Chapter 10   Conclusion

10.1 Introduction

After having addressed all the derived research questions in previous chapters, this chapter will consider the main research question, to see whether the study has contributed to the following:

- How can social systems theory help us to describe and assess the contribution of an IT intervention on the social system it serves, in a remote, rural African community?

Before doing this, a general summary and reflection on the research is provided. The research is assessed in various manners, including an assessment of the research process using Klein and Myers' (1999) principles for interpretive field studies, and an assessment of the theoretical contribution against the criteria suggested by Whetten (1989). The researcher also provides her own reflection on challenges experienced and considers opportunities for future research.

10.2 Summary of research: problem, planning and execution

10.2.1 Revisiting the problem

The problem stated in Chapter 1 was the difficulty of demonstrating an ICT4D project's contribution to 'development', meaning the sustainable socio-economic development of the larger social system within which an ICT intervention is made. 'Development's definition was taken to be self-reliant human-scale development that includes interdependence with other social systems. This definition also assisted in dealing with the associated problematic notion of 'sustainability', which in ICT4D literature was found to be largely focused on the sustainability of the ICT intervention itself. It was argued that an ICT4D project should aim to contribute to the sustainability, or self-reliance, of the containing social system.

To address the challenge of demonstrating a project's contribution to development, it was argued that a systems approach be followed. One of the key properties of systems thinking is its ability to relate the parts to the whole. A systems approach would provide a means to describe the interconnections or influences between different aspects of a system, in order to investigate how changes or additions to the system will affect the overall system. As such, it

would provide a language to help assess the effect of an ICT4D intervention to the containing system, in which ever way the containing system is defined.

10.2.2 A possible systems framework

It was further argued that the containing system should be investigated with a social systems approach, acknowledging its social as well as systemic nature. A journey to search for an appropriate systems approach led to the development of selection criteria as well as the identification of an interesting and promising approach. The approach entailed a conceptualisation of social autopoiesis, utilising structuration theory. This conceptualisation met the selection criteria specified for a social systems approach, and in addition indicated a way to describe a system particularly in terms of sustainability and interdependence with other systems, thus linking with the definition of development. As such, the social autopoiesis conceptualisation was selected and further developed into a systems framework for empirical application.

10.2.3 Empirical research

Empirical research was undertaken in the form of a single, longitudinal, interpretive case study in the rural village of Tugela Ferry in KwaZulu Natal, South Africa. IT literacy training was performed by a team from the University of Pretoria from 2009 - 2011. The community in which training took place was defined for purposes of analysis as two systems served: a mission system and a larger Zulu social system. These two systems were studied and described by means of the social systems framework. The ICT4D project was described as the serving system. The systems descriptions were used to investigate the mutual influences of the systems on each other, which could accordingly be used to assess the influence of the ICT4D system on its systems served.

10.3 Assessment of research undertaken

Assessment of the research is performed below in a number of ways. Firstly, the incremental contributions of the study are listed. Secondly, the research process is evaluated against Klein and Myers' (1999) criteria for conducting interpretive research. Thirdly, the theoretical contribution is assessed by using Whetten's (1989) criteria. Lastly, the research includes an own assessment of challenges experienced during the research process and with the theoretical framework.

10.3.1 Incremental contributions of this study

This study contributed the following incremental elements, each containing a small element of novelty. The combination of the small contributions adds up to the overall contribution of the study:

- Arguing for the use of systems thinking in ICT4D, to assess the contribution of an ICT4D project to the socio-economic development of the system(s) it serves (Chapter 2);
- Performing an assessment of the current literature concerned with systems thinking in ICT4D (Chapter 2);
- Traversing the literature on systems thinking as well as social theory in search of social systems theories or approaches to describe the social context of an ICT4D project (Chapters 4 and 5);
- Suggesting criteria for selecting such a social systems approach (Chapter 5);
- Investigating the applicability of social autopoiesis as a social systems approach in the context of the case study (Chapter 6);
- Developing the existing conceptual ideas around integrating structuration theory and autopoiesis, into a systems framework for practical application on the ICT4D case study (Chapter 7);
- Application of the systems framework to an ICT4D case study in rural KwaZulu Natal, South Africa (Chapters 8 and 9), resulting in a series of systems descriptions and influences; and
- Indicating how the social systems descriptions could be used to assess the contribution of the ICT4D serving system to the socio-economic development of the mission and Zulu systems served (Chapter 9).

