Theory of Planned Behaviour
5. C-TAM-TPB – Combined TAM and TPB

6. MPCU – Model of PC Utilisation
7. IDT – Innovation Diffusion Theory
8. SCT – Social Cognitive Theory

After comparing these models Venkatesh et al. (2003) formulated the Unified Theory of Acceptance and Use of Technology (UTAUT). They state that four elements play a significant role as direct determinants of user acceptance and usage behaviour: performance expectancy, effort expectancy, social influence and facilitating conditions.

2.2.4 A review of the acceptance models and applications of the TAM

Now many models of technology acceptance and adoption have passed in review, it is important to determine if any model is useful for the purpose of this research. The model that is needed must be suitable to measure the acceptance of ICT-projects in developing countries. It must include a variable that can measure among others the influence of culture on the process of acceptance. Below, a summary of all theories and models described earlier.

Starting with the theory of diffusion of innovation (Rogers, 1962), which divides the process of adoption into five stages. This model is very linear and simplified. The second step in the model is 'forming an attitude' and the third step 'make a decision to adopt or not'. Unfortunately it is not clear which factors influence these phases, so with this model it is not possible to determine the role of culture on the acceptance process.

The theory of planned behaviour (Ajzen, 2002) indicates that human action is guided by three kinds of actions: behavioural beliefs, normative beliefs and control beliefs. These aspects are very useful to determine people's behaviour, but in the technology sphere more variables had to be taken into account, like external influences.

Finally TRA and TAM, these models are very popular and have been used many times. All the literature about these models gave a good insight in applying them. TAM contains elements that are very useful for this study. Remarkably, many researchers added an extra variable to this model because the TAM might not cover all aspects of importance. It will be useful to study these adaptations of the TAM and to conclude which version is the most useful one for this study. Below a few applications of TAM are described.

Malhotra and Galletta (1999) think that the TAM is incomplete in one important respect; it does not account for social influence in the adoption and utilisation of new information systems. They added the variable 'psychological attachment', the user's commitment to a new information system, (see figure 4) an extension derived from Kelman's (1958,1961) process of social influence. The extension contains the impact of social influence processes

on users' behavioural intentions and attitudes toward using the technology. However, this study must concentrate on cultural influences and not on psychological influences.

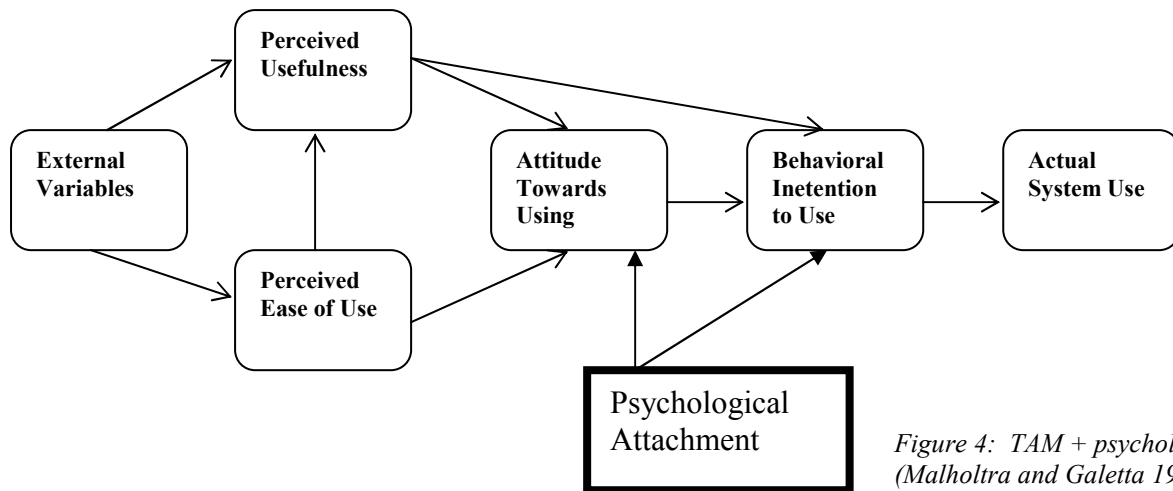


Figure 4: TAM + psychological attachment (Malholtra and Galetta 1999)

The research of Bahmansari et al. (2003) introduced 'trust' into the model. Following this research an adopter is operating in an environment of uncertainty, which creates vulnerability for the potential adopter. The adopter needs trust to adopt a new technology, therefore they created the following research model (see figure 5), based on TAM.

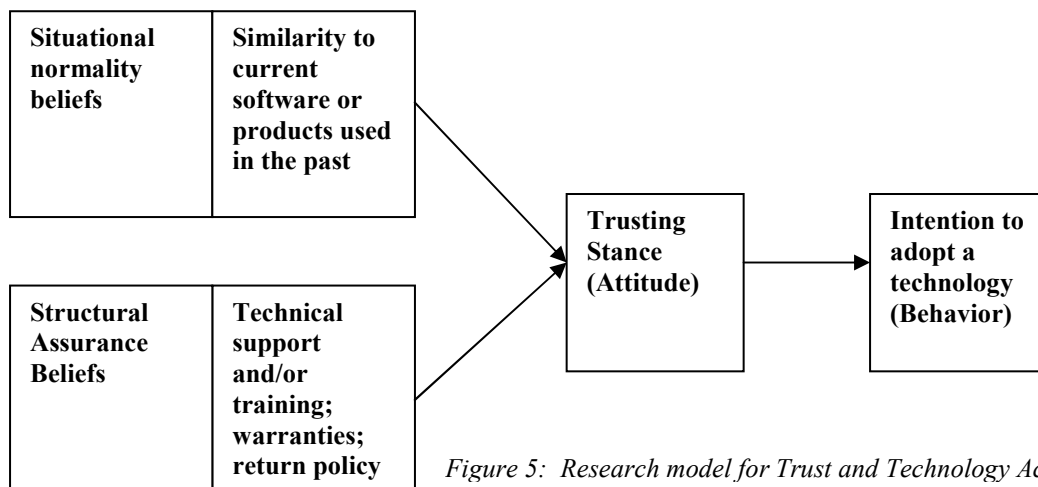


Figure 5: Research model for Trust and Technology Acceptance

Unfortunately this model abandoned several variables of the TAM that seemed interesting for this study; moreover this model is too much concentrated on software. External variables that can influence the process of technology acceptance are not included in this model.

Hun-Pin Shih (2004) combined the TAM and the information behavioural model of Choo (1991). This leads to a new research model that takes notice of the relevance of the information. This model is used in the context of researching the acceptance of the World Wide Web in an organisational context. It concentrates too much on the organisational context, which is not interesting for this study. For this study a model is needed that can

predict the acceptance of local people instead of employees, and the product is not an information system but an IT-project.

The research of Mathieson et al. (2001) also added a variable to TAM to overcome a limitation of the model.

“A limitation of TAM is that it assumes usage is volitional, that is, there are no barriers that would prevent an individual from using an IS if he or she chose to do so” (Mathieson et al., 2001).

They add ‘perceived user resources’ (R) to the TAM and tried to retain TAM’s simplicity and IS focus. Their addition is partly based on Ajzen’s Theory of Planned Behaviour. Perceived Resources is described as *“the extent to which an individual believes that he or she has the personal and organisational resources needed to use an IS”*. For example: skills, hardware, software, money, documentation, data, human assistance and time. Mathieson et al. identified a whole list of resource issues in the literature. They grouped these issues in four categories:

- User Attributes > characteristics of the individual making the usage decision. Variables that are related to the individual’s situation or some aspects of expertise with task or system.
- Support from Others > level of support available from other people. This variable is mainly about help from the organisation’s staff and not about social pressure to use the system.
- System Attributes > characteristics of the system itself, including availability, documentation and cost of access.
- General Control-Related > constructs at a more general level of abstraction. The constructs in this category deal with an individual’s overall belief about his or her control over system use.

Their findings resulted in an extended TAM (see figure 6).

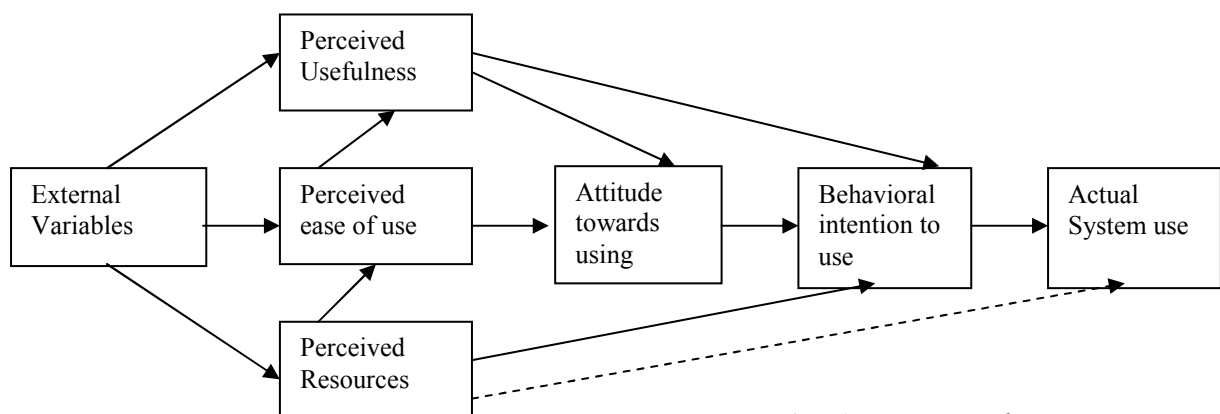


Figure 6: TAM + Perceived Resources

They investigated if Perceived Resources (R) was compatible with the other constructs of TAM and conclude that R should be task specific to be consistent with TAM's conceptualisations of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). TAM's PU and PEOU measure general perceptions without regard to specific details that underlie them. Mathieson et al. think the situation is different for R, therefore they created two sets of measure for R: a reflective instrument to have an overall perception of resource availability and a formative instrument to measure perceptions of the availability of individual resources.

Mathieson et al. were positive that R should affect Behavioural Intention to Use (I), because an individual's intention to use an information system should be affected by his perceptions of the availability of the tools needed to use the system. The relationship between R and Actual System Use was seen as very complex and troublesome, because it suggests that someone's behaviour could be inconsistent with his intention. The findings of this study were quite consistent with the predictions. First, the relationship between R and PEOU was confirmed. Second, R affected I, because the more resources an individual has, the fewer barriers in trying to use the system. Third, R was not related to Attitude towards Using, because an individual can see usage as desirable without having the necessary resources to perform it. Fourth, a weak relationship exists between R and Actual System Use, which is the only unexpected result. Although the effect is quite small it might be important in other circumstances. This model seems to be most compatible for this study, because it takes into account the relevant environmental factors. In the next paragraph several applications of the TAM will be discussed.

2.2.5 A model for technology acceptance in developing countries

There are even many more applications of the TAM than discussed in the previous paragraph, but it is difficult to find one that is suitable for this research. Most studies are conducted in an organisational context, managers want to know if their employees will accept a new IS and another focus of research must make clear if consumers will buy a specific software product or not.

An interesting question in this context is if differences in cultural background influence the acceptance process of technology. Craig van Slyke et al. (2001) set up a research program to find out if consumers' perceptions of the characteristics of Web-based shopping differ per country. They expected that due to the differences among countries in terms of culture and environment, there might also be a difference in how citizens perceive the characteristics of Web-based shopping (Slyke et al., 2001). They used Hofstede's (1991) dimensions of national culture for the countries Brazil, China and Malaysia. However, they noticed that, besides these cultural values, it is also important to understand the differences in the economic and technology situations in these three countries. They developed a survey in

which the measurement instrument was a seven-point Likert scale (strongly disagree to strongly agree), but for the demography oriented items they used direct questioning.

“Preliminary results indicate that there are differences in Brazilian and Malaysian subjects’ perceptions of the relative advantage, compatibility, result demonstrability, and visibility of Web-based shopping” (Slyke et al., 2001).

The researchers could lead back the differences between the countries for a major part to Hofstede’s cultural dimensions. For example, Brazil is a more individualistic culture than either China or Malaysia and Malaysia has a higher power distance index than either Brazil or China. This research shows clearly the differences in perception of people from different cultural backgrounds. This particular case covers specifically web-based shopping, but the differences in perception could probably play a role in the acceptance of all kinds of ICT-projects as well.

In short, several studies handle cultural differences in relation with technology acceptance. Most of these studies are conducted in organisational contexts. The acceptance of ICT-projects in a developing country seems to be another story. Still, there are many similarities as well, so it should be possible to use the TAM in this totally different context and many are based on the TAM. The initiators of an ICT-project can be seen as the managers of a company and the local people as the employees. The initiators want to know if the local people, the users, will accept their project. If the TAM is capable to predict the acceptance of an ICT-project it will be useful for future projects. The researcher especially wants to find the effects of culture on the acceptance process, so the focus will lie on the components that represent the cultural background of the user. The model will be tested in existing ICT-projects, just like the TAM has been tested in existing use of an IS in a company.

As appears in the previous paragraph, the TAM itself does not always cover enough aspects. Many researchers attached an extra dimension, like a psychological and a resource dimension. The extra dimension attached by Mathieson et al. seems to be the most useful one for this study. Besides Perceived Usefulness and Perceived Ease of Use there are more factors that can influence the acceptance process. Perceived Resources cover other aspects, which are especially interesting in developing countries. Beliefs about for example time or money are probably more related to poor than rich people. Therefore this research will include the extra dimension of Mathieson.

To make the model less complex and give more attention to actual use, the researcher removed the dimension ‘behavioural intention to use’. Also other researchers excluded this dimension. For example Yang and Yoo (2003) who used TAM to research the affective and cognitive dimension of attitude. In this study the researcher wants to find out the relationship

between external variables and actual use. If there exists such a relationship, it must be possible to make predictions about system use for future projects. In that case it is necessary to know when people use a specific system and not their intention. Following Bergeron et al. (1995) behavioural intention may lack practical value in predicting long-term future IS use. Other studies that excluded intention to use are Straub (1995) and Adams (1992). Finally, for this research the following model will be used (see figure 7):

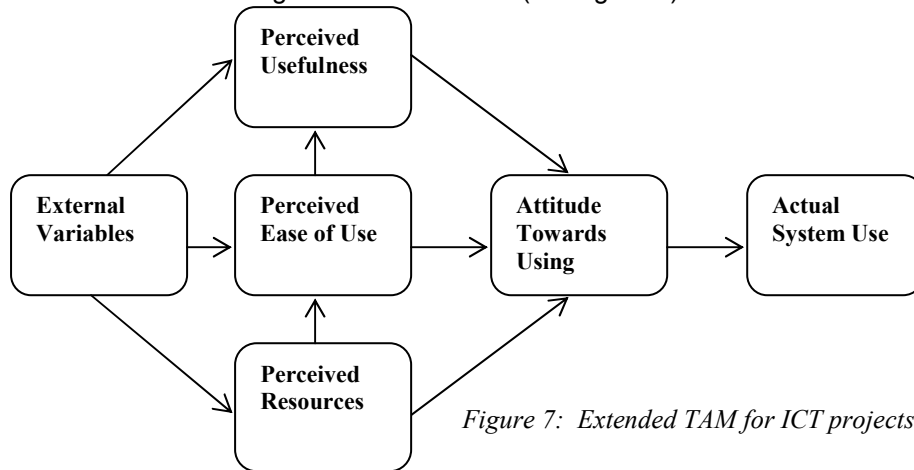


Figure 7: Extended TAM for ICT projects in developing countries

- *External variables (EV)*
User characteristics (including cultural background) influence perceived usefulness, perceived ease of use and perceived resources.
- *Perceived usefulness (PU)*
User's subjective probability that using the IS of the ICT-project will increase his or her performance within the context of the project.
- *Perceived ease of use (PEOU)*
The degree to which the user expects the target system to be free of effort.
- *Perceived resources (PR)*
The extent to which an individual believes that he or she has the personal and organisational resources needed to use an IS.
- *Attitude towards using (A)*
User's desirability of his or her using the system.
- *Actual system use (SU)*
Actual use (acceptation) of the ICT-project.

Supposedly, culture plays a role in the process of technology acceptance, but before it is possible to study this role, a definition of culture is necessary. Pia Honold (2000) concludes in her research that it is more important to find a definition that serves a specific area of research than a very general definition of culture. Therefore, this study will try to find a definition that is suitable in the area of culture versus ICT acceptance.

Many researchers attempted to give a good definition of the concept culture. Some even dedicated a whole book to this subject. In 'Culture: A Critical Review of Concepts and

Definitions' (1952), A. L. Kroeber and Clyde Kluckhohn list 164 definitions of culture (not including another hundred or so 'fragmentary' ones). Culture is one of anthropology's key epistemological concepts, but there has never been much agreement as to the meaning of the term. The following section will give an overview of earlier found definitions and will finish with a working definition for the purpose of this study.

2.3.1 Layers of culture

One of the most well known researchers in the field of culture is Geert Hofstede (1991). He considers culture as the collective programming of the mind – one's mental software. The development of this mental software emanates from one's social environment and life experiences. However, unlike computer software, one has the ability to deviate and modify mental programs. Hofstede also developed a couple of variables, which can help to measure culture, although he thinks there is no absolute measure for evaluating culture. He described culture by using its manifestations: symbols, heroes, rituals and values. The first three manifestations can be researched just by observation. Values are more difficult to investigate; they manifest themselves in a deeper layer of culture. Hofstede represents these variables in an 'onion diagram', indicating that symbols represent the most superficial and values the deepest manifestations of culture.

"Most anthropologists agree that culture has a depth of layers. One is overt culture, which is visible and easily described, and the other is covert culture, which is not visible and presents difficulties even to the trained observer" (Lee, 2000).

Fons Trompenaars (1996) also describes a model of culture by comparing culture with an onion (see figure 8):



Figure 8: onion model

"A good way to imagine what culture means is to compare it with layers of an onion. The outer layer is what people principally associate with culture: the observable reality of clothes, food, language, housing etc. The middle layer refers to the norms and values, which a community holds; what is considered right or wrong (norms) and good or bad (values). Understanding the core of the onion is the key to successfully working with other cultures; the series of rules and methods which a society has evolved to deal with regular problems that face it" (Trompenaars, 1996).

This model of culture by Trompenaars connects with the theories of Hofstede and Lee. They all see the depth in the concept of culture. Beside this onion model, there are two more models that help us understand the layers of culture. Jia Shen (2000) provided a review of the Iceberg Model and the Pyramid Model; they both illustrate the differences between the visible and the invisible layer.

The Iceberg model (see figure 9) suggests that only 10 percent of an iceberg is visible above the surface of the water. These 10 percent stand for the cultural characteristics that are easily visible to an observer. This means that 90 percent of the cultural characteristics are hidden from view. The model identifies three metaphorical layers of culture:

- Surface: visible, obvious rules such as number, currency, time and date formats.
- Unspoken rules: obscured, need context of situation to understand the rules
- Unconscious rules: rules out of conscious awareness and difficult to study.



Figure 9: The Iceberg model



Figure 10: The Pyramid Model

Geert Hofstede developed the Pyramid Model (see figure 10). This model also consists of three layers:

- Personality: specific to a person. It is learned and inherited
- Culture: specific to a group or category of people. It is learned, not inherited.
- Human Nature: common to all human beings. It is universal and inherited, not learned.

All layers can be influenced by the history of a culture. In short, to understand culture you have to pay attention to the past. Only then it is possible to get to know the invisible layer of culture, and understand the visible one. Since history is created every day, a culture will change every day. This brings us to the next chapter; culture is a subject to constant change.

2.3.2 Culture as a constantly changing entity

As Lakshmi Bandlamudi (1994) points out; culture must be understood as an entity constantly changing through human interaction and historical processes (Bandlamudi, 1994). In other words: culture is changing all the time, just like history. Consequently, it is easier to understand culture when you understand history. Following this idea, an existing culture can

be described as a product of history. To investigate a culture paying much attention to the history of that specific culture is necessary. Hofstede (1991) describes at each level of his cultural model the results for the areas of region, religion, gender and class and declares that historical events, however, do effect some generations in a special way.

Chris Westrup et al. (2002) also recognised the importance of change. The recognition of change is important to them for three reasons:

- Longitudinal intensive ethnography yields the importance of history and a historical perspective;
- it is a step towards identifying the importance of history and a historical perspective;
- Investigation begins to be directed into how cultures change and we move from a seashell view of cultures to one of cultures as products and processes of change.

Just like Bandlamudi, they see culture as a result of history. Through long investigation it is possible to understand why a culture developed to its current state.

"Thus we end up with a notion of culture that is not a thing, not a discrete entity, but an ongoing process that is inherently changeable and often malleable"
(Westrup et al., 2002).

This explains why it is so hard to describe a culture in just a few sentences. Nowadays, history is changing much faster than before. Especially Information technology is transforming time and the way time is perceived, used, managed and disciplined (Lee et al., 2002). These developments influence people's view of the world. The abundance of information is changing the way of living, working and acting, for example through the influences of other cultures. These changes can transform a culture permanently. This makes clear not every definition of culture is useful in any context and it is important to develop a definition that suits the area of interest.

2.3.3 Culture includes communication and language

Edward Hall (1959) made the following observation *"Culture is communication and communication is culture"*, and for communication language is needed.

"Language is more than just a functional means of communication within a culture. Language reflects how individuals think and interact with each other – and how they will approach interactive products introduced in their culture"
(Sacher et al., 2001).

Language, however, is also part of a culture's history: the way people interact with each other changes over time. Although language is a good reflection of a culture, it is necessary to keep

in mind that there is more than pure spoken verbal language: think for instance of body language, symbols, layouts and colours. All these aspects can be seen as part of the language of a culture. According to Trompenaars' (1997) opinion, communication is only possible between people who to some extent share a system of meaning. Trompenaars describes communication as the exchange of information, and information is in this case the carrier of meaning. He distinguishes two sorts of communication: verbal and non-verbal. In verbal communication, differences between the tone of the voice and the moments of silences in a conversation can lead to misunderstandings when people do not share the same pattern of communication.

"To express yourself in another language is a necessary, if not sufficient, condition for understanding another culture" (Trompenaars, 1997).

Also non-verbal communication needs attention; *"research has shown that at least 75% of all communication is non-verbal"* (Trompenaars, 1997). As far as non-verbal communication is concerned, major differences exist between cultures. In some cultures eye contact is expected, while in other this is considered to be rude. The same applies to touching and privacy-issues. To really get to know a culture, one has to lose oneself in the language (verbal as well as non-verbal) of that culture. In order to do so you have to research the history of the culture, because history determines a language. Understanding history leads to understanding the language, which leads to understanding the culture. Therefore, it is always important to take notice of the history of the studied culture and study the basics of the verbal and non-verbal language. In this way it must be easier to understand and analyse a culture.

2.3.4 More definitions of culture

Besides the layers, the history and the language of a culture there are much more elements that describe culture. It seems very hard to describe culture in one or a few sentences. This brings us to Pia Honold's (2000) definition that has the following five components:

- Culture defines members of a group as distinct from members of other groupings.
- Culture creates an orientation system and a field of action for these members.
- Culture manifests itself in cultural models. These may be internal cognitions or external artefacts and institutions.
- Cultural models are acquired through interaction with the environment. Action and experience, on the one hand, and cultural models, on the other, affect one another through the processes of accommodation and assimilation.
- Culture does not determine the behaviour of individuals but it does point to probable modes of perception, thought, and action. Culture is therefore both a structure and a process.

Especially her first assumption, to distinguish members from one group from the other, could be defined as very general. Most researchers start with making this point. People are also capable to identify themselves; individuals identify themselves as belonging to a particular group-ethnic, religion, gender or something else (Bandlamudi, 1994).

The extent of the definition of Honolds fits a remark of Edward T. Hall (1959), "*culture is not one thing, but many*". Bandlamudi (1994) describes culture as a set of norms and values that determine individual behaviour and these norms and values are understood in comparison with another culture (Bandlamudi, 1994).

It certainly is difficult to investigate norms and values of another culture when there is no reference. Much research into culture is done from a western-centred view. Hofstede (1991) also takes into account that researchers are programmed according to their own particular cultural framework. This can influence the results of a research.

In short, you have to take allowance to a lot of aspects when you want to define the concept of culture and it will be wise to think over what is important for the specific field of investigation. In the next paragraph a work definition, for the field of ICT-projects, will be given.

2.3.5 Towards a working definition of culture

Finally, a definition of culture to work with in this study will be formed. As mentioned before: there is not one right definition of culture: every field can form its own work definition.

The purpose of this study is to identify the effects of cultural background on the acceptance of ICT-projects in developing countries. Keeping this in mind, a working definition of culture must be formed and will like many others consist of a number of aspects. In the preceding paragraphs appeared that, among other things, a culture consists of a group of people who, in some way, belong together. The culture can be large, like people who live in the same country or people who have the same religion, but also small, like people who go to the same school, working at the same office or living in the same neighbourhood. Overall, it is rather clear to which group or groups a person belongs.

In the case of an ICT-project in a developing country, we have to deal with the local culture in the village where a project is started. The people of this culture shall speak the same language in the broadest sense. Not all their characteristics will be evenly clear for a stranger. Their symbols, heroes and rituals will be visual for everyone, but the values and norms are aspects only known, sometimes subconsciously, by the people belonging to that culture, or

people who are really investigating that culture. The basic assumptions in a culture are formed in time. Culture can be considered as a product of history and is changing all the time. For this study, the following definition will be used:

Culture defines a group of people who belong together due to geographical or social borders and therefore share similar norms, values and laws.

The focus of this definition is on measurable norms and values. The following paragraph will explain in more detail in what way dependent and independent variables can be measured.

2.4 Methods to measure culture

2.4.1 Cultural models

Hofstede developed, on account of his research for IBM, a couple of dimensions to measure culture in the area of national cultures. He describes a dimension as an aspect of culture that can be measured relative to another culture (Geert Hofstede, 1991). In total there are five dimensions in Hofstede's model of culture, which together form a five-dimensional model of differences among national culture. Below each dimension will be summarised.

Measuring the degree of inequality in society: The power distance index

Power distance reflects the range of answers found in the various countries to the basic questions of how to handle the fact that people are unequal. A table is composed of mean scores or percentages for each question and for all countries. With a formula a power distance index (PDI) is calculated. They are measures of differences only, because the scores represent relative, not absolute positions of countries. PDI scores inform us about dependence relationships in a country. Inequality can be measured in all kind of areas, for example in families, at school, in the workplace or between different social classes. This means that this way of measuring culture can be used in other social systems beside organisations. Hofstede also recognises that the different scores on the power distance index are strongly related to country's or population's history. To support the guesswork for causes, Hofstede looked for quantitative data about the countries, which might correlate with the power distance scores. The result of the statistical tool 'stepwise multiple regression' was that a country's PDI score could be fairly accurate predicted from the following:

1. The country's geographical latitude (higher latitudes associated with lower PDI)
2. Its population size (larger size associated with higher PDI) and
3. Its wealth (richer countries associated with lower PDI)

Collectivism versus Individualism

"Individualism pertains to societies in which the ties between individuals are loose; everyone is expected to look after himself or herself and his or her family.

Collectivism as its opposite pertains to societies in which people from birth onwards are integrated into strong, cohesive ingroups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (Geert Hofstede, 1991).

To measure the degree of individualism or collectivism Hofstede uses questions and scores, which he translates into an Individualism index (IDV). He discovers a negative correlation between the PDI and IDV score. In other words, many countries with a high score on the PDI score low on the IDV. In this dimension it is also possible to make an IDV on all kinds of areas, like occupation, family, school and state. To predict a more accurate IDV, the same historical questions as in the PDI can be used.

Femininity versus Masculinity

For the social roles Hofstede uses the terms masculine and feminine. Through questions a masculinity index (MAS) can be computed. Masculinity and femininity cannot only be measured between countries, but also in families, at school, at the workplace, etc. The origin of masculinity-femininity differences can be found in the history of a group or country.

Uncertainty avoidance

"As human beings, we all have to face the fact that we do not know what will happen tomorrow; the future is uncertain but we have to live with it anyway" (Geert Hofstede, 1991).

To alleviate this anxiety, human societies developed technology, laws and religion. To measure the (in)tolerance of ambiguity in a society Hofstede developed an uncertainty avoidance index (UAI) score. Uncertainty avoidance is the feeling of threat of the members of a culture. Uncertainty avoidance can be measured in all kinds of cultures, like at school, in the family and at work.

Long-term versus Short term orientation

This fifth dimension is more recently determined than the other four. This can be attributed to a cultural bias in the minds of the various scholars studying culture, including Hofstede. They all shared a 'Western' way of thinking. This fifth dimension is based on ideas of Confucius, who was an intellectual of humble origins in China around 500 BC. The two poles of this dimension have the following labels:

- Long-term orientation: persistence, ordering relationships by status and observing this order, thrift and having sense of shame.
- Short-term orientation: personal steadiness and stability, protecting your 'face', respect for tradition and reciprocation of greetings, favours, and gifts.

In this dimension it is also possible to make an index, the so-called 'Long Term Orientation' (LTO) Index.

In detail, Hofstede developed a model of five dimensions to measure culture. Each dimension can be measured relative to another culture. To predict an index score he uses questionnaires and information about the country like population size and wealth.

Another model is the one developed by Fons Trompenaars (1997). He studied culture to find out the effects on management. He thinks understanding your own culture is the basis for success. The internationalisation of business requires better understanding of cultural patterns. Culture presents itself on different levels: the national level, the corporate level and the professional level. Trompenaars focuses on the differences in culture at a national level. He developed a cultural model with seven fundamental dimensions of culture. Hereunder each dimension is summarised.

Universalism versus particularism

Universalist behaviour can also be described as rule-based behaviour. Particularist behaviour does not focus on rules, but focuses on the exceptional nature of present circumstances. In order to measure the degree of universalism or particularism series of questions have been developed.

Communitarianism versus individualism

This dimension is about individualistic interests, and the interests of the group people belong to. The question is, which interest is more important to people? Their own goal or the one of the group they belong to? To measure the degree of individualism, series of questions have been developed.

Neutral versus emotional

The way people express their feelings differs per culture. Cultures, in which feelings are controlled and not telegraphed all the time, are described as neutral. In contrast, cultures in which emotions are shown are called effective. When judging cultures on these aspects, it is important to bear in mind that for example neutral cultures are not necessarily cold or unfeeling. This dimension can also be measured per question.

Diffuse versus specific

This dimension is closely related to the last one, and handles the degree we engage others in specific areas of life. In specific-oriented cultures, people are direct, to the point and precise. In diffuse-oriented cultures, people are often indirect, evasive, tactful and ambiguous. In doing business with other cultures it is practical to know whether your business partner is specific or diffuse, in order to avoid misunderstandings.

Achievement versus ascription

There are many differences between societies; some have more respect for age and other more for achievements. Often achievement is seen as part of modernisation, the key to economy and business.

In short, Trompenaars' cultural model consists of seven dimensions. He uses questionnaires to measure the degree of a culture belonging to one side or the other.

Besides Hofstede and Trompenaars there are a few more researchers who developed a cultural model. **Edward Hall's** cultural model is not as strict as the models of Hofstede and Trompenaars. In his book 'Beyond Culture' (1976) he tries to give the reader some grip on his model of culture. He includes many aspects and thinks it is more important to look at the way things are actually put together than at theories. The evolution of man and his interaction with the environment is very complex. Every organism will alter its environment to survive. Altering the environment can be split up into two complementary processes: externalising and internalising. An example of an internalised control is conscience, and the spoken language is the primary extension. Hall gives his reflection on the following three values:

Context

Hall divided context into High-context (HC) cultures and Low-context (LC) cultures: any transaction can be characterised as high-, low-, or middle-context. HC communication can be described as economical, fast, efficient and satisfying and is frequently used as an art form. In a HC message, much of its meaning is internalised in the person or physical environment, and little of the meaning in the explicit coded part of the message. In a LC message most of the information must be in the transmitted message in order to make up for what is missing in the context. LC communication is not unifying like HC communication, but it can be changed easily and rapidly.

Time

Hall (1976) categorised the orientation towards time by various cultures as monochronic and polychronic. Monochronic cultures (e.g. American, German and British) perceive time as linear, they are task-driven and deadline-oriented cultures. Individuals from cultures geared to polychronic time (e.g. Middle Eastern, Latin American and African) have an opposite perception, for them time is not linear, but cyclical, many activities occur simultaneously in polychronic time cultures. Attention and plans are constantly shifted, and people do not adhere to appointment schedules as rigidly as in the monochronic time cultures.

Message speed

According to Hall, some cultures tend to use fast messages (for example, headlines, cartoons, propaganda, TV commercials, and so forth), while others are more comfortable with slow messages (for example, works of arts, poetry, deep relationships, and so on).

Finally, **David Victor** (1992) researched communication in the International Business. He introduces LESCANT for studying business communication across cultures. LESCANT is an initialism of the words: Language, Environment and technology, Social organisation, Contexting, Authority conception, Non-verbal behaviour, and Temporal conception. This model offers valuable ideas for analysing a target audience.

2.4.2 Measuring culture and product design

Except these extensive descriptions of cultural models, there are of course more ideas or ways to measure culture. Though, it is striking that many researchers use the models of Hofstede and Trompenaars. With some adaptations they make the models suitable for their own research.

It is noticeable that there a lot of research has been done of cultures in the area of Interface Internationalisation, Interface Acceptance, and so on. Jia Shen (2000) explains why it is so important nowadays. Years ago it was not such an issue; North America sold their computer products all over the world and no questions about the interface were asked. However, things changed, like the group of Internet users that has grown exponentially. Furthermore competitors come onto the market and user interface internationalisation is not anymore a moral decision but a business decision (Shen 2002). If you want to sell your product in another culture you have to make some adjustments. To find out which adjustments are necessary you have to understand the other culture. Thomas Vöhringer-Kuhnt (2002) points out that culturally specific influences are very important when using any given computer system. It is not possible to interact with a system without affecting these influences. The attitude towards technical products is influenced by the cultural background of the user (Vöhringer-Kuhnt, 2002). This must mean that product developers must have found out many things about different cultures. To sell products in another culture, you have to investigate that culture. To find new markets it is necessary to find out why a product is successful in one place and not in another. Although much research concentrates on the aspect of usability, there is also a part that investigates the acceptability of new technologies in other cultures. The results of these researches can be helpful for implementing ICT projects, with a more idealistic goal, in a culture.

The influence of culture on user experience and user acceptance has been shown several times. Vanessa Evers (2001) researched the influence of users' cultural background on interface understanding. Four groups of users, with different backgrounds, were evaluated in

their understanding of a virtual campus website. The study proved that the four sample-groups varied in their understanding of the website and that these differences could be attributed to their cultural background. Evers applied various methods for investigation, involving a questionnaire, icon recognition exercises, a hands-on observation and an interview.

To find out the differences in attitudes towards computers and interface designs a lot of cross-cultural research has been carried out. If you can determine the needs of the people from a specific culture you can adapt your product to meet their wishes. This is the way to sell a product in many different cultures and also an opportunity to make more people enjoy the benefits of computers. Corse and Robinson (1994) developed a four-step model, which they think is a powerful method to study the effects cultural background. The four steps are:

- Videotaping social interactions.
- Soliciting explanations and interpretations of the videotaped events from relevant 'insiders'.
- Gathering reactions to and critiques of the videotaped events from cross-cultural 'outsiders'.
- Returning for reactions and responses from the insiders on the outside commentary.

"This process enables a dialogue across cultures which stimulates a much deeper level of insight about the assumptions behind social interactions and the culturally valued skills and behaviors" (Corse & Robinson, 1994).

This, of course, is a very labour-intensive method; many tapes are needed to include enough aspects of the culture. However, the dialogue across cultures makes it a real cross-cultural research.

"Cross-cultural studies involve persons from different countries and/or ethnic groups; a defining characteristic is their comparative nature" (Van de Vijver, 2001).

For the comparison of these groups all kinds of methods can be used: like observations, interviews, survey questionnaires, etc. Van de Vijver (2001) noticed that a difference in scores is not always caused by the difference in cultural background. It is also possible that these differences refer to individual differences. This is a problem in cross-cultural research; observed results are often susceptible to multiple explanations. The cultural backgrounds of the subjects could differ in so many respects (e.g. education, socialization, daily experiences, and exposure to media) that there is a problem of identifying the real cause (Van de Vijver & Leung, 2000). It is important to make some precautions to eliminate this problem, for example the use of a control group.

2.4.3 Measuring culture in a local community

In the previous paragraphs various methods to measure culture have been discussed. Every researcher distinguished his or her own dimensions of culture, some more specific than others. To measure culture in the context of this study it is important that the dimensions are usable in a non-organisational context. The cultural model of Hofstede (1991) seems to be the most useful one in this case. For every dimension Hofstede states that they are present in family, school and school situations. In addition, it seems important to use a control group, because it is not possible to say something about one culture when you cannot compare it with another one. For this reason Hofstede used measures to indicate the differences between countries, these measures give a good overview in the differences.

2.5 Conclusion literature review

The literature review tried to discuss all aspects of the question proposed in the introduction. This question about the effects of culture on the acceptance of ICT-projects in developing countries can now be elaborated into a research proposal.

First of all we have seen that many people think it is profitable and necessary to start ICT-projects in developing countries. The development of IT-projects can lead to economic growth and offers opportunities for education, science and health. Not all ICT-projects succeed at once, caused by several reasons. Problems can have a technical nature, but they are also caused by culture, like gender-inequality and religion-communal differences. To learn more about the influence of culture its is important to know exactly how people determine the concept 'culture'. Culture appeared to be a very extensive concept with many aspects to take into account. Many researchers created models to describe and measure culture, which give a good overview of the important aspects of a culture. Every field of research should use an own definition of culture that suits the area of research; this study will make use of the definition as proposed in paragraph 2.3.5.