The overall contribution can accordingly be summarised as the development and application of a social systems framework to assess the contribution to socio-economic development of an ICT4D project on the social system(s) served by it.

10.3.2 Assessment of conducting an interpretive field study

The empirical process is assessed using Klein and Myers' (1999) principles for doing interpretive field research. These principles are applicable to case study as well as ethnographic research (Myers, 2009:84). Please refer to Section 3.4.5 for a summary and

explanation of the seven principles, which were provided as part of the study's research planning and accordingly used as a guide for conducting empirical research. The application of these principles is described and assessed below.

10.3.2.1   The principle of the hermeneutic circle

Field work for the case study was performed during a total of five visits to the case study setting over a period of two and a half years. The repeated practice of being immersed in the details of the community during a field trip, and time away from the community between visits, allowed for a hermeneutic process. During periods away from the community, the researcher reflected on the theoretical framework, the data collected as well as personal experiences in the field. These reflections, together with continual further reading back at home, informed the development of the theoretical framework as well as the planning for each subsequent field trip. In short, a hermeneutic process underpinned and integrated all aspects of the study.

10.3.2.2   The principle of contextualisation

In Chapter 8, a demographic analysis was done for the Msinga community, which represented the general research setting. For each social system of interest, namely the two systems served and the serving system, historical as well as general contextual information was provided. As such, the principle of contextualisation was thoroughly applied as preparation for the field study.

10.3.2.3   The principle of interaction between researcher and subjects

The researcher's subjectivity led her to often experience and classify the Zulu culture as different to her own culture and the mission culture as similar to her own. The mission people accepted the researcher as one of them, feeling free to give her an insider's view and even sharing self-criticism of the mission culture. When interacting with Zulu people, whether members of the mission church or not, the researcher's interaction with males was very different to the interaction with Zulu females. The females were spontaneous and willing to volunteer information of a personal nature. Males were much more formal in their interaction. Regarding the researcher's view of the traditional Zulu culture being 'different': she almost missed a comment by a research participant that the Zulu community is traumatised by the fast pace of change that they are exposed to. Whereas the rural Zulu community appears to be much 'behind' in development compared to the researcher's own urban environment, a person

living in the Zulu community had to point out that they are also experiencing a rapid process of development. On the IT literacy training course, the researcher, when conversing with trainees, was always addressed with the respect assigned to a teacher. Trainees were without exception positive about the IT training they received, and may have omitted their negative experiences so as not to offend the researcher. The examples discussed above are evidence of the researcher's awareness of her own subjective position and its influence during interaction with participants.

10.3.2.4   The principle of abstraction and generalisation

Modelling assumptions and simplifications are presented in Chapter 8. These have been informed by jointly reflecting on the contextual information related to the research setting, the theory studied and the empirical situation. The social context of the ICT4D project is defined and modelled as social systems of interest. In Chapter 9, the systems framework is used as the theory by which to describe the social systems. Abstraction, as part of a reflective process, played a central role in how data was collected and interpreted in the study.

10.3.2.5   The principle of dialogical reasoning

The dialogical reasoning is between the way the theory guides the researcher to see the situation and the story that the data tells. The researcher's first exposure to the case setting led to a strong impression that the identities of the traditional Zulu culture and the mission culture were well defined and self-producing. These impressions influenced the choice of theory, which again led the researcher to observe the situation in a particular manner. With subsequent data collection exercises, it appeared that the researcher's first impressions on the community had to be altered. The Zulu community was clearly not economically self-producing, something that the structuration based theory with its overly social focus was weak in pointing out. The researcher realised she had to be more careful in applying the theory, which had a strong influence since it was used for both data collection and analysis. This is evidence of critical awareness of the theory used and its limitations.

10.3.2.6   The principle of multiple interpretations

It did not frequently happen that multiple versions or interpretations of the same situation were found. One example was the differences in interpreting the national and local government's approach towards the tribal leadership system. While an official from local government saw some changes as essential to socio-economic development in the community,

a number of people believed that changes to tribal leadership was eroding the basis of Zulu culture. It was also experienced that when people started to trust the researcher, they more freely expressed their views, to the point of being critical of their own social systems.

Thus, since the case environment was not highly politicised and this was not a critical study, not many conflicting interpretations were found. However, deeper trust relationships led to people revealing other interpretations than the superficial.

10.3.2.7 The principle of suspicion

The researcher was always the guest of the mission when visiting Tugela Ferry. Most of the study's information was collected from members from the mission church. The mission members were not only more accessible because she stayed among them; they were also able to speak English in contrast to most traditional Zulu people. In order to prevent a view that was overly biased from the mission's point of view, the researcher made an effort to also collect data from people not belonging to the mission church, even though this was harder to achieve. As such, the principle of suspicion played a limited role in the study.

10.3.2.8 Reflection on applying the principles

Under the headings above, clear evidence was provided of the application of Klein and Myers' (1999) principles while conducting research. The principle of the hermeneutic circle was central to all aspects of the study, including not only the empirical research but also the research planning and the development of the theoretical framework.

10.3.3 Assessment of theoretical contribution

Whetten's (1989) criteria for evaluating a theoretical contribution are used to assess the contribution of the study at theoretical level. The application of Whetten's (ibid) criteria will simultaneously serve as a way to assess the social systems framework, which has been motivated by means of the researcher's own set of criteria before applying it, and which needs to be assessed again after its empirical application.

Whetten (ibid) guides the researcher in describing the theory in terms of four building blocks it needs to contain: the "what", "how", "why" and "who/where/when" of the theory. The "what" refers to the building blocks of the theory, whether they are called elements, concepts or variables. "How" refers to the relationships between the building blocks. The "what" and

"how" together *describe* the theory. The "why" *explains* or motivates why the particular set of factors have been put together as they are – why have they been selected and why should someone use the theory? The "who/where/when" considers the limitations of the theory – under what conditions is it applicable?

The theoretical framework of this study has been described in detail in Chapter 7, and is summarised in Table 7.1. In this way, the "how" and "what" elements have been addressed. The question of "why" has been discussed at different levels throughout the thesis. In Chapter 2, the "why" of using systems thinking to assess the contribution of ICT4D to development is discussed. In Chapter 5, the theory is motivated at a high level using a set of criteria for selecting a social systems framework. Chapter 6 addresses some aspects related to the "why" of social autopoiesis. Chapter 7 motivates for the particular systems framework elements at a more detailed level.

The who/where/when of the particular case study for which the systems framework has been developed, is presented in Chapter 8. Chapter 3 discusses the limitations of the study in terms of the ability to generalise from the case. However, the limitations of the theory itself need to be considered separately. The core of the theoretical framework consists of two theories: structuration theory and autopoiesis. Structuration theory is a general social theory that could be applied, conceptually or empirically, in any social setting. Autopoiesis has not been developed for application in a social setting. Therefore, a large portion of Chapter 6 is dedicated to the theoretical applicability of autopoiesis in the social domain. Having concluded in Chapter 6 that autopoiesis can indeed be applied in principle to a social context, without having to prove that the system under consideration is autopoietic or organisationally closed, the question remains: in what social settings? The researcher believes that the theory's applicability then moves to concerns of ease of use and usefulness. The social systems in Tugela Ferry provided a relatively easy setting to apply autopoiesis to, because the social systems had distinct social characteristics (organisation) and were socially relatively isolated, thus easy to 'model'. Mingers (1995:205) holds as criteria for the acceptability of social autopoiesis its effectiveness and usefulness. The usefulness of the theory can be assessed by the outcome of its application, which is discussed in Chapter 9.