Acceptation of an ICT-project by the local community is necessary to make it successful. Only when people have no fear of using technologies they can profit optimally from the opportunities the technologies offer. To study the role of culture in the process of ICT acceptance in developing countries, it was necessary to study the acceptance and adoption process in general. Since the separation between acceptance and adoption is very vague, the researcher made the choice to concentrate on the acceptance process. To understand this process the Technology Acceptance Model of Davis (1986) with the extension 'perceived resources' of Mathieson et al. (2001) appeared to be the most useful in this area of research. This model covers several variables that influence the acceptance process including cultural

ones. Probably this model is useful to determine among others the effects of culture on the decision to accept (make use of) an ICT-project.

Before formulating the research questions, the researcher wants to take into account the following key points from the literature review and keep them in mind during this research:

- The main problem in making a project a success lies within the lack of awareness of what ICT could offer. There is an important role for governments in informing their people (UNCTAD, 2003).

The researcher shall study the awareness of the local people about the possibilities of ICT and how they received this information. Furthermore the involvement of the government will be studied in detail.

- We need to define the characteristics of those projects and try to spread the word about what works and what does not (Keniston, 2002).

After studying an ICT-project the researcher wills define the main characteristics that make that project successful, as well as the ones that do not.

- Failures can serve as information and give prevention for making the same mistakes again (Heeks, 2003).

The researcher wants to collect a list of failures that can inform initiators of future projects and give prevention in making the same mistakes.

- The forerunners in the use of ICT are mostly young and high-educated people with high incomes; the stragglers are mostly women, foreigners and the unemployed (Frissen, 2000).

The researcher shall inventorise the background the visitors of the ICT-projects.

- In addition to culture, it is also important to understand the differences in the economic and technology situations in countries (Slyke et al., 2001).

This study shall give some general background information about the country and the people who are related to the studied ICT-project.

- It is important to know what a person needs and wants in his daily life, because on this basis people decide to adopt or not (Mante-Meijer & Ling, 1999).

People will be questioned to get insight in their wishes.

- Differences in score between groups can possibly refer to individual differences. For this reason it is important to make some precautions, for example the use of a control group (Van de Vijver, 2001).

A similar project will be studied in a developed country.

Chapter 3: Research methodology

In this chapter the findings of the literature review will be used to formulate the goal of this research and explicit describe the methods that will be used.

3.1 Purpose of this research

The purpose of this research is to determine the effects of cultural background on the acceptance of ICT-projects in developing countries. In this study the researcher will try to find out whether cultural background influences the user acceptance of ICT-projects in comparison to the other user characteristics such as socio-economic background, age, gender, etc. In case culture plays a significant role in the process of acceptance, initiators of ICT-projects can use this information to avoid culturally related problems for future projects.

3.2 Expectations of this study

Several studies showed that culture influences people's way to approach websites and information systems (Evers & Day 1997, Mao & Palvia 2001, Straub 1997). The researcher expects 'culture' to have some influence on the acceptance process of ICT-projects as well. This research will make use of the Technology Acceptance Model as discussed in paragraph 2.2.5. The dimension 'external variables' in the TAM include the concept of culture.

Davis defined many external variables, but not all are useful in this study. The two most important groups of external variables are system design characteristics and user characteristics. System design characteristics include for example interface design and functionality. This study concentrates on the user characteristics, which include, among others, culture. Evers (2001) states that a study investigating cross-cultural users must include many individual user characteristics in order to assess the influence of cultural differences compared to the influences such as age, gender, etc. Questions about age, gender and computer experience are also used by Calisir and Calisir (2004) who researched end-use satisfaction with enterprise resource planning systems. Hung-Pin Shih (2004) used the following user characteristics in his study of Internet utilisation behaviour: gender, age, education, job description, work experience and Internet/Intranet experience. The website of the 'Center for Education of Integrating Science, Mathematics, and Computer (CEISMC)' contains a checklist for user characteristics. This centre divides the characteristics into four groups: Cognitive (computer literacy), personal (interests, beliefs), social (educational level, career) and physical (age, sex). Following these findings and considering the purpose of this study, the following characteristics will be included in the questionnaire: age, gender, education, job sector, average year income, religion, computer experience and cultural background.

In this research it is not possible to use all dimensions of a cultural model, because that would make a questionnaire or interview too extensive. Three dimensions were chosen that seemed to be most suitable for this study. In this study three dimensions of Hofstede will be used, namely Power distance, Collectivism versus individualism and Uncertainty avoidance. They are well described by Hofstede; he demonstrates large differences between countries in these dimensions. It appears that large power distance and collectivism play a significant role in developing countries. The need for and the existence of rules differ a lot between countries. For that reason they are interesting to use for the purpose of this study. Probably this dimension can play a role in technology acceptance as well. Of course there are more dimensions of interest for this study, but a choice must be made. Future research could use other dimensions.

In the first dimension, Power Index, Hofstede found large differences between the scores of developed countries and developing countries. Hofstede studied 50 countries and 3 multicountry regions; India got a PDI score of 77 and the Netherlands scored 38, which resulted in a tenth place for India and place forty for the Netherlands. This means that the inequality between people in India is perceived to be much bigger than in the Netherlands (the country with the highest PDI score is Malaysia and the one with the lowest Austria). If indeed a large power distance exists between for example, boss and employee, parent and child or teacher and student, the decision of the employee, child and student to accept ICT lies namely in the hand of the boss, parent and teacher. Therefore, it could be expected that a high PDI score might result in a lower score of ICT acceptance in India.

The second dimension, Individualism vs. Collectivism, showed a smaller difference between India and the Netherlands in Hofstede's study. India has an IDV score of 48, which results in place 21 on the ranking list, while the Netherlands scores 80 which result in a fourth place. This means that people in the Netherlands are more individualistic than people in India. The country with the highest score is the USA and the one with the lowest score Guatemala. Hofstede concludes that the dimension Power Distance and Individualism vs. Collectivism are negatively correlated. It appears that large power distance countries are also likely to be collectivist and vice versa. For the Netherlands, this seemed very true; India on the other hand is a border case. The researcher expects, on basis of the background information about India, that local people in India will be more collectivistic than the employees questioned at IBM. The people at IBM work in an international company, will be quite educated and do not belong to the group of locals that never worked with computers before. The people that will be questioned in this study live in a much more traditional way and are probably more collectivistic. Furthermore, the expectation is that the acceptance process of an ICT-project will develop differently in a collectivistic than in an individualistic culture. In a collectivistic culture a whole group must be convinced to make use of the project, which probably is difficult in the beginning but much easier when the majority is convinced of the advantages of

the ICT-project. In an individualistic culture everyone has to be personally convinced to take part in the project, this process will not always go faster after reaching a major part of the target group.

The third dimension, Uncertainty Avoidance, shows the smallest difference between India and the Netherlands. India has an UAI score of 40, which results in place 45 on the ranking list and the Netherlands has a score of 53, which result in place 35. On the basis of these results, both India and the Netherlands experience little anxiety in their daily life (the country with the highest score is Greece and the one with the lowest score Singapore). On basis of the countries background, the researcher expects the scores in this study to be quite similar.

Except for these three cultural dimensions the researcher also expects influence from the other external variables. Age, gender, education, job sector, average year income, religion and computer experience may play a role as well. On the basis of the goals of the projects the researcher expects a mix of age, gender, education level and religion. However, the projects will be mainly visited by people from the lowest income groups and after a while all computer levels will be represented.

3.3 Research questions and research model

To fulfil the purpose of this research, this study shall address the following questions. The main question is:

What are the effects of the cultural background of the local user group on the acceptance of ICT-projects in developing countries?

To support this question, the following sub-questions are formed:

- a) Do user characteristics (including cultural background) have an effect on the process of acceptance?*
- b) In what way do the user characteristics impact the process of acceptance?*
- c) What possibilities have developers of ICT-projects in developing countries to take cultural background into account?*

To carry out this study a model (see figure 11) is developed and used as a guideline for this research.

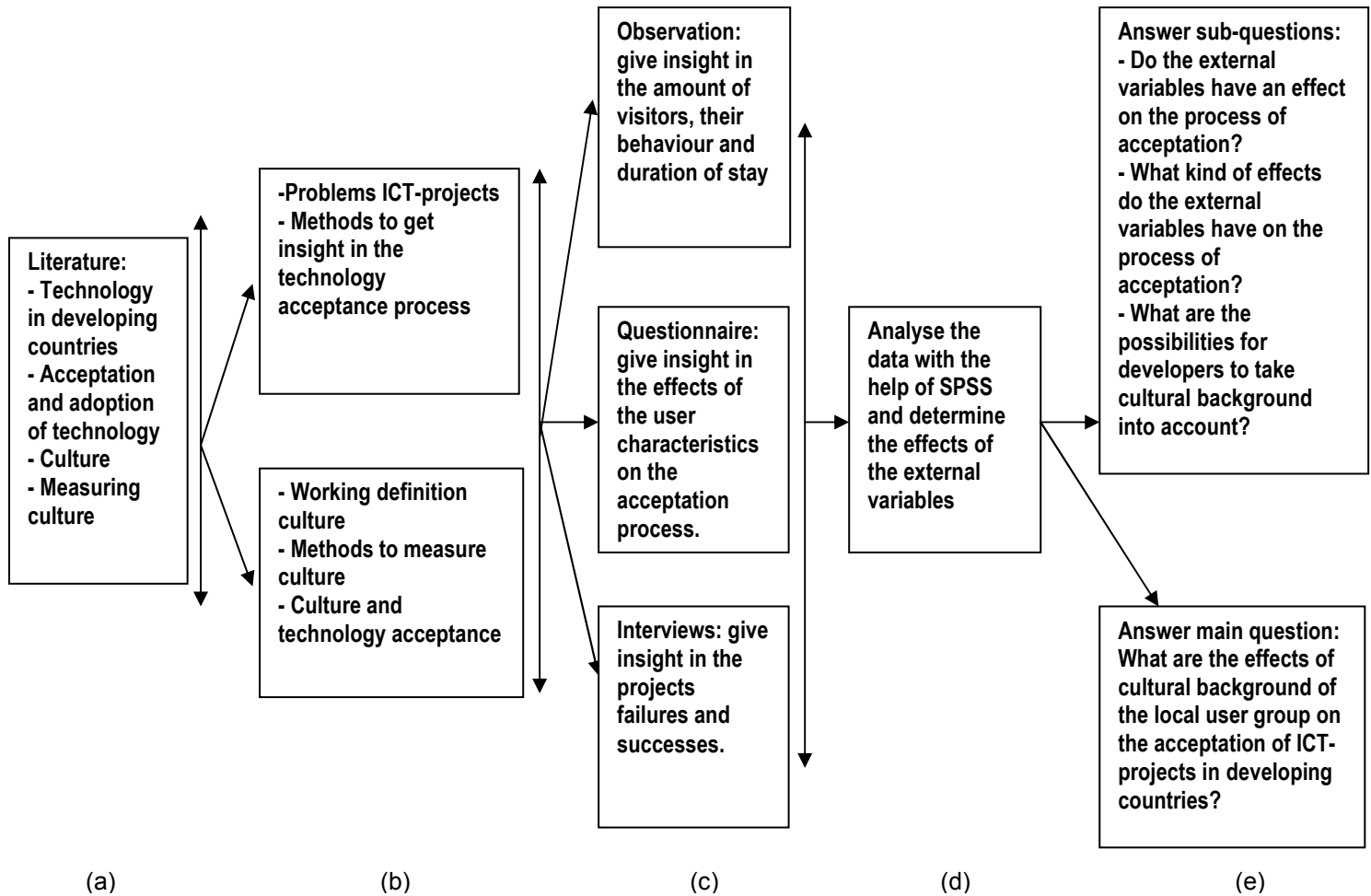


Figure 11: research model

Steps following from this model:

- (a) Study literature, articles and information from the Internet to give insight in:
 - The benefits of ICT-projects for people in developing countries as well as in the problems that occur in bringing these projects to successful completion.
 - An overview of definitions of culture and methods to measure culture.
 - Issues concerning the acceptance and adoption of technology
- (b) The literature review results in an overview of: problems of ICT-projects, methods to get insight in the technology acceptance process, a working definition of culture and methods to measure culture. Consequently, a suitable method will be chosen to use in this study.
- (c) Contextual information, questionnaires and interviews will give insight in a currently running ICT-project in a developing country and a project in a developed country (control group). The questionnaires and interviews will be developed on the basis of the findings of step (a) and (b).
- (d) The collected data will be analysed with help of SPSS and the effects of the external variables can be determined.
- (e) Answer the main and sub-questions of this research and discuss the results.

To carry out this research, data needs to be collected to answer main and sub-questions of this research. To collect this data the researcher selected an ICT-project in the south of India, which will be further discussed in section 3.4. Besides that, a similar project in the Netherlands was selected to function as a control group for this study.

3.4 Akshaya project

The Akshaya project was chosen after approaching several projects in South Asia. The responses of Akshaya were quick and informative. Besides that, they were very much interested in attention from foreign countries. The Akshaya project appeared to be a very representative project for this study. The project was still in its pilot phase and could therefore provide a lot of information about what they learned and what they would do different in the future. In addition, they started the project in a quite backward district in Kerala (south India) and wanted to offer the opportunities of technology to every family. Before discussing the expected results and methods to collect the data, some background information about India and Akshaya will be given.

3.4.1 Background of India

As mentioned before many ICT-development projects exist in the world. This study involves the Akshaya project. India is a developing country that is trying hard to strengthen its economy. It does so by developing advanced software but also by bringing the opportunities of ICT to the common people and developing ICT knowledge nationwide. Before giving more details about the Akshaya project first some more background information about India.

The first things people associate India with are the huge population and the enormous size of the country (3,3 million square km). To be exact India counts 1.065.070.607 (July 2004 est., www.cia.gov) inhabitants and is therefore the second most populated country in the world, China is the first with 1.298.847.624 (July 2004 est., ww.cia.gov) inhabitants. The Akshaya project is developed in South India in the state Kerala. The pilot study of this project took place in the district of Malappuram.

3.4.2 South India

About one-third of India's population lives in the southern states. The first evidence of human habitation in southern India dates from Stone Age times. Historians believe that North and South India evolved quite independently. Many things influenced this process, like various rulers and religions. From 1296 the Muslim rulers in Delhi campaigned in southern India. The sultan of Delhi on the other hand, dreamed of conquering all of India. It did not work out that way, because many other developments occurred, like the Vijayanagar Empire installed by Hindu chiefs at Hampi.

The Portuguese were the first Europeans to sail across the Indian Ocean from the east coast of Africa. On 20 May 1498 Vasco da Gama arrived in Calicut (Kozhikode). It had taken him 23 days to sail from the east coast of Africa. The Portuguese wanted to establish a sea route for trade in spices. This was the beginning of European contact with the East. The Portuguese colonized Goa and introduced Catholicism. The Dutch and English, on the other hand, were mostly interested in trade, mainly spices. The English main interest was Indonesia, but the Dutch were too strong, so the English turned to India instead. By 1818 most of India was under British influence. After 1857 the attitude of the colonial rulers hardened.

Mohandas Karamchand Gandhi led the non-violent Satyagraha movement to force the British to leave, which succeeded after thirty years (in 1947). The Independence movement had largely split along religious lines, the Muslim League demanding a separate Muslim state called Pakistan. This partition of India led to a devastating outbreak of violence and the repercussions of partition are still felt today.

Like discussed in the literature review (2.3.2) the history of a country is very determining for the development of its culture. What happened in history can still be felt today and influence people's behaviour towards new developments. This paragraph gave some headlines of the history of South India; in the next paragraphs the specific surroundings of this study will be discussed.

3.4.3 Kerala

Kerala is a 560 km long small strip of land in the south of India. The state took birth on the first of November 1953, six years after the Indian independence (1947). The language spoken in this state is Malayalam and the people are called Keralites or Malayalees. Malayalees are living all over the world, but about 8% (2.5 million) of them in the Gulf countries. About 60% of

India	Kerala	The Netherlands
3,3 million sq km	38,863 sq km	41,000 sq km
1065 million	32 million people	16 million people
325 people sq km	819 people sq km	479 people sq km

the population is Hindu; the other 40% is equally divided between Muslims and Christians. Kerala is divided into fourteen

Table 2: population density

districts with Trivandrum as the state capital. Kerala is the most literate state in India, thanks to intensive government campaigning in previous years. Furthermore, Kerala made remarkable progress on all indicators of social development, such as access to basic education, medical facilities and so on. Another remarkable fact about Kerala is the population's density (819 people per square kilometre), which is the highest in the country.

The major advantage of the local self-government institutions is that it involves the total participation of the local community on addressing its needs, priorities and development perceptions. Although Kerala has one of the highest qualities of life indices in India, there are some paradoxes. Kerala has the highest level of literacy and firm local self-governments, besides that it has a good telephone infrastructure and strong government and political support for innovative ICT initiatives. Despite of this, large sections of the population are excluded from the benefits of ICT (the poor, farmers, fisherman, woman, tribals) and even though there is a high telecom penetration (8%), Internet penetration is limited to just 1,5 % of the population. It is concentrated in the city and mostly used by students. ICT-projects will be important to reach the excluded groups and inform them about the benefits ICT can offer them.

3.4.4 Malappuram

Malappuram has a unique background and for that reason life there is different from any other district in Kerala. Malappuram means a terraced place atop the hills. The district of Malappuram was carved out of the districts Calicut and Palghat in 1969. Malappuram district is bounded by Kozikhode district in the north, The Nilgiris on the east, Arabian Sea on the west and Thrissur and Palakkad districts on the south.

Malappuram gave place to the headquarters of European and British troops (from the beginning of the 19th century) and later, it contained the headquarters of the Malabar Special Police (MSP). Malappuram figures prominently in history as the place that frequently questioned the British Colonial Authority. Famous are the Mapilla revolts of Malabar that took place between 1792 and 1921 and which were suppressed by the MSP.

Of all the districts in Kerala, Malappuram appears to be the least developed. The district has the highest population's density and most people are Muslim. The people of Malappuram had a long resistance against learning, especially against the English language, which is a result of the English occupation and the strike in 1921 when the English killed many Muslims. Because of this, modern developments in Malappuram are still behind in comparison with other districts in Kerala.

3.4.5 Akshaya

There are many ICT projects in developing countries, but few like Akshaya in Kerala South India. The Akshaya project has the potential to become one of the largest projects, because it wants to set up the project in whole Kerala. Besides that it uses very advanced techniques (like wireless Internet), which makes the project very unique. Currently it completed the pilot phase and is preparing for statewide rollout.