After having described and motivated the theoretical framework and its applicability, the focus moves to Whetten's (1989) seven questions of assessing the *value* of the theory presented. The seven questions are as follows:

i. *What's new?* What is the value-added contribution to current thinking? The degree of "differentness" is more important than the scope of the contribution.

ii. *So what?* Will the contribution be able to influence research practice, and are practically feasible solutions proposed to address current gaps?

iii. *Why so?* Is the underlying reasoning credible, in terms of the train of logic, quality of argumentation and making visible of assumptions?

iv. *Well done?* Does the work reflect thoroughness, completeness and seasoned thinking?

v. *Done well?* Is the thesis well written, with its central ideas being accessible?

vi. *Why now?* Is the work addressing current concerns and topical issues?

vii. *Who cares?* Is the work of interest to a big enough academic audience?

Responses to Whetten's (ibid.) questions are presented below:

10.3.3.1 What's new?

What are the aspects of novelty of this study? Firstly, the use of systems thinking to assess the contribution of an ICT4D project on the socio-economic development of the encompassing system has not been done in this manner before. In Chapter 2, the researcher indicates the overall lack of systems thinking in ICT4D, and also the lack of systems approaches in ICT4D impact assessment frameworks.

Second, by using the systems framework of social autopoiesis in the above context, the researcher has theoretically linked the autopoiesis concepts of autonomy (or being self-sustaining) and structural coupling with 'developmental' concepts in the ICT4D domain, namely self-reliance, mutual interfacing (Roode et al., 2004), and sustainability.

A third aspect of novelty is that the combined structuration theory/ social autopoiesis concept has been developed into a framework that can be applied empirically for data collection and analysis.

10.3.3.2 So what?

The resources and effort spent on ICT4D are only justified if they have an impact on socio-economic development. In particular, the contribution of ICT4D to the wider social system where it is deployed needs to be shown. Such contribution is very difficult to demonstrate, and this study suggests a new means to do this. In particular, the research shows that the problem is a systems problem, and then suggests a systems approach to deal with it.

The systems framework developed towards this end has been applied to an ICT4D case study to show its practical value. Since the field of ICT4D is theoretically very fragmented, with a wide range of theory being used on case studies, it is not evident that an ICT4D audience will be convinced to apply it in practice, even if they recognise the theoretical value. The fact that the theory has been used on only one case study is a limitation, although it is at the same time an opportunity for further empirical research.

10.3.3.3 Why so?

What makes this research contribution credible? Research has been systematically guided by the research questions that were formulated. The reasoning followed was made as clear as possible, substantiating claims by means of existing work, empirical evidence and/or a transparent train of logic. Assumptions have been surfaced and made explicit throughout the study; whether these were the assumptions about development and ICT4D (discussed in Chapter 2), assumptions related to systems thinking (discussed in Chapter 4), assumptions underlying the research philosophy (discussed in Chapter 3), assumptions about the nature of the system studied (discussed in Chapter 5), or modelling assumptions (discussed in Chapter 8).

10.3.3.4 Well done?

To assess whether the study contains seasoned thinking, completeness and thoroughness, and whether its ideas have matured over time, the researcher can claim the application of the principle of the hermeneutic circle in all aspects of the study, as motivated earlier against Klein and Myers' (1999) principles. For example, throughout the case study, the theory has informed data collection which again informed the theory. Periods of reflection and study were alternated with periods of involvement with ICT4D team members, periods of exchanging ideas with colleagues/experts/supervisors, and periods in the field, all which informed each other. Also in the spirit of interpretive research, an attempt was made to get broad and multiple perspectives on the theoretical bases available, and to similarly collect multiple perspectives, including a historical perspective, as part of the empirical study. The researcher can, by observing how her own ideas have developed since the first research paper on the topic (Turpin, 2009) show evidence of growth in thinking.

10.3.3.5 Done well?

To assess whether the thesis is well written and accessible, an overview is given of how it is presented. The study has been carefully set out to commence with a literature-based motivation of the problem statement. A theoretical framework using systems thinking is developed by first scrutinising existing systems as well as social theories to search for social systems approaches that could be applied to study ICT4D's social context. During the search, criteria are identified for selecting a social systems theory. Also during the search, the researcher has identified the theory of social autopoiesis as her personal preference, and she has justified the choice of theory against the stated criteria. The main building blocks of the theory, namely structuration theory and autopoiesis, are subsequently discussed in more detail to gain a firm insight into their central tenets. Since the social application of autopoiesis is controversial, the researcher conducts her own investigation into its applicability to the social domain, and to the case study in particular. After having gained a thorough understanding of the theoretical elements, the researcher develops a social systems framework from the theoretical principles. The framework is accordingly used to collect and analyse data on an ICT4D case study. Data analysis takes the form of a systems description and analysis. The result of the data analysis is the ability to respond to the stated problem of assessing the contribution of ICT4D to development, in the context of the case study.

It is acknowledged that the theory of autopoiesis is not readily accessible: Bailey (1994) claims that the major hindrance that has kept autopoiesis from being used more widely is the inaccessible writing style of its primary authors. The researcher makes an effort to provide an accessible overview, but there may remain members of the ICT4D or IS audience who find that they do not readily engage with it. The researcher has however noted that some of her IS colleagues are wary of the theory because of its biological origins and perceptions that it is functionalist. These concerns have been discussed at length, from the research philosophy assumptions in Chapter 3 all the way to the modelling assumptions in Chapter 8. In this manner, the theory has been "opened up" to the reader.

10.3.3.6 Why now?

The topic of socio-economic development is a matter of urgency in South Africa, as many poverty-stricken citizens feel increasingly left out of the development they were anticipating after 1994. Also, while the study's focus on a deeply rural tribal system may seem antiquated, this system is a daily reality to millions of people, not only in KwaZulu Natal but in many other remote African settings. ICT4D practitioners and researchers alike are compelled to

consider the actual developmental impact of their activities. Walsham's (2005) passionate plea for the IS community to seriously engage with concerns of socio-economic development still holds, and it reverberates in Heeks' (2010) call for investigating the downstream impact of ICT4D projects.

10.3.3.7 Who cares?

An ICT4D audience that is concerned with effecting socio-economic development would find this work relevant. Secondly, a systems audience who is interested in the value obtained from applying systems thinking in a social context would constitute an audience. The researchers specifically concerned with applying autopoiesis socially constitute a relatively small audience. However, the ICT4D and systems audience are wider audiences.

10.3.4 Own assessment of challenges faced

In the assessment that follows, the researcher critiques and assesses her approach.

The researcher possibly made the research project difficult by attempting a number of challenging activities: Searching and motivating for a social systems approach (which entailed a broad search through different subject disciplines as well as developing a set of selection criteria), applying Mingers' concepts in practice (which meant justifying the use of social autopoiesis as well as operationalising Mingers' concepts), applying a theory from outside the ICT4D domain (which meant motivating for it), and having to revisit Giddens to use as part of a social autopoiesis framework, in a different way than usually applied in IS (which meant a thorough study of structuration theory and having to motivate for a different application).

The difficulty of addressing multiple audiences, simultaneously trying to make a contribution to an ICT4D audience and the systems fraternity, was experienced. The researcher had a personal interest in systems thinking, and the application domain of the thesis was ICT4D.