"There are many good projects - sponsored by State Governments and NGOs - which are admirable; but nowhere has the kind of vision and strategy been as demonstrable as in Akshaya. Neither do I think any other State has the wherewithal for possibly accomplishing these because without literacy, without commitment on the part of the people concerned, without a certain level of social justice, these things would be very difficult to achieve," Prof Keniston said. (The Hindu Business line – "MIT professor impressed by Akshaya project", June 11, 2003)

The first ideas about bringing ICT opportunities to the common man in Malappuram came from the local self-governments (local Panchayats). The government organs in India are decentralised since 1995, which means that most power is held by the local self-governments, chosen by the people. They manage budget for developing initiatives in their own community. The idea for an ICT-development project came up and the local governments asked the state government for help. The government of Kerala gives a high priority to ICT development; there even exists a separate department for IT, active under the name "Kerala State Information Technology Mission". The IT department's main achievement till then was the 'Friends' project; this project brings government services closer to the people. Friends is described as "An E-governance initiative of the government of Kerala for single window payment for common services".

When the state government decided to support the local governments in developing an ICT project, the Akshaya project was born. Kerala State IT Mission started its research in May 2002 by searching for information about other similar projects. IT Mission visited some websites and made a compilation of their findings. Unfortunately there was no time and money to make visits to other projects. Subsequently, they held a household survey to get insight in the wishes of the local people and the knowledge they already had about ICT. On the basis of this information, the concept of access, skill set and content has been developed.

3.4.6 The concept of Akshaya

The Kerala State IT Mission wants to ensure broad-based **access** to Information and Communication Technology. To realise this, Akshaya e-Centres will be set up across Kerala. These centres will be run by entrepreneurs, within 2 km reach of every household and cover an average of 1000 families. The centres will be networked together through the Internet. The following point of attention is **skill set**; without computer skills people cannot profit from the opportunity of access. Therefore, the Akshaya e-centres will provide training to familiarise people with ICT and give them skills in operating computers, using the Internet, and so on. The goal is to bring e-literacy to one person in every family and transform them into ambassadors of change in society. Finally, Akshaya will provide **content**, which means a wide range of data especially developed for the Keralite. Content will be available on many

subject areas, such as agriculture, education and employment. Moreover the content will be in the local language (www.Akshaya.net).

All further ideas and goals of Akshaya are based on this concept of access, skill set and content.

Access	Skill set	Content
<ul style="list-style-type: none"> - A centre within 2 km of every household. - Each centre to cater a average of 1000 families. - All centres networked using the Internet. - Created and managed by private entrepreneurs. - Support facilities like webcams, scanners, printers, fax machines, etc. - Will provide jobs to a large cross-section of people. 	<ul style="list-style-type: none"> - Aimed at creating 100% e-literate state. - E-literacy to one person in every family. - Carefully designed content modules. - The bonding between the centre and each family will enable a symbiotic relationship that will facilitate the creation of data warehouse for the State and access to relevant content for the family. 	<ul style="list-style-type: none"> - Content includes a wide range of subjects including education, career development, agriculture, health, IT, biotechnology, law and justice, etc. - Self-development modules covering spoken English, vocational training, personality development, career planning, accounting, etc. - Content available in local language

Source: Kerala State Information Technology Mission

Table 3: The Akshaya concept of Access, skill set and content

As soon as the idea about Akshaya was clear, IT mission decided to start a pilot in the district of Malappuram. This district was chosen because the idea for an ICT project came from the local government bodies there.

3.4.7 Akshaya in practice

The project was launched at November 18th 2002 and had to create 6000 information centres and 50.000 employment opportunities within three years. The main goals are:

- a) IT-literacy to at least one member of each family of the 65 lakh (lakh=100.000) families in the state.
- b) Extend the training initiative into a service delivery mechanism for the local citizen.

Expected benefits:

Direct Benefits	Indirect Benefits
<ul style="list-style-type: none"> - At least 1 computer literate person in every home in the state. - Network of 6000 Community Information Centres across the state. - Convenient access for the common man to information services. - Local Community Empowerment. - Generate locally relevant content. - Generate over 50,000 direct employment opportunities in three years. - Generate direct investment of over Rs. 500 crores in 3 years. 	<ul style="list-style-type: none"> - Cheaper communication through Internet telephony, e-mail, chat etc. - Enhanced ICT demand in Tele-medicine / e-Commerce / e-Education. - Enlarged marketing opportunities for agricultural / traditional products / artefacts. - Improved delivery of public services. - Catalysing of all sectors in the IT Industry.

Source: Kerala State Information Technology Mission

Table 4: benefits Akshaya

The success of the project depends largely on the commitment and effectiveness of the entrepreneurs, so it is evident that the selection process of the entrepreneurs is very important; points of attention were prior entrepreneurial experience and familiarity with the local region. One of the main concerns of the project is the sustainability of the Akshaya centres; for this reason a whole range of services that the centres can offer is developed. An example is the possibility to pay government bills through the Internet. The selection of the location of the centres is very important as well; this required a detailed field. A survey collected information about access and the availability to any family within a maximum distance of two kilometres, in addition the project made use of existing computer centres. The new locations must include the availability of power and telephone connections. The local bodies assisted with the selection of the centres.

For such a large project, assistance and corporation from different parties is needed. The partners of Akshaya are:

- **Kerala State IT Mission**
An autonomous nodal IT implementation agency for the department of IT Government of Kerala.
- **STED**
Science and Technology Entrepreneurship Development board Calicut is a project set up by national science technology government of India.
- **C-DIT**
The Centre for Development of Imaging Technology is an autonomous centre under government of Kerala
- **The Local Self Governments**
The local self-governments are directly managed by its own residents and therefore very much aware of the needs of the local people.

The government expects great benefits of the Akshaya project. By now the project is still in the pilot phase, so we do not know yet if the expectations will become a reality. At least it was clear that making this project a success is not possible without the help of other parties. The project team still tries to co-operate with other organisations, which is a good initiative for the growth of the project.

3.4.8 the pilot project

The researcher investigated the Akshaya project at the end of the pilot phase (summer 2004). The authorities had found the pilot project very successful and were busy preparing the statewide rollout.

The project team is established in the Akshaya office in Malappuram city. This team can be seen as the engine of the whole project. It co-ordinates the entrepreneurs and stays in close contact with the government IT mission department. The team watches the activities of the entrepreneurs very closely and tries to correct them when necessary. The members of the project team visit the centres regularly and organises information meetings for the entrepreneurs and their staff. The team is also developing new ideas, attracting companies and providing information for the state-wide rollout.

At the time of this study there were more than 600 Akshaya e-centres in Malappuram district. The first phase of the project had been completed and was very successful. This 'first phase' means giving one member of each family a basic computer skill course. The second phase had already started, but unfortunately was not found to be as successful as the first. In the second phase people could get a follow up course to learn more computer skills. The main reason for reduced interest in this course was due to the higher costs. The government sponsored the first course, so the costs for the people were almost nothing. Instead, the second course was quite expensive.

The focus in the current phase of the project lied in the sustainability of the centres. The centres have to offer services to become self-sustained. The Akshaya project team is arranging all kinds of activities to support the entrepreneurs and also tries to get the attention of companies for support and co-operation with the Akshaya project.

3.5 Cybersoek project

Even in a wealthy country like the Netherlands there are people who are excluded from the benefits of ICT. The number of people that are excluded may not be as big as in developing countries, but for the people without any access to computers it can be very confronting because most people in their country do have access. Before discussing the Cybersoek project in detail, first some background information about The Netherlands.

3.5.1 Background of the Netherlands

The history of a country contributes to the development of a national culture. The developments influence people's behaviour today and therefore it is important to take notice of the history before studying a culture.

Some first associations people may have with the Netherlands are mostly cheese, tulips, wooden shoes and lots of water. Besides that, the country is known as small and densely populated. The Netherlands exists of 41,000 square kilometres and there live about 16 million people. Most people live in the west; in this part of the country you will find the biggest cities

as well. Water defines life in the Netherlands. Because so much of the country is below sea level, Dutch life depends on 1,500-mi/2,400 km of dikes.

The early history of The Netherlands is connected with Belgium and Luxembourg; together they were known as the 'Low Countries' until the 16th century. By then the present-day boundaries were roughly drawn. Since the 16th century, shipping, fishing, trade, and banking have been leading sectors of the Dutch economy. The Netherlands is one of the world's ten leading exporting countries. Foodstuffs form the largest industrial sector. Other major industries include chemicals, metallurgy, machinery, electrical, goods and tourism.

The Netherlands is a constitutional monarchy with a bicameral multiparty legislature: the First (Lower) Chamber has 150 members, elected for a four-year term; and the Second (Upper) Chamber has 75 members, indirectly elected by provincial councils for the same length of term.

The Netherlands is known as a tolerant and peaceful country. For example in 2001 same-sex marriage was approved and euthanasia was legalised, confirming the Netherlands' liberal and progressive approach to social issues (www.minbuza.nl)

3.5.2 Background Amsterdam

Amsterdam developed at the end of the 12th century around a dam in the river 'Amstel'. In the period 1585-1672 (the golden century) the city got its historical form. The economical developments after World War II were rather successful, the social developments, on the other hand, were more problematical. In 1960s new impulses were influencing the city, people began to question the politics and attitudes of the post war West. A series of street 'happenings' and 'be-ins' occurred, women campaigned for improved rights and 'hippies' started appearing in this artistic centre of Europe. Many of those new impulses, especially in cultural relation, still exist today. In the 1990s the demographics of the city changed, immigrants from Africa and Turkey now make up a quarter of the population of the city. Today Amsterdam has 743.000 inhabitants (www.amsterdam.nl).

3.5.3 Cybersoek

In 2000 the Ministry of the Interior and Kingdom relations started a project in relation with its policies for big cities. These policies have to handle problems like unemployment, living circumstances, youth problems, and so on. The goal of the project is to realise accessible ICT for people in backward neighbourhoods. The project was started because of the important place ICT takes in the society of The Netherlands. The government feared a separation in society in the area of knowledge and information. A formation of cities developed a plan with the following goals: fight against the 'digital divide', improve the labour position of people of

the concerning neighbourhoods and strengthen the social cohesion between the inhabitants. A city district of Amsterdam, *Stadsdeel Zeeburg*, was chosen to make a plan for this project. This project is called 'Cybersoek'. In Zeeburg there are more than 100 different nationalities; the total amount of foreigners is 18.856. About 41 percent of the inhabitants have access to the Internet. Stadsdeel Zeeburg counted exactly 42.443 inhabitants on 31 March 2005. The surface of Stadsdeel Zeeburg is about 1.560 ha (www.zeeburg.nl).

3.5.4 *The concept of Cybersoek*

The activities of Cybersoek are connected with the three main goals formulated by the Ministry of Internal Affairs (REF BOEKJE CYBERSOEK). These goals form the basis of the Cybersoek project.

- *Fight against the digital divide through education in the areas of ICT and Internet:* The first two years of Cybersoek were about Get to know and Learning. This happened through starters courses for adults, computer courses for elder people and courses for children from primary schools.
- *Improve the labour position of participants and volunteers/staff:* During certain hours people can freely visit Cybersoek, to improve their skills and knowledge. The team members are giving personal advices. Improving knowledge and sharing knowledge is a very important aspect of Cybersoek.
- *Strengthen the social cohesion between the inhabitants of the neighbourhood:* During the coffee pauses social interaction takes place. The effect of the nice location of Cybersoek is big; people feel themselves at home very quickly.

Cybersoek can be seen as a meeting place, a place to study and an extension of school.

3.5.5 *Cybersoek in practice*

One of the first activities of Cybersoek was the open hour for elder people in the neighbourhood. It was a success immediately: Cybersoek provided coffee and tea and the visitors brought cookies and cake. On Thursday morning an open hour for women only started; beginners as well as advanced users visit these meeting, during which the accent lies on the improvement of the labour position. The activities differ from the first time using a mouse to making an own website. Finally there are also open hours for everyone older than 21. On Wednesday evenings especially males visit the centre.

Cybersoek offers many courses like: computers and internet, Internet 50+, Word and Windows, Computer lessons for Women, Introduction lessons for people from the centre for seekers of asylum in Zeeburg and Making websites and adapt photos. Besides these activities there are some intensive collaborations with primary schools

3.6 Method

The researcher will visit the Akshaya project in South India for a period of two months. During this period a questionnaire will be handed out to as many people as possible, with the goal of reaching about 100 respondents. Besides that, people will be interviewed and observed. The researcher shall operate from the office of the local project team. The next paragraphs will describe the development of the questionnaires and interviews.

3.6.1 Survey

A survey will be carried out in order to investigate people's attitude towards computers and to get information about their cultural background. The questions will cover specific social behaviour in the past (to measure cultural background), because not all behaviour is observable. The questionnaire (appendix 1) will be typed out on paper and translated into the local language by people of the project office of Akshaya (appendix 2). Subsequently, the questionnaires will first be brought to and afterwards collected from the respondents by the researcher herself or someone from the project office. In case of the Cybersoek project, the researcher will translate the questionnaire into the local language herself and hand out the questionnaires during the open hours at the centre (appendix 3). The questionnaires will contain exactly the same questions in both countries.

The questionnaire is meant for the target group of the Akshaya project, the local families in Malappuram. In case of the Cybersoek project, the questionnaires are meant for people who live in Zeeburg and visit the centre. The collected data will be used to answer two sub-questions, namely: 1) Do user characteristics (including culture background) have an effect on the process of acceptance and 2) In what way do the user characteristics influence the process of acceptance.

3.6.2 Developing the questionnaire

The questionnaire (appendix 1,2,3) is based on the extended TAM (introduced in paragraph 3.5). Figure 12 shows the extended TAM again and is followed by a description of the construction of the questions.

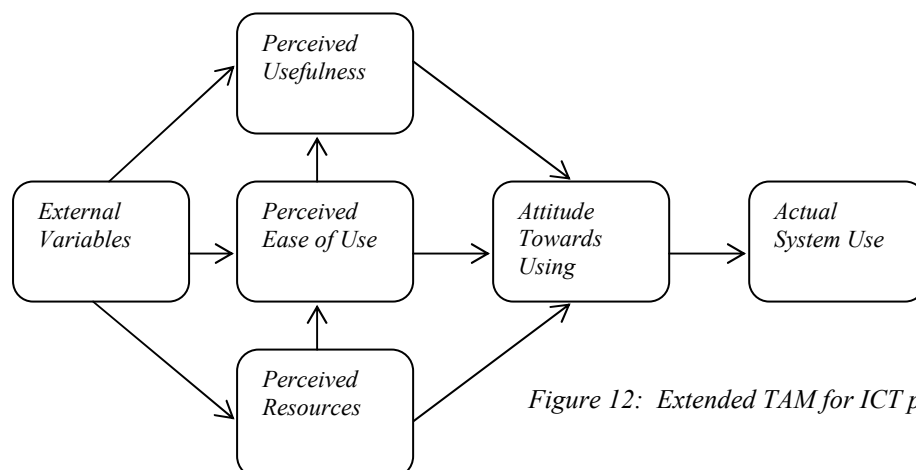


Figure 12: Extended TAM for ICT projects in developing countries

In the **external variables** the following characteristics will be included: age, gender, education, job sector, average year income, religion, computer experience and cultural background. The questions are organised as follows:

- *Age*: This variable is split up into six categories with intervals of 10 years and ending at 'older than 50'.
- *Gender*: This variable contains the options male and female.
- *Education*: This variable deals about one's highest completed education, starting at primary school and ending at postgraduate education.
- *Job sector*: This variable gives a range of potential kinds of work. These jobs are based on information about the main job sectors in The Netherlands (CBS) and India (LP).
- *Average year income*: This variable was difficult to operationalise, because the differences between incomes in The Netherlands and India are extreme. For that reason, the questionnaire for India will use different categories of income than the questionnaire for the Netherlands. The categories will be presented in the local currency.
- *Computer experience*: This question covers the amount of hours the respondent used a computer in the previous month and the frequency of his computer use in a week.
- *Culture*: As discussed in the literature review (paragraph 2.4.3) three dimensions of Hofstede will be used in this study. To measure these dimensions Geert Hofstede developed many questions. Unfortunately, there is no possibility to make use of these questions for this study. So, the researcher developed specific questions for each dimension on the basis of Geert Hofstede's book "Cultures and Organization, Software of the mind" (1991).

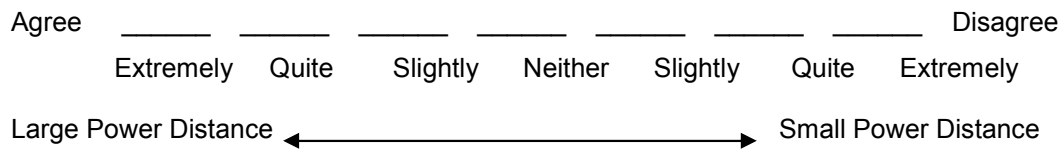
Next, the development of the questions for every cultural dimension will be discussed.

Power Distance

According to Hofstede, inequality between people is visible in the existence of differences in social class, education level and occupation. The differences in 'power distance scores' for countries can be associated with differences in family relations, school, workplace, state and in ideas prevailing within countries. These categories will be used as a basis to develop the questionnaire.

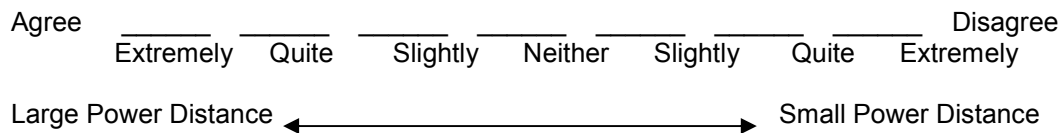
Hofstede states that the impact of family on our mental programming is extremely strong. For that reason the first question measuring power distance will be about family relations.

1. Children in my community are obedient towards their parents and older relatives, even when they are adults.



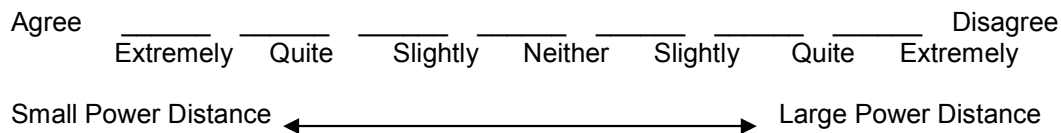
In school a child continues to develop its mental programming. In a large power distance situation the parent-child inequality is perpetuated by a teacher-student inequality. The second question is about the teacher-student relationship.

2. Students have to stand up when the teacher enters the classroom.



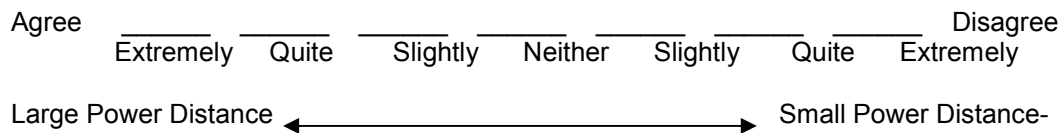
After people's experiences in the family and school, most people start their working lives. The new role-pair that comes up is boss-subordinate; this resulted in the third question.