The researcher has elected to use a theoretical framework that is different and possibly controversial, thereby making successful research dissemination more of a challenge. The level of conceptual difficulty of the chosen theory, in particular the autopoiesis part, may hinder the wider adoption of the theory, even though its benefits for ICT4D are well argued. Further, the controversy around using a systems theory whose distinguishing elements are biologically based may pose another barrier to adoption.

Despite all the challenges experienced, it was an immensely exciting intellectual journey during which a new and different social systems approach was developed to apply in ICT4D. The field trips to the rural Zulu community was personally rewarding at a level that cannot compare with research in an urban context. The researcher had an opportunity to learn from people who were materially poor but socially and spiritually wealthy. She further had the privilege to be involved in a project where the difference that it made could be personally observed, and not just theoretically argued.

10.4 Opportunities for further research

The biggest current limitation of the social systems framework is that it was developed with a particular case setting in mind, meaning that there is not yet empirical evidence for its wider applicability. The framework now needs to be tested in another rural, developing country ICT4D context, to see whether similar value can be added and insights be gained. Perhaps, the framework needs to be tested in a situation where an ICT4D intervention failed, to see if it could provide explanations based on a description of the social systems served, using the framework concepts. An investigation could also be made as to the framework's applicability to other complex societal systems, perhaps outside the ICT4D context.

Other possibilities include revisiting the framework to include recent contributions on socio-economic development, such as Sen's capability approach (Zheng 2009), where Sen's notion of 'capability' bears interesting resemblances with Giddens' (1984) notion of 'capability' in a social structuration context.

One of the shortcomings of Giddens' structuration theory is its assumption that everything that affect humans can be described by considering the social. A challenge faced with the existing social systems framework was to try and describe purely economic activity. In fact, some economic concerns of the systems served were almost missed when using the Giddens lens. Fuchs (2010) notes the same concern regarding social theory. This matter can be investigated to see if the systems framework can be revisited to better address the noted concern.

When using Giddens' structuration theory to assess a project's contribution to socio-economic development, it only accounts for contributions that can be described in terms of structural rules and resources. It was clear that the mission social system as well as the ICT4D project made a contribution to the communities they served in terms of unselfish practical caring,

which can be associated with ubuntu. While this caring often resulted in benefits that could be described in terms of, for example, allocative resources, the act of caring itself as a valued social contribution did not fit in the Giddens-based theoretical framework. While Giddens' social theory cannot be expected to be all-encompassing, the recognition of ubuntu related practices can be investigated as a topic for further research.

An area for further research that was suggested by an external examiner, was to further explore the autopoietic notion of consensual domains that form through structural coupling. In this study, the ICT4D social system pro-actively worked to strengthen effective communication and social relations with the mission as their system served. The mission in turn managed to develop a good social rapport with the larger Zulu system. The establishment of consensual domains is implied in the data as a success factor facilitating socio-economic development, while it was not explicitly included in the theoretical framework. Further work on applying autopoiesis concepts in ICT4D will benefit from including this notion.

10.5 Final remarks, and revisiting the main research question

This chapter provided a summary of the research undertaken. The research process as well as its contribution was assessed in multiple ways. This study's research results, presented in Chapter 9, indicate the value of systems thinking that is carefully applied to a complex problem situation. In particular, it provides an example of the potential contribution of systems thinking to ICT4D, after having indicated its severe lack in Chapter 2. In line with the systems theme of the thesis, Checkland and Holwell's (1998) definition of an information system was used throughout. The notions of 'system served' and 'serving system' provided a suitable frame of reference with which to respectively model the social context of the ICT4D project and the ICT4D project itself. The description of the serving system and its systems served by means of the social systems framework made it possible to assess the mutual influences among these systems, and in particular the influence of the serving system on the systems served. In this way, the contribution to development of an ICT4D project to the systems served in a remote, rural African community could be assessed.

The main research question was accordingly addressed:

- How can social systems theory help us to describe and assess the contribution of an IT intervention on the social system it serves, in a remote, rural African community?