3. If I disagree with my boss, I will speak up.



Finally power distance and the state, which brings up the role-pair authority-citizen.

4. People have to respect the decisions of government officials.

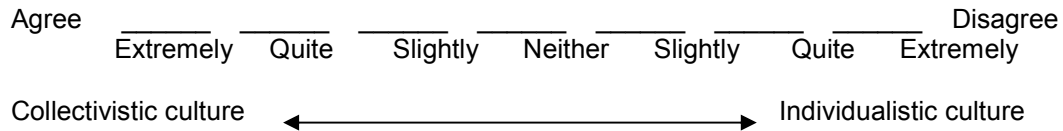


Collectivism versus Individualism

Hofstede measured collectivism and individualism by asking people about their working goals. The areas he identified as individualistic are personal time, freedom, and challenge. The areas that were identified as collectivistic are training, physical conditions and use of skills. He also describes collectivism and individualism in the context of family, school, work and state. According to Hofstede the relationship between the individual and the group is first learned in

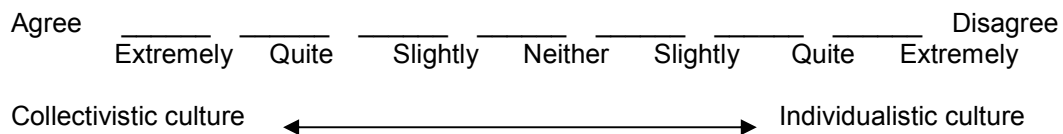
the family setting. Obligations to the family in a collectivistic society are besides financial also ritual.

5. Family celebrations are very important and should not be missed.



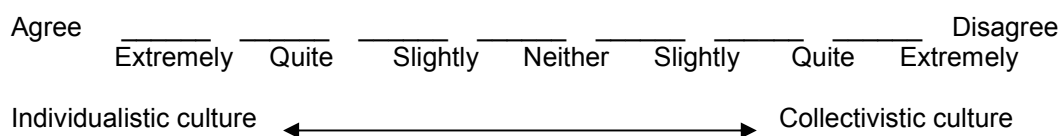
The relationship between the individual and the group is further developed at school, which is very visible in classroom behaviour. According to Hofstede the purpose of education is perceived differently between the individualist and collectivist society. In collectivistic cultures education is mostly reserved for young people, while in individualistic cultures learning is a lifetime process.

6. Learning is one-time processes, reserved for the young only, who have to learn how to do things in order to participate in society.



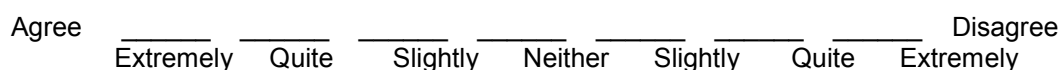
Following Hofstede, the hiring process in a collectivist society always takes the ingroup into account. Usually preference is given to hiring relatives.

7. Decisions to hire or promote are based on the applicant's skills and knowledge.



Hofstede calls societies in which the interest of the group prevails over the interest of the individual collectivistic and societies in which the interests of the individual prevail over the interests of the group individualistic.

8. I do not mind having a different opinion from the opinion of the majority of my community.



Individualistic culture ←————→ Collectivistic culture

Uncertainty avoidance

According to Hofstede people in uncertainty avoiding cultures are looking for structure in their organisations and relationships. One of the first things a child learns is the difference between clean and dirty and safe and dangerous. If people experience much anxiety they will take precautions. A way to feel safer is having insurances or a lot of rules to lean on.

9. I think it is important to have a life insurance.

Agree _____ _____ _____ _____ _____ _____ _____ Disagree
Extremely Quite Slightly Neither Slightly Quite Extremely

Strong uncertainty avoidance ←————→ Weak uncertainty avoidance

A difference between strong and weak uncertainty avoidance cultures, especially at the elementary and secondary school, is the expected role of parents versus teachers. Following Hofstede, in cultures with strong uncertainty avoidance parents are sometimes brought in by teachers as an audience, but they are rarely consulted. In cultures with weak uncertainty avoidance parents are asked to participate in their children's learning process.

10. Teachers should involve parents in their children's learning process.

Agree _____ _____ _____ _____ _____ _____ _____ Disagree
Extremely Quite Slightly Neither Slightly Quite Extremely

Weak uncertainty avoidance ←————→ Strong uncertainty avoidance

Laws and rules are very noticeable at the workplace in societies that try to prevent uncertainties in the behaviour of people.

11. In my workplace there are many formal rules controlling the rights and duties of employers and employees.

Agree _____ _____ _____ _____ _____ _____ _____ Disagree
Extremely Quite Slightly Neither Slightly Quite Extremely

Strong uncertainty avoidance ←————→ Weak uncertainty avoidance

Hofstede states that in countries with strong uncertainty avoidance tend to be more and more precise laws than in those with weak uncertainty avoidance. Citizens from weak uncertainty avoidance countries believe that they can participate in political decisions at the lowest, local level.

12. I am positive towards government institutions

Agree _____ Disagree

Extremely Quite Slightly Neither Slightly Quite Extremely

Strong uncertainty avoidance ←————→ Weak uncertainty avoidance

Questions to measure **Perceived Usefulness** and **Perceived Ease of Use** are well described by Davis and validated by many others. Table 5 and 6 present an overview of some researchers who used specific questions to research these variables. On this basis the researcher decided to use the questions 5, 6, 8 and 10 to measure Perceived Usefulness and the questions 2, 4, 8 and 10 to measure Perceived Ease of Use.

Perceived Usefulness	Davis (1989, 1993)	Mathieson (2001)	Venkatesh and Davis (2000)	Shih (2004)	Saadé (2003)	Yang (2003)	Maholtra (1999)
(1)Using (application) improves the quality of the work I do	X						
(2)Using (application) gives me greater control over my work	X						
(3)(Application) enables me to accomplish tasks more quickly	X			X			X
(4)(Application) supports critical aspects of my job	X						
(5)Using (application) increases my productivity	X	X	X	X		X	X
(6)Using (application) increases my job performance	X	X	X	X	X	X	X
(7)Using (application) allows me to accomplish more work than would otherwise be possible	X						
(8)Using (application) enhances my effectiveness on the job	X	X	X	X		X	X
(9)Using (application) makes it easier to do my job	X				X		X
(10)Overall, I find the (application) useful in my job	X	X	X			X	X

Table 5: Perceived Usefulness

Perceived Ease of Use	Davis (1989, 1993)	Mathieson (2001)	Venkatesh and Davis (2000)	Shih (2004)	Saadé (2003)	Yang (2003)	Maholtra (1999)
(1)I find (application) cumbersome to use	X				X		
(2)Learning to operate (application) is easy for me	X	X		X			X
(3)Interacting with the (application) is often frustrating	X						
(4)I find it easy to get the (application) to do what I want to do	X	X	X	X		X	X
(5)The (application) is rigid and inflexible to interact with	X						
(6)It is easy for me to remember how to perform tasks using the (application)	X					X	
(7)Interacting with the (application) requires a lot of mental effort	X		X				
(8)My interaction with the (application) is clear and understandable	X		X	X	X		X
(9)I find it takes a lot of effort to become skilful at using the (application)	X	X			X	X	X
(10)Overall, I find the (application) easy to use	X	X	X	X	X	X	X

Table 6: Perceived Ease of Use

The variable 'perceived resources' is introduced by Mathieson et al.(2001). As discussed previously, they grouped the resources into four groups. Mathieson et al. give some examples of questions they used to measure perceived resources. On the basis of these questions some questions specifically for this research were developed. For every identified resource, namely user attributes, support from others, system attributes and general control some questions have been developed (see appendix 1).

According to Legris et al. (2003), who evaluated studies making use of the TAM from 1980 till 2001, most studies used the constructs suggested by Fishbein and Ajzen to measure attitude towards using. Fishbein and Ajzen (1975) developed the Theory of Reasoned Action (TRA), forming the basis of the TAM. Following Fishbein and Ajzen (1980) attitudes are determined by behavioural beliefs. For any given behaviour at a given time, we will have a set of salient beliefs. For each belief, we have an outcome evaluation and for each belief we also have belief strength. The attitude towards behaviour can be predicted to multiply the outcome evaluation and the strength of belief. Figure 13 gives an example question used by Fishbein and Ajzen. In this research we use the seven point Likert scale as well, the second part of the questions will not be used because the questionnaire would become too voluminous. For this

research four questions about people's belief according to the system have been developed (see appendix 1).

A woman's belief about Using Birth Control Pills:								
- My using birth control pills causes me to gain weight								
Good	<u> (+3) </u>	<u> (+2) </u>	<u> (+1) </u>	<u> (0) </u>	<u> (-1) </u>	<u> (-2) </u>	<u> (-3) </u>	Bad
	Extremely	Quite	Slightly	Neither	Slightly	Quite	Extremely	
How certain are you that using birth control pills will cause you to gain weight?								
<u> </u>	Not at all certain (0)							
<u> </u>	Slightly certain (+1)							
<u> </u>	Quite certain (+2)							
<u> </u>	Extremely certain (+3)							

Figure 13: from Ajzen, A., & Fishbein, M. (1980) *Understanding attitudes and predicting social behaviour*

Finally, the variable **Actual Use**, which concerns the way the users actually behave when using the system. Malhotra et al. (1999) used the question: how many times, how many hours and how frequently do you use the system. Yang et al. (2003) also has a question about the frequency. In this research, the quantity (in hours) the respondent believes he used computers the last month and his beliefs about the frequency of use will be questioned. If the respondent makes regular use of the ICT services, you could say ICT became a part of his life and is totally accepted. Finally, the purpose of use will be questioned as well to get more insight in the preferences of people.

Handing out the questionnaires in India

The researcher had the opportunity to stay at the Akshaya project for two months and received help from the project-team to collect data. The researcher and a member of the project team discussed the questionnaire. This resulted in some suggestions on how to design the question on average year income, adding a question about religion and making some adjustments in a question measuring uncertainty avoidance. Subsequently, the project team translated the questionnaire into the local language (appendix 2). After translation, the questionnaire had to be typed out in Malayalam (the local language). Only one person in the project office could type these characters. When the questionnaire had been finished, the researcher tested it with a student from a nearby University. He translated the questions from Malayalam back to English, which made clear the questions were translated correctly.

The decision was made to hand out about 100 questionnaires in different blocks of the district. Malappuram exists of 14 blocks, so questionnaires must be collected from at least one centre in every block to get a good overview. The questionnaires were handed out in the Akshaya computer centres, at people's houses and through the entrepreneurs. The

entrepreneur or a member of the project team explained the people the purpose of this research and asks them to fill in the questionnaire.

Handing out the questionnaires in the Netherlands

After finishing the study of the Akshaya project the researcher approached a similar project in the Netherlands. The Cybersoek project shows much similarity with the Akshaya project and was therefore very suitable to act as a control group. The researcher could freely ask people to cooperate with the questionnaire during the free visit hours. Three different moments were chosen to visit the Cybersoek centre: these were the visit hours for seniors, women and 21+. The researcher tried to hand out as many questionnaires as possible, which resulted in 25 completed questionnaires. The questionnaires had been translated in Dutch and the researcher explained the respondents the goal of the study before handing out the questionnaire.

3.6.2 Interviews and observation

To get more information about the context of the project, interviews and observations will take place to support the outcomes of the questionnaire.

Interviews

Besides the users, another group of interest is the initiators of the project and other involved parties. They will be questioned to find out more about the development of the project and problem and success factors. In addition, they can provide general information about the project, like the main goals and the target groups. In an interview it is easier to use open questions and it is possible to ask more about a specific subject. The interviews will be unstructured, because not all questions will be relevant for everyone. Moreover, it is not yet clear who can be interviewed and who not. A set of questions is developed to make use of during the interviews (see Appendix 2). The most important aspects the researcher wants to study with the help of the interviews are the problems, success factors, the role of culture and the sustainability of the project. These aspects can help to answer the research questions.

Observation

The last method is observation. When investigating actual behaviour it is sometimes better to observe rather than rely on self reported data (Evers, 2001). The researcher will observe the amount of visitors in the e-centres, their actions with the computers and their duration of stay. Besides that, the researcher will take notice of the amount of available computers, the interior of the centres and the available help (books/trainers) for the users. Observations allow the researcher to collect data about people's actual behaviour in the e-centres. Points of interest are: the purpose of their computer use, the feeling of comfort in the centres and the interaction with other visitors or instructors. To do so the researcher will use checklists (see Appendix 3) and photos. The photos will be made in and around the project centres, just like

the observation. Furthermore, some not standardised questions will be used to give more insight in eventual problems caused by external variables.

Chapter 4: Results

In this chapter the results of the questionnaires, interviews and observations will be discussed and analysed. First, the main characteristics of the respondents in India and the Netherlands will be given. Next the data of both groups will be analysed and compared.

4.1 Characteristics of the sample

In the next table (table 7) the main characteristics of both samples are given.

		India (N=107)	The Netherlands (N=25)
Age	11-20	38	0
	21-30	37	1
	31-40	16	4
	41-50	10	5
	>50	6	15
	<i>Missing</i>	1	0
Education	Primary School	13	6
	High School	45	12
	Further (non university) education	26	4
	University graduate education	22	1
	Postgraduate education	0	2
	<i>Missing</i>	1	0
Income:	rupees	Rupees	Euros
	0 – 24999	0 – 6999	4
	25000 – 49999	7000 – 13999	8
	50000 – 74999	14000 – 20999	5
	75000 – 99999	21000 – 27999	0
	> 100000	> 28000	0
	<i>Missing</i>	<i>Missing</i>	8
Religion	Hindu	35	1
	Muslim	66	5
	Christen	4	5
	Buddhist	1	1
	No Religion	1	8
	<i>Missing</i>	1	5
Job Sector	Agriculture, forestry and fishery	1	0
	Industry	1	0
	Construction	10	1
	Trade, hotel, restaurant, industry and reparation	2	2
	Transportation, storage and communication	2	0
	Financial and business service	4	0
	Government	4	1
	Education	41	0
	Care and other services	2	1
	Not working / retired / unemployed	6	5
	Housewife	26	9
	Other	7	5
	<i>Missing</i>	1	1

Table 7: Characteristics of the Akshaya and Cybersoek sample

Sample India

107 questionnaires have been collected in and around the Akshaya e-centres. The 107 respondents consisted of 45 males and 61 females (1 respondent unknown). This proportion

can be explained by the fact that during the house-to-house visits, men were working and women were at home and thus more able to fill in the questionnaire.

75 of the respondents were between 11 and 30 years old, since there were mainly young people present at the Akshaya e-centres. The 32 people older than 30, were mostly questioned during the house-to-house visits. People with many different educational backgrounds filled in the questionnaire, but high school was the most often mentioned highest education (45 of the respondents).

The biggest group of respondents is the one with the lowest income. This result is very compatible with the total situation in India, because many people there live in poverty (of its nearly 1 billion inhabitants, an estimated 350-400 million are below the poverty line, 75 per cent of them in the rural areas). This confirms the reliability of the respondents that are used for this study. The majority of the respondents are Muslim, this is in accordance with the fact that 2/3 of the inhabitants of Malappuram are Muslim.

The two main job sectors represented in this sample are 'education' and 'housewife'. The sector education can be explained by the fact that many students were present in the centres (they grouped themselves in the category education), besides that, a lot of women are teacher (teaching is a very respected job for women in India). The group housewives can be explained by the house-to-house visits.

Sample the Netherlands

The researcher collected 25 questionnaires in the Cybersoek centre. The 25 respondents consisted of 7 males and 18 females. This can be explained by the fact that the researcher visited the free hours for women only and that during the free hours for seniors more women were willing to fill in the questionnaires.

Most respondents (20) were 40 years or older, because most people were questioned during the free hours for seniors. All questioned respondents belonged to the lowest three groups of income. Eight respondents did not like to answer this question; therefore it is difficult to determine which income group is most represented at the Cybersoek centre. All religions in this study are represented, though eight respondents have no religion at all. Every educational background was represented in this study as well; the highest completed education of most respondents was high school.

The two main job sectors represented in this study are (1) not working / retired / unemployed and (2) housewife. This is not surprising since most of the questioned respondents were woman and/or 40 years or older. In addition, these people do belong to the target groups of Cybersoek.

4.2 Reliability Analysis

To analyse the collected data, questions that had to measure the same concept should be grouped. Therefore, reliability analyses have been carried out on the groups of questions that had to measure the concepts Perceived Usefulness, Perceived Ease of Use, Perceived Resources and Attitude towards Using. Every concept included four questions; the four questions were put together and the Alpha was calculated.

Reliability Analysis measures the internal consistency of the items that are used to define a scale. Cronbach's Alpha is the most common measure of scale reliability. The higher the Alpha is, the more reliable the test is. Usually a value of 0.7 and above is acceptable (Nunnally, 1978).

The results of both India and the Netherlands have been used (N=132), because the consistency of the questions is tested and not the differences between the two groups. The scores of the reliability analysis are presented in the following table (table 8):

Concept	Alpha	Items
Perceived Usefulness	0.86	4
Perceived Ease of Use	0.88	4
Perceived Resources	0.77	4
Attitude towards Using	0.23	4

Table 8: Reliability analysis

The first three concepts have a very high Alpha, which means the four questions of these three concepts correlate very well and therefore measure the same concept. This is not surprising, since the used questions were validated many times before (Mathieson 2001, Maholtra 1999). For the remainder of the analysis a scale of the four questions of every concept has been made.

The four questions that had to measure Attitude correlated less, though after deleting question 2 and 3 an Alpha of 0.71 was found. The questions to measure Attitude were:

1. I like using computers.
2. Working with computers is fun.
3. Overall, there are no barriers for me to use computers.
4. Using computers is a good idea.

In retrospect it seems logical that question 2 and 3 do not really measure Attitude. You do not need to find working with computers fun to have a positive attitude towards using computers

and question three is a question that better belongs to the concept of Perceived Resources. For the remainder of the analyses, a scale of question one and four will be used.

The cultural variables

To measure the cultural dimensions (Power Distance, Uncertainty avoidance and Collectivism / Individualism) twelve questions were used: four for every dimension. Unfortunately, when the four questions were grouped a negative Alpha was calculated. This means the items do not have positive covariances, and therefore may not form a useful single scale because they are not measuring the same thing. This is not surprising, since the questions have been especially developed for this study and not validated like the questions that were used to measure the concepts Perceived Usefulness, Perceived Ease of Use, Perceived Resources and Attitude towards Using. To determine the existence of another relationship between the twelve questions about culture: all questions were put together and subsequently items were deleted until the highest Alpha was reached. This happened at the moment when five questions were left. The following five questions gave an Alpha of **.694**:

1. Children in my community are obedient towards their parents and older relatives, even when they are adults.
2. Students have to stand up when the teacher enters the classroom.
3. People have to respect the decisions of government officials.
4. Teachers should involve parents in the children's learning process
5. Learning is a one-time process, reserved for the young only, who have to learn how to do thing in order to contribute in society.

These five questions measure different aspects of culture, but cannot be grouped under one of the three cultural dimension. Therefore this group of questions will be seen as a general measure of 'culture'. For the remainder of the analysis this group of questions will be used as the variable culture.

4.3 Results

In this paragraph analysis have been carried out in order to answer the research questions.

4.3.1 Different cultures

It appeared to be quite difficult to measure cultural background in a structured way. After analysing the collected data it was not possible to use the three cultural dimensions of Hofstede (paragraph 4.3). The researcher also noticed that sometimes, especially in India, people gave the answers they thought were expected or 'right'. This explains some contrast in people's answers and the observations of the researcher. The following table (table 9) shows the means and standard deviations of both groups of respondents.

Mean and Std. Deviation	Culture	Age	Income	Perceived Usefulness	Perceived Ease of Use	Perceived Resources	Attitude Towards Using	Actual Use
India (N=107)	6.01 (1.08)	3.15 (1.17)	1.35 (0.69)	1.70 (1.19)	1.81 (1.15)	2.06 (1.17)	1.34 (1.10)	2.42 (1.69)
The Netherlands (N=25)	4.32 (1.19)	5.36 (0.91)	2.06 (0.75)	2.40 (1.26)	2.79 (1.11)	2.19 (0.99)	1.29 (0.46)	2.32 (0.85)
Total (N=132)	5.76 (1.28)	3.57 (1.42)	1.46 (0.74)	1.83 (1.23)	1.98 (1.21)	2.01 (1.10)	1.33 (1.01)	2.40 (1.55)

Table 9: Means and Std. Deviation of India and the Netherlands

To determine the differences between the two investigated cultures, the researcher carried out a t-test. The T-test is used to determine whether there is a significant difference between the means of two groups. It helps to answer the underlying question: do the two groups come from the same population or is there some significant difference between these two groups that we can say that they are really from two entirely different populations.

Because the two populations used in this study are independent and not related in any way, the independent samples t-test will be used. The alpha is set on .05, which is the standard position. An alpha of less than .05 can be interpreted to mean that the differences are not due to sampling error.

The cultural variable, as created in paragraph 4.3, and the two groups of respondents are used in this t-test. The F significance is .349 ($p > .05$), so in this case equal variance can be assumed. Though, if the significance value is less than Alpha, the null hypothesis (the two groups are homogeneous) must be rejected. The significance value is .000 ($.000 < .05$); this means the null hypothesis must be rejected. The two populations are not homogenous; the Indian participants score differently on the variable Culture than the Dutch participants.

Now that we have seen that the investigated cultures significantly differ from each other, it is case to examine the differences. We look at all 5 questions that had to measure culture and the differences in the answers of the Indian and Dutch participants. The scores of Quite and Extremely Agree and Quite and Extremely Disagree will be summarised to see where the weight of the results lies (table 10).

The variable culture was created out of the following five questions:

1. Children in my community are obedient towards their parents and older relatives, even when they are adults.
2. Students have to stand up when the teacher enters the classroom.
3. People have to respect the decisions of government officials.
4. Teachers should involve parents in the children's learning process

5. Learning is a one-time process, reserved for the young only, who have to learn how to do thing in order to contribute in society.

		Agree	Disagree
Question 1	India	80,0 %	8,6
	The Netherlands	44,0	24,0
Question 2	India	94,3	5,8
	The Netherlands	30,4	52,1
Question 3	India	82,9	3,8
	The Netherlands	52,0	12,0
Question 4	India	95,3	3,8
	The Netherlands	77,3	0
Question 5	India	56,7	19,2
	The Netherlands	28,0	64,0

Table 10: Agree or Disagree on the cultural statements

The first three questions treat the relationships between people in different situations (community, school, state). According to these results, the distance between people in India is larger than in the Netherlands, especially question 2 shows a big difference in opinion. The inequality between people in India is not only shown by the results of these questions, but also observed by the researcher. The Indian community shows a huge respect for family and elderly people. At school teachers as well as bosses in offices earn a lot of respect. Also between families from different castes there are huge differences in opportunities in life, although the government officially prohibited judging people on their origin. In the Netherlands there still are large power distances between people, though not as many as some decades ago. Distances between people within a family and at school are rather small, but the distances towards government and bosses are still rather large. The results of the study of Hofstede (1991) show that India has a higher score on the Power Distance Index than the Netherlands. The results of this study are quite similar.

Question 5 indicates that the Indian participants see learning as something meant for young people. Hofstede indicates this phenomenon as typical for a collectivistic culture. The data show that the Dutch participants are mostly individualistic, but do not give any decisive answers about the Indian participants. Out of the observation the researcher can indicate the Indian respondents as more collectivistic than individualistic. Out of experience she knows most people do not like to have a different opinion (or look different or work in a different way) than the majority of the people in their community. In case someone has a different opinion, he or she is afraid to show it because of the chance of 'exclusion'.

Concluding it is possible to say that the researcher studied two different cultures. The t-test shows a significance difference between the two populations. In addition, the two groups differ in opinion about the cultural statements. In the next paragraph the researcher will study the relation between the variable cultural and technology acceptance.

4.3.2 Effects of external variables

<p><u>Variables:</u> Age (ratio) Gender (nominal) Education (ordinal) Job sector (nominal) Income (ratio) Religion (nominal) Hours (ratio) Frequency (interval) Purpose (nominal)</p>

A method to investigate the relationship between several variables is correlation. Correlation gives the strength and the direction of a relationship between two interval or ratio variables; this will be done with the correlation coefficient Pearson's R. Not all external variables in this study have an interval or ratio scale. Therefore, we will only consider the ones that have (see figure 14). The value of the correlation coefficient lies between -1 and $+1$. If R is equal to 1 , the relation is a perfect positive, if R is equal to -1 the relation is a perfect negative. Positive correlation indicates that both variables increase or decrease together, whereas negative correlation indicates that when one variable increases, the other decreases, and vice versa. To explain the variance for 50% or more, you need an R of 0.7 or more.

Figure 14: variables

In the correlation matrix (table 11) Pearson's correlation coefficient for the data is shown. Asterisks mark up the significant correlations. As the asterisks indicate, several variables have significant relationships. First, the relationships of the external variables will be analysed. Before doing so, the Technology Acceptance Model will be presented again to illustrate the variables of this research once more (Figure 15).

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Age	1	.262**	-.337**	.168	.177*	.005	-.008	.301**	-.042
2. Income	.0262**	1	-.121	.165	.194*	.143	.022	.168	-.144
3. Culture	-.337**	-.121	1	-.422**	-.422**	-.218*	-.420**	-.056	-.011
4. Perceived Usefulness	.168	.165	-.422**	1	.819**	.727**	.671**	.202*	-.293**
5. Perceived Ease of Use	.177*	.194*	-.422**	.819**	1	.660**	.568**	.087	-.276**
6. Perceived Resources	.005	.143	-.218*	.727**	.660**	1	.582**	.234**	-.196
7. Attitude Towards Using	-.008	.022	-.420**	.671**	.568**	.582**	1	.108	-.216**
8. Frequency Computer Use	.301**	.168	-.056	.202*	.087	.234**	.108	1	-.389**
9. Hours computer Use	-.042	-.144	-.011	-.293**	-.276**	-.196	-.216**	-.389**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 11: Correlation

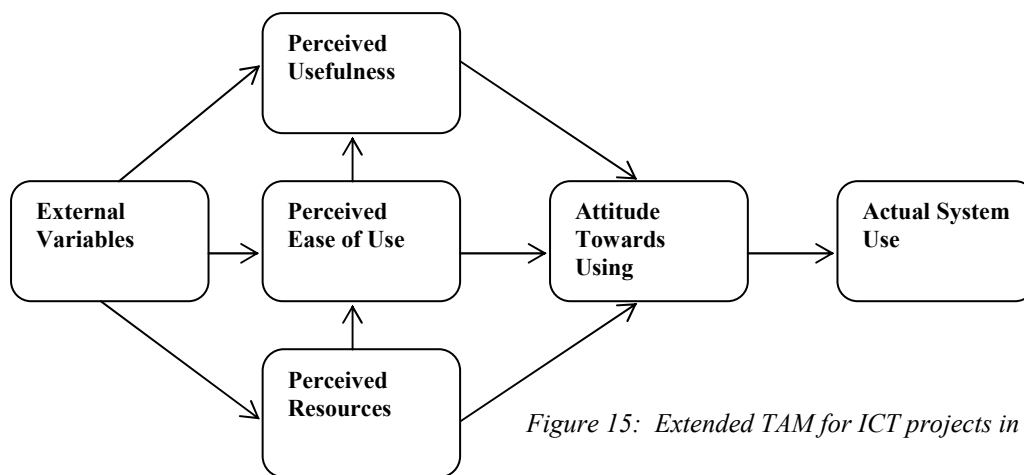


Figure 15: Extended TAM for ICT projects in developing countries

Age, Income and Culture are the external variables in this study and ‘frequency’ and ‘hours of computer use’ indicate the Actual system Use. Age has significant relationships with the other external variables: culture and income. The relationship with income is not surprising since young people mostly earn less than older people. Remarkably, income shows no other significant relationship within this data. Age also influences the cultural variable; this can be explained by the fact that young generations mostly differ in opinion from older generations. Finally, age has a significant relationship with frequency of computer use. In India, especially young people made use of the computer centres and in the Netherlands mostly old people. Age is in this case determining the actual use of the computers in the centres.

The last external variable is culture. Culture shows significant relationships with Perceived Usefulness, perceived Ease of Use, Perceived Resources and Attitude towards Using.

Apparently culture plays a very important role in people's opinion and attitude towards computer. Culture does not influence the actual use; in that case Age plays the most important role.

The other variables show strong relationships as well, especially between Perceived Usefulness, perceived Ease of Use, Perceived Resources and Attitude towards Using. This is not surprising since that part of the model has been tested and validated many times before, and the researcher used the validated questions.

4.3.3 Conclusion results

Out of the results of the correlation analysis we can conclude that age plays the most important role in determining the actual use of computers. Culture has no direct influence on actual use, but does influence people's opinion and attitude towards computers. Before discussing the differences in the results of India and the Netherlands, the next paragraphs will discuss the results of the interviews and observations.

4.4 Interview results Akshaya

During her two-month stay at the Akshaya office the researcher interviewed several people. All interviews were unstructured, but made use of some questions formulated in appendix 2. It was not possible to plan the interviews in front, because the researcher was dependent on the plans and schedules of the members of the project team. The researcher spoke with the following people:

- Members from the Akshaya project team (5)
- Members from Kerala IT Mission (2)
- Entrepreneurs (10)
- People who participated in the project (15)
- Other researchers (5)
- Finance officer Malappuram (1)
- People from DC School (3)
- People from Intel (1)

To carry out these interviews the researcher visited the relevant centres and organisations.

The first orientation on the work of the entrepreneurs took place during a visit to some Akshaya centres in the beginning of the researcher's investigation of the project. Together with two researchers from Delhi, Institute of Social Studies Trust (ISST), three Akshaya centres were visited and three entrepreneurs were questioned. The questioned entrepreneurs started their centre about one year ago. They heard about the opportunity via the media and

invested some of their own money and got a loan from the bank. They promoted the first phase of the project through house-to-house visits and they all reached the goal of training one member of every household in their area. They did not notice any difference between the performances of women and men and all their visitors were very enthusiastic about the course and the centre. The second phase attracts less people; the main reason the entrepreneurs give are the costs for this course. The people who visit the centres nowadays come mainly to use the Internet and e-mail or to play games. One centre already offers the opportunity to pay bills, but they all have plans for the future to offer more services. These entrepreneurs were very positive and glad they made the choice to run an Akshaya centre.

Later on, the outcomes of this first orientation appeared to be very compatible with results from interviews with other entrepreneurs. It was of course easier to speak with the enthusiastic entrepreneurs, because they were active in meetings and very willing to talk to researchers. The project team informed the researcher of the different attitudes of the entrepreneurs; they introduced a system to rate the entrepreneurs on basis of their activities and commitment. DC School of Management And Technology (DCSMAT) tried to make this system more scientific, because they got the assignment to advise the Akshaya project team and to help with the state-wide rollout. They see the role of the entrepreneur as very important for the success of the project: therefore they wanted to develop some guidelines for the recruitment of entrepreneurs in the future. The researcher agrees with the importance of the role of the entrepreneurs. An entrepreneur is mostly someone respected in the local community, so he or she is in a good position to convince people of the benefits of ICT.

These first interviews made clear the importance of the entrepreneurs. They appeared to be one of the main reasons the project is successful. Without their commitment and willingness to take risks (for example getting a loan), it would not be possible to develop a project on this scale. Of course not all 600 centres (and thus 600 entrepreneurs) succeeded at once, but due to much stimulation of the government most centres did become successful. DCSMAT investigated the Akshaya project already in a quite early stage. The researcher visited this school: her findings are represented in the next paragraph.

4.4.1 DC School of Management and Technology

First, some background information. DC school of Management and Technology (DCSMAT) relies on the corner stone of “DC¹ books”, one of the top publishing houses in India. The director of DC Books had a dream to start a school similar to the education he received in America. For this project he picked a very special spot in the mountains near Kottayam, Kerala. By now the school offers only an MBA-course (Master in Business Administration),

¹ **Padmabhushan Dominic Chacko Kizhakemuri** (1912-1999), popularly known as **DC** was an ardent freedom fighter, a dedicated social activist, an inspiring teacher, a veteran journalist and one of the founding fathers of the literary workers’ forum (Sahithya Pravarthaka Co-operative Society), the largest literary organisation of its kind in Asia.

but it plans to offer more courses in future. The manner of teaching in this school is different from many other MBA courses in India. The students have to work in groups and solve practical cases instead of receiving only one-way lectures from teachers. During the researcher's visit in July 2004 she noticed a great deal of professionalism in the attitudes of the teachers and students of DCSMAT

DCSMAT got involved with the Akshaya project by coincidence but turned out quite important for the project. The first time students at DC school heard about the Akshaya Project was in August 2003, when Akshaya was still in the middle of the first phase: the e-literacy program. Three students of DC school went to Malappuram to study the project; they wanted to develop a business model for Akshaya, because after the first phase, Akshaya would have to sustain without the involvement of the government. When the government (IT mission department) found out about the studies of DC School the government wanted them to get involved in the project. In January 2004 DC school got the assignment to study the pilot project of Akshaya in Malappuram and to collect information for the state-wide roll out of this project. Besides that, the school had to take care of the recruitment of the project co-ordinators (one for every state) and also got the task to prepare the induction program for the co-ordinators.

DC school's first insights of Akshaya

After visiting 30 centres and interviews with the project co-ordinators, DC school wrote a report about their insights of the Akshaya project (Sreekumar, 2004). First of all, the school found the enthusiasm of the learners very impressive; they described the response of the public as very encouraging and most of the centres were performing well in terms of number of trainees. A remarkable finding was that in rural areas there was more enthusiasm and the number of trainees was greater. More findings were:

1. In rural areas, women seemed to be more enthusiastic than men.
2. Over 60% of the trainees in rural areas are women.
3. Men prefer the evening / night-time slot.
4. Most of the trainees in urban areas are either students or men who are employed.
5. In urban areas, the door-to-door campaigning resulted in families sending their children (boys and girls) to attend Akshaya; women are either shy or more interested in television or engaged in house keeping.

Most of the entrepreneurs were very enthusiastic and confident about their job. The interaction with the public seems to be very important for the success of their centres. At the time of this report, the entrepreneurs had not really made any plans for the future and they were still really depending on the government. This is not surprising since the project was still

in a starting phase, although this would have been the right time to prepare them for the future and their independence.

Finally, the report made some remarks about the location, the scheduling and the branding. It concludes with the suggestion to make one centre sustainable and take lessons from this experience. Another conclusion is that there is need to reflect and codify the experiences of IT Mission (Knowledge Management).

In May 2004 DC school delivered an interim report to the State IT mission (Ravikumar, 2004). These findings form the basis for the business model developed for Akshaya. According to DC school, four factors caused the success of Akshaya.

1. The passion of the people involved in its conceptualisation and implementation.
2. The project never looked like a typical Government owned project in that it was least burdened by typical Government interferences.
3. The project had substantial autonomy in the decision-making processes.
4. The social capital that got created by the entrepreneurs was something positive that was unintended.

The project has been indicated as highly person dependent instead of system or organisational culture dependent. For replicating this project in other states one would need to take these factors into account, which, on the other hand could be very challenging because replication can take away the novelty of the program and hence the passion that may result from it. Though it is inevitable to have a formal system there must be space to accommodate novelty and passion. Following DC school, such a business model would include the following characteristics.

1. The proposed organisation should have absolute autonomy in managing the projects.
2. The proposed organisation should have two main objectives:
 - (a) To study the social process that goes into creating an entrepreneur; then conceptualise it in order to institutionalise the making
 - (b) To monitor the implementation of the project and explore the emerging opportunities and threats in the environment and guide the Akshaya units to adapt themselves to the changing environment.
3. The proposed institutional structure should be financially independent because financial dependence implicates the attendant conditions that might impede the performance of the organisation
4. Passion and creativity will have to become the main attributes of the organisational culture; this requires appropriate recruitment, incentive, HRD (Human Resource Development) and OD (Organisation development) interventions.

The researcher's impression of DC school

The professors and students of DC school carried out the evaluation of Akshaya in a very structured way. They collected a lot of information by visiting Akshaya centres and interviewing the project co-ordinators. Their report contained clear advises for the government of Kerala. From the data received from the Akshaya office they made clear statistical data and analysed these. Unfortunately, they had some communication problems with the government. More exactly, the government seems to change plans without consulting DC school. For example:

- DC school proposed to do the state-wide roll out in phases, because it will be very difficult to start the project in 13 states at the same time. The government insisted on doing the roll out for all states at once, so DC school changed the plans to meet their wishes. After a while the government changed its mind: after all they wanted to do the state-wide roll out in phases.
- The government asked DC school to do the induction program for the 13 Project Co-ordinators (PC) and the 13 Department Co-ordinators (DP). DC school proposed to give training to the PC's and DC's at the same time, because they have to work together in future. The government however, wanted the trainings to be separated. Finally, the government agreed with three-day training; one day only for the DP's and the other two days the PC's and DP's together. They set a date for the training and DC school prepared everything. Than the government kept on postponing.

Because of the involvement of many parties and people, good communication is indispensable. It is too bad that some misunderstandings can slow down the development of the Akshaya project. Concluding, the findings of DC school make clear the important role of the entrepreneur again. The enthusiasm of the initiators play a big role in the success of Akshaya, but replicating this project can be difficult because it will be necessary to create this enthusiasm again in a situation where the novelty of the project is already gone.

4.4.2 Intel

To make the centres sustainable it is important that they can offer a lot of services. The help of other organisations can be very important. One of the first organisations that used Akshaya to offer their product is Intel. This organisation developed an IT program for children and found the Akshaya infrastructure very compatible to launch its own project. Due to this project, entrepreneurs can attract children to their centre and receive themselves a good teaching training program.

The development program of Intel aims to decrease the digital divide. India is the fourth country where Intel launches its education program for children, before Mexico, Israel and

China. Intel wants to collaborate with governments to enable effective use of the government-managed Community Technology Centres (CTCs) for building the required skills for the knowledge economy. The idea is that the government and its partners provide the infrastructure, connectivity, hardware, software, staff and budget. Intel on the other hand will supply the curriculum for CTC staff training and program management expertise. The target goal of Intel is to create 500 CTCs, with a minimum of 700.000 learners in 10 countries at the end of 2005.

The curriculum is meant for children between 8 and 16 years old. The curriculum will feature the integration of technology skills and cognitive skills, including traditional literacy, numeric problem solving and critical thinking. The learner curriculum contains skill cards and activity cards. The skill cards are dealing with graphics, word processing, spreadsheets and multimedia. The activity cards are split up into three age groups; 8-12, 12-14 and 14-16. The theme of the first module is 'community'; it makes the children think about their own local community.

The day the researcher visited an Intel training, a training of the last batch of entrepreneurs and staff took place. The training contains a program of five full days and is very interactive. The training of the first batch of entrepreneurs and staff started at June 15th 2004, the last batch ended at July 30th. By that time Intel trained the staff of almost 100 Akshaya centres to provide this education program for children. The centres are selected by the local Panchayaths (governments); for every Panchayath one centre will provide the Intel program. The training of children has already started in some centres and turns out to be a great success. First, the entrepreneurs had to create awareness and find 10 children to follow the course; after that the news is hoped to be spread. Children have to pay 150 rupees (€ 2,63) for a 15-day course, 2 hours a day. The entrepreneurs use the money to make photocopies of the material needed for the course.

4.4.3 Interviews at the Akshaya project office

On the 13th of July 2004 Prof. Keniston asked, in presence of the researcher, a group of entrepreneurs about the main problems they face. Like many times before, their main problem appeared to be the Internet connectivity; they are waiting for a solution a long time now. Furthermore, there were some technical problems like cd's or cd-readers that do not function and there was not much local content available. The entrepreneurs also had some financial problems. Especially the electricity charges are very high: if you use more you pay exponentially more. They think the government should make some exception for the Akshaya centres, but until now the government seems not to be interested in this request. Finally, they talk about their political point of view; they really manage to be friends with both sides (left and right parties). People see the entrepreneurs as an independent party. The entrepreneurs

think they can make the best earnings out of offering services like browsing, chatting (webcam) and paying bills. They really want to offer more services, but for most services they will need Internet connectivity first. They also think it is a good idea to sell, for example, food or drinks in the Akshaya centres.

In conclusion, the main problem of the entrepreneurs and the project team during this period of investigation is the Internet connectivity of the centres. The project team chose a very advanced wireless Internet connection, but Malappuram is a difficult district because of all the hills. The main reason for the delay is that the companies that must deliver the materials are late. The materials are imported from Canada and Israel which takes a very long time to reach Malappuram. In the meantime, entrepreneurs receive Internet training and learn about the wireless system (see appendix 4) and how to support it. The gap between the first courses the centres gave and their ability to offer on-line services to the people is getting bigger and people do not visit the centres very often anymore. As soon as there is connectivity the entrepreneurs have to campaign again. This is an important lesson for the state-wide rollout.

The project team hoped to solve the connectivity problems in about a month, which means around September 2004. In August 2004, 300 centres had a connection; unfortunately the connections turned out to be not stable yet. For the remainder of the centres the building of antennas is still in progress.

The project team informed the researcher about some actions that are already in progress or planned:

- A little book with stories about ordinary people, and how Akshaya can offer a solution to their problems. The little books will be provided to every household in Malappuram (a draft is already finished).
- A chipcard is in development, which will become available for 50 rupees (€0,88) in an Akshaya centre. With this card people receive privileges, such as surfing time, discounts, and so on.
- The project team developed a list with 100 services a centre can offer to its customers. This list has been developed as a result of many talks/interviews with the entrepreneurs about their wishes and interests (see Appendix 5).
- There is also a list of 80 companies the project team wants to approach to get involved in the Akshaya project. Already some companies have taken up an office in Malappuram, which creates opportunities of co-operation.

Mr. Vinod (head of the project team) is very positive about the future, but stresses that the development of the Akshaya project is a long process and changes take a lot of time. Besides that, there is no money to hire more personnel to do things faster; most activities, like writing

the promotion book, have to be done by the people from the project office. The task cannot be outsourced, because others (like people from the head office in Trivandrum) do not have the insights the project team has.

The project team and other researchers made clear that there were not many efforts to share the knowledge of Akshaya or make use of the knowledge gained from other similar projects. It is a pity because it could prevent 'reinventing the wheel', like professor Keniston mentioned. The reason the project team gave is that they are still in the pilot phase and they think it is only wise to share knowledge after a long time of experience.

4.4.4 Conclusion Interviews

The interviews gave the researcher a lot of information about the development of the Akshaya project and the main problems the project had to face. The interviews did not provide much information about the role culture played in the acceptance of technology by the local people. The main thing the researcher found out about this topic was the role of 'safety'. It appeared to be very important to make sure the e-centres were a safe place to go to, especially for women and children. The role of the entrepreneur was to convince the families that the centre is a safe place to go to. The entrepreneurs are mostly people with a lot of connections in the area and therefore trusted by many people. The trust in the entrepreneurs in combination with good information about the possibilities of the computers in the centres made people decide to go there.

The interviews provided a good overview of some involved parties in the Akshaya project and their opinion and/or role according to the project. There are clearly more researchers interested in the Akshaya project, because researchers from several countries visited the project (Japan, USA, Germany). In India itself DC school scientifically analysed the Akshaya project and tried to describe the success factors; they also give advises for the future development of the project. The local project team and the government try to solve problems as quickly as possible and are developing activities and products to make the project sustainable. Intel is the first company making use of the infrastructure of Akshaya. Because of their involvement entrepreneurs receive trainings and new people are attracted to the centres. Parties like Intel are necessary in the future to make the centres sustainable and independent from the government.

4.5 Observations Akshaya

Observations were made in the Akshaya e-centres at the project office and during meetings, trainings and other activities that had to do with Akshaya. Observation was used to complete the overview of the whole situation.

4.5.1 The Centres

All centres have the same format, though some have more computers than others. The average is about five computers for each centre. People in the centres are mainly students and young people. The centres are very recognisable by the blue Akshaya board at the front of the building. The centres charge different amounts for their services, for example 20 rupees (€ 0.35) an hour for surfing. Apart from the entrepreneur, every centre has two staff members, mostly young people. The opening hours of the centre differ per centre: the entrepreneur decides to be open or not. If the entrepreneur and staff have a meeting the centre will be closed.

4.5.2 The project office

The project office is the pivot of the Akshaya project. There are four project co-ordinators, all responsible for a specific part of the district Malappuram. The remainder of the staff is supporting staff for telephone, data entry, driving, etc. They recently installed a permanent Internet connection, which unfortunately does not always work. Sometimes there are not enough computers for the team members to work on. The team is very hardworking and is in fact too small to perform all of its tasks. Four people have to support more than 600 entrepreneurs and visit the centres regularly. They also work on the connectivity, attract third parties, organise meetings, stay in contact with the government, etc. It is obvious that there is not enough time to spend on tasks such as making promotion material, analysing surveys and translating work into English or local language.

4.5.3 More meetings

During the researcher's stay at the Akshaya office she accompanied members of the project team to several meetings.

- **Advanced Micro Devices (AMD) Presentation.** People from AMD came to Malappuram to give a presentation about a new computer system they developed, especially for developing countries. The computers are meant for people with little money. It is a very smart and small system for which Microsoft developed the software. In a few months the first version of this new device will be launched. Of course AMD hoped an organisation like Akshaya to be interested in this device. However, the entrepreneurs were not very enthusiastic, although they liked the device. The problem, according to the entrepreneurs, is that the price is still too high for the common man.
- **A meeting of entrepreneurs in Pookkottur.** The reason for this meeting was a conflict between some entrepreneurs and Panchayath members concerning the performance and involvement of some entrepreneurs. A member of the project team organised the meeting in order to solve the problems. These actions of the project team are very important to guarantee the quality of the Akshaya centres. Sometimes an entrepreneur needs some

extra motivation to continue the centre. Especially in difficult times, like performing without Internet connectivity.

- **Five meetings in different Akshaya centres.** Vinod (head project team) visits the entrepreneurs every two months (there are 617 entrepreneurs). The main goal of these meetings is sharing problems and success stories and providing information and help. The main problem this time is the Internet connectivity; many centres are not connected to the Internet, which is the reason why many visitors stay away. The researcher discovered a survey in Malayalam (the local language) in one of the centres; it appears that this survey has been developed by the Panchayaths (local governments). The survey asks questions about the family situation and needs of the families. The entrepreneur will collect the survey from every household in his region. The survey is still running, unfortunately there were no results by the time of this research.
- **Meeting for future entrepreneurs of other districts.** During this meeting a movie was shown about Akshaya with some invited speakers to tell about this project. Subsequently, the guests were taken to visit some centres. The goal of the meeting was to make people enthusiastic becoming an entrepreneur: the Akshaya project will be launched in other districts soon. The researcher was not able to collect the reaction of the guests, because there were barely any English-speaking people.
- **Internet training.** The state is giving all entrepreneurs and staff Internet training. This training consists of understanding Internet connectivity, how to create an Internet connection and carry out tasks on the Internet. The researcher was surprised that such training was not held before the start of the centres. A member of Kerala IT mission made clear that this was owing to the delay of the Internet connections and the fact they just discovered the need of the entrepreneurs for such training. In the future entrepreneurs will receive Internet training at the beginning of the development of their centres to prevent them for connectivity problems.

4.5.4 Conclusion observations

The observations gave a good overview of the situation in the centres and in the project office. The researcher noticed that most visitors of the centres were quite young (between 15-25) and very willing to develop their computer skills for the purpose of their studies or finding a job. The differences between the centres were very visible; some were crowded and full of enthusiastic people and some centres were much quieter. The differences can be caused by the location of the centres - some centres were located in the middle of a town and others in very rural areas - but also by the differences in enthusiasm of the entrepreneurs; some of them had a lot of contact with people near the centres and decorated their centres with drawings (made on the computer) of children, while others operated more on the background and did not do much to involve people. Out of these observations the important role of the entrepreneurs has been determined again. The researcher could not observe much cultural-

related influences in the centres, except that people took their shoes off before entering a centre.

The project team made a very positive impression on the researcher. They were all very enthusiastic about the project and worked very hard (mostly seven days a week). Furthermore they were willing to organise meetings and they travel a lot. Travelling in this area is unfortunately very time consuming, so the project team tries to minimise this time to visit more centres at once or ask entrepreneurs to meet at a central place. The busy schedule of the team members and the lack of money to hire more people sometimes causes problems, for example the Internet connectivity problem and the gap between offering the first course and the second one. The researcher could not find any cultural variable involved in this problem. The only striking thing, related to culture, was that no member of the project team was female and just a few entrepreneurs were female. It appeared to be much more difficult for a woman to get a loan at a bank to start a centre. To solve this problem the Akshaya team offers women help in negotiating with the banks. Besides that, it is still very normal girls get married in their twenties and then stay at home to take care of the children. Like in many developing countries, this traditional male-female role pattern is changing. This takes however, a lot of time.

4.6 Interview and observation results Cybersoek

During this study there was no opportunity to interview the people working for Cybersoek. Fortunately, the researcher could talk with some employees and volunteers during her visits. They explained there are differences in performance by people from different cultural backgrounds. In spite of the fact all visitors live in the same country, they show differences in performances, probably caused by different cultural background.

The volunteers are mostly people who started as a visitor of Cybersoek themselves. They got very enthusiastic and are able now to help other people. The technicians are mostly people who want to do something different besides their regular jobs.

Cybersoek is located in a restored building in Amsterdam, stadsdeel Zeeburg. There are about 20 computers available. People come to learn but also to have a conversation and drink a cup of coffee. During the free hours for 21+ and women, mainly people from ethnic minorities are represented. This is not surprising since they are one of the target groups of the project. In this study the visitors were treated as one homogeneous group, because they all live in the same country. It could be that their different ethnic background influences their performances, but this is no factor analysed in this study.

4.7 Akshaya and Cybersoek compared

The projects show many similarities in goals and development. However, the results of the questionnaires, interviews and observation make clear there are many differences as well. In the following paragraphs the differences as well as the similarities of the projects will be discussed.

4.7.1 Age

In both projects age seems to be a determinant factor in the frequency of computer use. This seems a similarity, but it is a difference as well. In the case of Akshaya, young people use computers more frequently than older people and in the case of Cybersoek older people use computers more frequently. This difference can be explained by the fact that Akshaya attracts especially young people because they are eager to learn working with computers and do not have one at home. Cybersoek has an important focus on older people, because they do not get in contact with computers due to school or work (like younger people do in the Netherlands) and often feel a barrier to buy one themselves. The role of computers in India and the Netherlands is very different. In the Netherlands the computer is already a part of every day live, only some older people or people with no job or very little money are excluded. In India the majority of the people in the rural areas have no contact with computers at all: Akshaya often offers people's first experience with a computer. Akshaya wants to reach every family, while Cybersoek directs more to groups of people who are excluded from computer use. It is not surprising that most respondents of the Cybersoek project are relatively old, because the elderly form a group, which often has difficulties in catching up with all developments in technology. Another group of regular Cybersoek visitors are foreigners; they mostly want to extend their chance on a job by developing computer skills. These people are mostly under 50 years, but not many of them were represented: it often was too difficult for them to fill in the questionnaire because of their lack of understanding the Dutch language. In table 21 the differences in age of the respondents in both projects are represented.

Age in %	0-10	11-20	21-30	31-40	41-50	>50	Total
Akshaya	0 %	35,5	34,6	15,0	9,3	5,6	100 (N=107)
Cybersoek	0	0	4,0	16,0	20,0	60,0	100 (N=25)

Table 12: The differences in represented age groups.

4.7.2 Questionnaire

It seemed that the seven point Likert scale was better understood by the Dutch participants than by the Indian participants. The answers of the Indian participants focused around the extremes of the scale, resulting in answers such as extremely agree or extremely disagree. The Dutch participants were found to show more gradations in their answers and they also

were less extreme in their answers. They were not always very certain about their abilities to use computers. The researcher got the impression that the Indian participants were very willing to show their positivism about the project. This because they were quite impressed by the visit of a researcher from abroad who was interested in ‘their’ project. People in the Netherlands appeared to be less sensitive for the authority of researchers and more willing to express their feelings of discomfort or complaints. In table 22 and 23 you clearly see the differences in answering a question. The answers of the Dutch participants are spread around different gradations, while the answers of the Indian participants cluster around the extremes. The researcher got the impression that the scale was not always understood by the Indian participants: they had never seen a questionnaire like this one before. Dutch participants could have more experience with filling in questionnaires, because companies and the government regularly investigate people’s opinion towards al kinds of subjects. In the rural areas this happens rarely.

PU1 in %	Extremely Agree	Quite Agree	Slightly Agree	Neither Agree or disagree	Slightly disagree	Quite disagree	Extremely disagree	Total
Akshaya	72,8 %	13,6	2,9	4,9	0	3,9	1,9	100 (N=103)
Cybersoek	40	20	24	12	0	0	4,0	100 (N=25)

Table 13: results of the question “Using computers increases my productivity”

Col1 in %	Extremely Agree	Quite Agree	Slightly Agree	Neither Agree or disagree	Slightly disagree	Quite disagree	Extremely disagree	Total
Akshaya	1,9	2,8	0	3,8	1,9	19,8	69,8	100 (N=103)
Cybersoek	0	4,2	0	8,3	8,3	33,3	45,8	100 (N=24)

Table 14: results of the question “Family celebrations are very important and should not be missed”

4.7.3 More differences

The differences in frequent use of computers (table 24) can be explained by the opening hours of the centres. The Akshaya centres are opened every day and everyone can come by at any time. In the case of Cybersoek people visit the centre once a week to follow a course or make a visit during the free hours.

Frequency	Every Day	3-5 week	Once a week	Once in two weeks	Once a month	Never	Total
Akshaya	37,3 %	34,3	6,9	2,9	7,8	10,8	100 (N=102)
Cybersoek	20,0	32,0	44,0	4,0	0	0	100 (N=25)

Table 15: Frequency of computer use in the Akshaya and Cybersoek centres.

In both projects people from the lowest income groups are the most represented (table 25). This is not surprising since these projects are meant for people who cannot buy an own computer or pay a lot for a computer course. This makes clear the projects are reaching their target groups and do not attract people who actually do not need any support.

Groups of Income in %	1	2	3	4	5	Total
Akshaya	73,1 %	21,5	2,2	3,2	0	100 (N=93)
Cybersoek	23,5	47,1	29,4	0	0	100 (N=17)

Table 16: Income groups

The purpose of computer use differs a lot between the visitors of the two projects (table 26). The visitors of Cybersoek are especially interested in the use of e-mail and chat, while the visitors of the Akshaya project indicate the use the computer for other purposes. After informing, it appears that 'other use' was mainly chosen because there was no option to choose for the purpose 'study'. So, the majority of the visitors of Akshaya come to the centres to study. By studying they hope to increase their changes for a good job. At the Cybersoek project the most visitors use e-mail to stay in contact with relatives and friends in other countries and to apply for jobs. Most respondents declared they actually make use of several purposes.

Purpose in %	Business	E-mail/chat	Surfing	Games	Other	Total
Akshaya	23,3 %	10,3	7,8	11,1	47,8	100 (N=90)
Cybersoek	16,0	44,0	12,0	12,0	16,0	100 (N=25)

Table 17: Purpose of computer use

Chapter 5: Discussion and Conclusion

With the help of the results from the previous chapter, the researcher will try to answer the research questions. Before coming to a conclusion, the following paragraph contains a discussion about the pros and cons of this study.

5.1 Discussion

Although this research did not confirm the connection between culture and technology acceptance, it did provide a lot of useful information about IT projects. Several reasons may have frustrated the results of this study. For example, the format of the questionnaires and the coincidence of choosing two very successful IT-projects. It would be interesting to conduct the same study at a project with less success.

5.1.1 *The Akshaya project*

The Akshaya project in South India is a very impressive project. On one side it was a perfect place for this study, because of the idea of bringing technology to the local people. On the other side, the timing was not so perfect. It would have been more interesting to carry out this study in the beginning of the project. At the time of this study, many problems had been already overcome, including cultural ones. Unfortunately, not all problem phases have been documented. It appears that informing people intensively by someone they trust is the best way to overcome problems. This way of approaching people with new developments does not really make an infringement in their way of living. The Akshaya way of introducing technology in a local culture should be studied by other initiators. It is very important that this kind of projects learn from each other's successes and failures.

5.1.2 *The Cybersoek project*

The Cybersoek project was a rather good choice to use as a control group, because the project shows many similarities with the Akshaya project. The difficulty in this project was that the respondents represented many different cultural backgrounds and were therefore difficult to treat as one group. It would be interesting to study this project according to the effects of the different backgrounds.

5.1.3 *The questionnaire*

The questionnaire needs adjustments before it will be useful for comparable research. The questions to measure culture need some consideration, as the researcher feels they did not always measure the cultural dimension they should. This appeared from the difficulties to

group the questions and the factor analysis, which resulted in very different clusters than intended. Besides that, the way the questions were formulated was perhaps too complicated for most people. People needed a lot of support to fill in the questionnaires. Instead of the seven-point scale, it would be better to give a few options to answer the questions. In addition, there is the problem that people give answers they think they are expected to give. Especially in a culture like India, people do not like to be negative towards a foreigner. The researcher thinks it would be wise to discuss some of the questions with the people themselves or ask some more about specific situations to solve this problem. Unfortunately, the researcher did not speak the local language and a lot of people did not speak English. Therefore, the researcher was very dependent on people from the project team. This team had a very busy schedule and did not have the time to accompany the researcher too long.

5.1.4 Gender

The researcher thinks it would be easier for a male researcher to study the Akshaya project. All members of the project team were male and seemed not always very comfortable with a female researcher in their middle. This created sometimes some misunderstandings. The researcher did not get involved in all actions and therefore the progress of the research was sometimes quite slow. On the other hand, the project team was very helpful when necessary.

5.1.5 Future research

The researcher still believes that aspects of a local culture can have great influence on the technology acceptance process. To prove so, it would be very interesting to carry this research out again with some adjustments. The questionnaire really needs some consideration, like the way of presenting the questions to the respondents (paragraph 5.1.3). Maybe it is wise to discuss with the local team what is the right way to present the local people a questionnaire. It would be interesting to investigate an area where a project like Akshaya is just starting: in that case it would be really possible to see and document problems in the beginning phase. Akshaya is going to roll out the project in the whole state, so there must be enough opportunities to carry out this study again.

5.2 Conclusion

In this paragraph the researcher will try to answer the research questions and discuss if they are compatible with the earlier formed expectations (paragraph 3.6). Starting with the first two sub-questions:

1a) Do user characteristics (including cultural background) have an effect on the process of acceptance?

1b) In what way do the user characteristics impact the process of acceptance?

The researcher expected influences of all three cultural dimensions (power distance, uncertainty avoidance and collectivism/individualism). In practice, it was not possible to use these three dimensions because the developed questions did not form the correct groups. Therefore the researcher created only one variable presenting culture in a more general way. The correlations culture showed with some variables of the technology acceptance model were not very strong. There was no relationship between culture and actual use either.

Concluding, it is possible to say that the external variables do have some influence on the acceptance process, though their influence is limited. The main question of this study was:

1) What are the effects of cultural background of the local user group on the acceptance of ICT-projects in developing countries?

Out of the results of this study it is difficult to say what the effects of cultural background are, because the cultural variables do not show very strong relationships with the technology acceptance model and no relation with actual use.

Because of the Akshaya project and all the promotion and information around this project, the Indian respondents created a very positive attitude towards computers and new technology. This does not automatically mean these people use computers very frequently, which can be explained by the fact that the project was still developing. The Akshaya centres did not yet offer many services (like Internet, government payments) yet, so for a lot of people it was not interesting enough to come to the centres.

The cultural background of the Akshaya and Cybersoek respondents do show differences, though it is not possible to say that these differences in background are determining the computer use. This can be caused by the fact that the respondents of the Cybersoek project all had different backgrounds themselves so it was difficult to treat them as one group. It would be interesting to study the differences between the respondents according to their origin.

1c) What are the possibilities for developers of ICT-projects in developing countries to take cultural background into account?

Developers for future IT-projects can take a good example out of the Akshaya and Cybersoek project. In the case of Akshaya, they started the project with informing the people very intensively, which was done by people who were in very close contact with the locals. The Akshaya e-centres became a trusted place for a whole village or town. Because of all the

information people received and the trust they had in Akshaya, the project became successful. People were not afraid to go to the centres or to send their children. Cybersoek created a safe place as well and was capable in attracting a lot of elderly people. The methods used by these two projects should be used in future projects. Informing people by trusted persons appeared to be the success formula of the Akshaya project to overcome all fears and cultural related problems related to the acceptance of new technologies.

References

- Adams, D.A., R.R. Nelson & P.A. Todd (1992), 'Perceives Usefulness, Ease of Use, and Usage of Information Technology: A Replication', *MIS Quarterly*, Vol. 16, No. 2, pp. 227-247.
- Ajayi, O.C., Franzel, S., Kuntashula, E., Kwesiga, f. (2003), "Adoption of improved fallow technology for soil fertility management in Zambia: Empirical studies and emerging issues" in *Agroforestry Systems* no. 59, pp 317-326.
- Ajzen, I., "Constructing a TpB Questionnaire: Conceptual and Methodological Considerations", 2002. Internet: <http://www-unix.oit.umass.edu/~aizen/tpb.html>
- Ajzen, I., Fishbein, M. (1980), "Understanding attitudes and predicting social behaviour", Eaglewood Cliffs, NJ: Prentice-Hall.
- Bahmansiari 2003
- Bandlamudi, L. (1994), "Dialogics of Understanding Self/Culture" in *Ethos* vol.22, no. 4. pp 460-493.
- Bergeron, F., Raymond, L., Rivard, S., and Gara, M-F. (1995), "Determinants of EIS use: Testing a behavioral model," in *Decision Support Systems* no. 14, pp. 131-146.
- Bobde, D. P., Deb, A., Rane, R. R. (2002), "The Warana wired village project in retrospect" in moving from virtual to real benefits in local development:reflections in an e-workspace, UNCRD. http://www.uncrd.or.jp/hs/02e_eworkspace/eng/papers/cs_warana.htm
- Chau, P.Y.K. (1996), 'An Empirical Assessment of a Modified Technology Acceptance Model', in *Journal of Management Information Systems*, Vol. 13, No. 2, pp. 185-204.
- Cheung, S.F., Chan, D.K.S., Wong, Z.S.Y. (1999), "reexamining the theory of planned behavior in understanding wastepaper recycling" in *Environment and Behavior*, vol. 31, no. 5, pp 587-612.
- Chin, W. W. & Todd, P. A. (1995), "On the Use, Usefulness, and Ease of Use of Structural Equation Modeling in MIS Research: A Note of Caution" in *MIS Quarterly*, vol 19, no. 2, pp. 237-246.
- Choo, C.W. (1991), "Towards an information model of organizations", in *The Canadian journal of Information Science*, vol. 16, no. 3, pp 32-62.
- Computing Research Association (CRA) (1995), "Culture, Society and Advances Information Technology", available at: <http://www.cra.org/Policy/reports/aspects/aspects.pdf>.
- Corse, S. M., Robinson, M. A. (1994), "Cross-cultural measurement and new conceptions of culture: measuring cultural capacities in Japanese and American preschools", in *Poetics: Journal of Empirical Research on Literature, the Media, and the Arts*, no. 22, pp 313-325.

- Damsgaard, J., Lyytinen, K. (2001), "What's wrong with the diffusion of innovation theory. The case of a complex and networked technology". Proceedings of the IFIP 8.6. Conference, Banf 8-10.4.2001, Canada
- Davis, F. D. (1993), "User acceptance of information technology: System characteristics, user perceptions and behavioral impacts" in *International Journal of Man-Machine Studies*, no. 38, pp 475-487.
- Davis, F. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", in *MIS Quarterly*, no. 13, pp 319-340.
- Davis, F. D. (1986), "A technology acceptance model for empirically testing new end-user information systems: theory and results", Sloan School of Management, Massachusetts Institute of Technology.
- Dev Sood, A., "Background and Perspective" available at: <http://www.infochangeindia.org/ltanddlbp.jsp>. Last accessed at 25 May 2005.
- Evers, V. (2001), "Cultural Aspects of User Interface Understanding: An Empirical Evaluation of an E-Learning website by International User Groups", the Open University. Available at: <http://staff.science.uva.nl/~evers/publications.html>
- Evers, V., Day, D. (1997), "The role of culture in interface acceptance", in *Human Computer Interaction: INTERACT'97*, Sydney, Chapman and Hall.
- Fishbein, M., Ajzen, I. (1975), "Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research", Addison-Wesley, Reading, MA.
- Flett, R., Alpass, F., Humphries, S., Massey, C., Morriss, S., & Long, N. (2004), "The technology acceptance model and use of technology in New Zealand dairy farming" in *Agricultural Systems*, vol. 80, pp 199-211.
- Frissen, V. (2000), "De mythe van de digitale kloof", advice for the ministry of OcenW in the Netherlands, available at: <http://www.minocw.nl/cultuurict/nota2.pdf>.
- Global Knowledge Partnership (GKP) (2003), "ICT Success Stories in Development", available at www.globalknowledge.org.
- Hall, E. (1959), "The Silent Language", Doubleday, New York.
- Hall, E. (1976), "Beyond culture", Garden City, N.Y., Anchor Press.
- Hattotuwa, S. (2003), "ICT and Conflict Resolution", written for Oneworld South Asia Partners meeting, 3-4 February 2003, Delhi, India. Available at <http://india.takingitglobal.org/express/article.html?cid=1021>
- Heeks, R. (2003), "eGovernment for Development, The Impact of eGovernment Failure", IDPM, University of Manchester, UK. Available at <http://www.egov4dev.org/impactfailure.htm>
- Hofstede, G. (1991), "Cultures and Organisations: Software of the Mind", McGraw-Hill, New York.
- Honold, P. (2000), "Culture and Context: An Empirical Study for the Development of a Framework for the Elicitation of Cultural Influence in Product Usage" in *International Journal of Human-Computer Interaction*, vol. 12, no. 3&4, pp. 327-345.

- Hounsa A.M., Godin G., Alihonou E., Valois P., Girard J. (1993), "An application of Ajzen's theory of planned behaviour to predict mothers' intention to use oral rehydration therapy in a rural area of Benin", in *Social Science and Medicine*, vol. 37, no. 2, pp 253-61.
- Hsu, C-H., Lu, H-P. (2004), "Why do people play on-line games? An extended TAM with social influences and flow experience", in *Information & Management*, vol. 41, pp 853-868.
- Kelman, H. C. (1958), "Compliance, Identification, and Internalization: Three Processes of Attitude Change", in *Journal of Conflict Resolution*, vol. 2, pp. 51-60.
- Kelman, H. C. (1961), "Processes of Opinion Change," in *Public Opinion Quarterly*, vol. 2, pp. 51-60.
- Keniston, K. (2002), "Grassroots ICT Projects in India: Some Preliminary Hypotheses" in *ASCI journal of management*, vol. 31 (1&2).
- Kroeber, A. L., Kluckhohn, C. (1954), "A Critical Review of Concepts and Definitions of Culture", Random House, New York.
- Lai, V.S., Honglei, L. (2005), "Technology acceptance model for internet banking: an invariance analysis", in *Information & management*, vol. 42, no. 2, pp 373-386.
- Lee, H., Whitley, E. A. (2002), "Time and Information Technology: Temporal Impacts on Individuals, Organizations, and society" in *The Information Society*, no.18, pp 235-240.
- Lee, K. (2000) "A Study on the Cultural Effects on User-Interface Design", The ACM SIGCHI conference on Human Factors in Computing Systems 2000. Available online: <http://www.globalisation.org/sigchi2000/xPapers/LKP-ADCpaper.pdf>. Last accessed on 18 April 2005.
- Legris, P., Ingham, J., Collerette, P. (2003), "Why do people use information technology? A critical review of the technology acceptance model", in *Information & Management*, Vol. 40, No. 3, pp. 191-204.
- Malhotra, Y., Galletta, D.F. (1999), "Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation", in: *Proceedings of the 32nd Hawaii International Conference on System Sciences*, IEEE Comput. Soc. Press, Los Alamitos.
- Mante-Meijer, E., Ling, R. (1999), "The adoption and use of ICT services in Europe, potential acceptance of mobile broadband services" in EURESCOM P903.
- Mao, E., Palvia, P. (2001), "Culture's Effect on Information Technology Acceptance". *Proceedings - National Decision Sciences Institute*, San Francisco.
- Marti, J. & Müller, C. (2003). *Cross-Cultural Communication and comprehensibility on websites. Designing for global markets 5*, IWIPS 2003.
- Mathieson, K., Peacock, E., Chin, W. (2001), "Extending the Technology Acceptance Model: The influence of Perceived Resources" in *The DATA BASE for Advances in Information Systems*, vol. 32, no. 3, pp 86-112.

- Moore, G. A. (1991), "Crossing the Chasm", Capstone Publishing Ltd; Revised Edition.
- Moore, G. A. (1995), "Inside the Tornado", HarperCollins Publishers, Inc.: New York.
- Nunnally, J. C. (1978), "Psychometric theory (2nd ed.)", New York: McGraw-Hill.
- Pair, L.M. (2002), "Cross B Cultural Arbitration: do the differences between cultures still influence international commercial arbitration despite harmonization?" in *ILSA Journal of International and Comparative Law*, vol. 9 no.1, pp 57-74.
- Ravikumar, K. (2004), "Interim Report Akshaya Project", DC School of Management and Technology, Kerala, India.
- Rogers, E. M. (1962), "*Diffusion of Innovations*", The Free Press, New York.
- Rogers, E. M. (1976), "New Product Adoption and Diffusion", in *Journal of Consumer Research*, Vol. 2, pp. 290 -301.
- Saadé, R., Bahli, B. (2004), "The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: an extension of the technology acceptance model", in *Information and Management*, vol. 42, no. 2, pp 317-327.
- Sacher, H., Tng, T., Loudon, G. (2001), "Beyond Translation: Approaches to Interactive products for Chinese Consumers" in *International Journal of Human Interaction*, vol.13, no.1, pp 41-51.
- Sarker, P. P. (2002), "ICTs for Development Initiatives in South Asia", Bytes for All, <http://www.bytesforall.org>
- Segars, A. H., Grover, V. (1993), "Re-examining perceived ease of use and usefulness: A confirmatory factor analysis" in *MIS Quarterly*, vol. 17, pp 517-525.
- Shen, J. (2000), "User Interface Internationalization", unpublished manuscript, available at http://eies.njit.edu/~turoff/coursenotes/CIS732/samplepro/user_interface_internationalizat.htm
- Shih, H-P. (2004), "Extended technology acceptance model of Internet utilization behavior" in *Information & Management* vol. 41, pp 719-729.
- Slyke, C. van, Lou, H., Belanger, F. (2001), "Cultural differences in perceptions of electronic commerce: A comparison of three countries", published in the Proceedings, 2001. Internet: http://www.bus.ucf.edu/cvanslyke/6485/ClassNotes/dsi_2001_distribution.pdf
- Sreekumar, A. (2004), "Some Insights on the Akshaya Project of Kerala State IT Mission", DC School of Management and Technology, Kerala, India.
- Straub, D., Keil, M., Brenner, W. (1997), "Testing the technology acceptance model across cultures: A three country study", in *Information & Management*, Vol. 33, No. 1, pp. 1-11.
- Straub, D.W. (1994), "The Effect of Culture on IT Diffusion: E-mail and FAX in Japan and the U.S.", in *Information Systems Research* vol.5, no.1, pp. 23-47.

- Straub, D.W., Limayem, M., Karahanna-Evaristo, E. (1995), "Measuring System Usage: Implications for IS Theory Testing", in *Management Science*, Vol. 41, No. 8, pp. 1328-1342.
- Terry, D.J., O'Leary, J. (1995), "The theory of planned behavior: The effects of perceived behavioural control and self-efficacy", in *British Journal of Social Psychology*, vol. 34, pp 199-220.
- The Digital Opportunity Initiative (DOI) 2001, "Creating a development dynamic", Accenture, Markle Foundation, United Nations Development Programme, <http://www.opt-init.org/>.
- Thompson, R. (1997) "Understanding the Use of Information Technology: Application of the UTIP Framework", submitted for Americas Conference on Information Systems 1997.
- Trompenaars, F. (1996), "Resolving International Conflict: Culture and Business Strategy" in *London Business School*, vol. 7, no. 3, pp 51-68.
- Trompenaars, F. (1997), "Riding the waves of culture, understanding diversity in global business", second edition, The McGraw-Hill Companies.
- United Nations Conference on Trade and Development (UNCTAD) (2003), "E-commerce and development report 2003", United Nations New York and Geneva 2003. Internet: http://www.unctad.org/en/docs/ecdr2003_en.pdf, last accessed at 23-05-05.
- United Nations Educational Scientific and Cultural Organisation (UNESCO) (2003), "Ethnographic Action Research" authors: Jo Tacchi, Don Slater, Greg Hearn. Available at <http://unescoedelhi.nic.in/publications/ear.pdf>
- Venkatesh, V., Davis, F.D. (2000), "A theoretical extension of the technology acceptance model: four longitudinal field studies", in *Management Science*, vol. 46, no. 2, pp 186-204.
- Venkatesh, V., Morris, M.G., Davis, G.B., & Davis, F.D. (2003), "User Acceptance of Information Technology: Toward a Unified View", in *MIS Quarterly*, Vol. 27, No. 3, pp. 479-501.
- Victor, D. A. (1994), "Advancing Research in International Business Communication" in *The Bulletin*, september 1994, pp 41-22.
- Vijayasarathy, L.R. (2004), "Predicting Consumer Intentions to Use Online Shopping: The Case for an Augmented Technology Acceptance Model" in *Information & Management*, vol. 41, no. 6, 747-762.
- Vijver, van de, F.J.R. (2001). Cross-cultural reserach methods. In N.J. Smelser & P.B. Baltes (Eds.), *International Encyclopedia of the Social & Behavioral Sciences* pp. 2999-3003) Oxford: Elsevier.
- Vijver, van de, F.J.R., Leung, K. (2000), "Methodological Issues in Psychological Research on Culture" in *Journal of cross-cultural psychology*, vol.31, no. 1, pp 587-612.

- Vöhringer-Kuhnt, T. (2002), "The Influence of Culture on Usability", a master thesis conducted at Frei Universität Berlin.
- Westrup, C., Al Jaghoub, S., El Sayed, H., Liu, W. (2002), "Taking Culture seriously: ICTs, Cultures and Development", in *IFIP 9.4 conference 2002*, Bangalore.
- Yang H-D., Yoo, Y. (2003), "It's all about attitude: revisiting the technology acceptance model" in *Decision Support Systems*, vol. 38, no. 1, pp 19-31.
- Yoo, S-H. (2003), "Does information technology contribute to economic growth in developing countries? A cross-country analysis", in *Applied Economics Letter*, vol. 10, issue 11, pp 679-682.

Appendix