Chapter 5 Social theory building blocks, and selecting a social systems theory

5.1 Introduction

In this chapter, the search continues for possible systems theories or approaches to describe the social context of an ICT4D project. A journey is made through social theory, considering its use and application of systems thinking. In doing so, the second part of the following research question is addressed:

- How does the literature approach social systems, from systems thinking and from social theory perspectives?

Not only have systems thinkers attempted to extend systems concepts to social settings; social theorists have also incorporated systems thinking in some of their work. The knowledge base and departure point of the social theorist is firstly that of the social setting. They are domain experts applying a method sourced from systems theory, whereas systems thinkers are method experts applying their method to a new domain. Whereas the sociologists' understanding and application of systems theory might be selective, their understanding of the social setting is important to the study of social systems. If the study of ICT4D's social context is to be taken seriously, then the recognised knowledge domain for studying the social setting needs to be considered, namely sociology. Since the search is for a social systems theory, only social theory that appropriates systems thinking is surveyed.

Similar to what has been done in the previous chapter, a historical context of how systems thinking has influenced social theory is provided in Part I of this chapter. The historical overview commences with the mechanical social systems view that arose during the seventeenth century. This is followed by an introduction to functionalism and its major proponents. Other, more recent systems-related contributions to social theory are subsequently discussed. A separate section is dedicated to the social theory of Anthony Giddens. It summarises his thinking around social systems and also discusses structuration theory. Structuration theory is the social theory that is taken further into the systems framework of this thesis, for data collection and analysis. Although the motivation for including structuration theory in the systems framework only follows later, the theoretical background on structuration theory is placed in this chapter, along with the other social

theories presented. Following the discussion of the individual social system theories, an assessment of the theories is presented in a single section.

Having concluded a discussion on systems theories (in Chapter 4) as well as on social theory using systems thinking, the time arises to select an appropriate theory/approach, or combination of approaches, to develop into a systems framework for the study. This matter is discussed in Part II of this chapter, and contributes to the research question:

- What is an appropriate social systems framework with which to study the impact of an IT intervention on a remote, rural African community?

In the discussions below, differences may be noted between the use of systems concepts by sociologists and the terminology used in the previous chapter on systems approaches. This chapter is based on the writings of sociologists. For example, where biological principles are used, von Bertalanffy's thinking may feature strongly in the writings of systems theorists whereas sociologists will refer to Parsons' appropriation of biological principles. Also, the term 'functionalism' appears frequently in social theory discussions related to systems thinking, but the term seldom appears in the systems literature. Another difference is that in systems literature, reference is made to systems thinking, systems methods or systems approaches while the social theory literature may refer to a systems theory.

Part I: Social theory building blocks

5.2 A mechanical view of society

One of the earlier system-related views of society, the mechanical view, can be traced back to the age of modernity. The age of modernity is characterised by rapid advances in the fields of physics, mechanics, mathematics and astronomy during the seventeenth century. Newly acquired analytical thinking and approaches were also applied to the human and social domain, giving rise to "social physics", which viewed humans as intricate machines (Buckley, 1967: 8; Dahlbom and Mathiassen, 1993: 14). Also, a "social mechanics" view arose that saw society as an astronomical system, applying laws of mutual attraction and concepts such as space, equilibrium, forces, energy transformation and the like. According to Buckley (ibid.), some, but not all of the work done in this stream, has made a valuable contribution to social science. He singles out Pareto's "rational mechanics" of the late nineteenth century as a meaningful contribution (Buckley, 1967: 8). Although not always in as strong and explicit a

format, the mechanical world view has prevailed and remnants of this view are still present in metaphorical speech.

In the previous century, another rapid development in analytical and mathematical methods occurred around World War II, giving rise to the field of Operations Research, the principles of which found their way into management science, and as such into the social domain. As discussed in Chapter 4 when introducing systems thinking, the direct application of these analytical principles to the social domain is referred to as "hard systems thinking". Hard systems thinking is another manifestation of a mechanical world view.

5.3 Functionalism

5.3.1 Biological models in the social domain

The use of the organism analogy in sociology is widespread (Buckley, 1967: 11). According to Buckley, the central principle of the organism view is the mutual dependence of the components of a system. This principle is shared with the mechanical view of society. Although functionalism is the most prominent stream within the organic or organismic mode of thinking, not all use of biological models can be labelled as functionalist. Examples of organism-related social theory contributions not associated with functionalist thinking are those of Spencer in the late nineteenth century, and Ward in the early twentieth century (Buckley, 1967: 11-13). According to Buckley, Spencer was careful in applying biological analogies but it was unfortunate that he chose to associate society with an individual organism rather than to a species. Ward selected the species analogy, and his work can accordingly be associated with a stream called Social Darwinism. Whereas the organism analogy focuses on the cooperation between parts of society, the Darwinist model emphasise competition among parts (Buckley, ibid.).

5.3.2 Functionalism: an overview

The bulk of systems thinking found in social theory can be classified under the heading of functionalism. Prominent classic and modern social theorists who made use of systems concepts in the functionalist tradition, are Auguste Comte, Emile Durkheim, Talcott Parsons and Robert Merton (Giddens, 2001: 16). Comte (1798-1857) was one of the founding fathers of sociology. He had a positivist inclination, wanting to study society as one studies the natural world, and this view went along with his use of systems concepts. Comte had a strong

influence on the writings of Durkheim (1858-1917), who in turn influenced Parsons (1902-1979) and Merton's (1910-2003) work in the twentieth century (Giddens, 2001: 16). Functionalism's heydays were in the 1940s and 1950s, when it was the dominant social theory in America (Haralambos and Heald, 1985: 521), predominantly on the strength of Parsons' contribution.

Functionalists use systems concepts from biology, comparing the functioning of society to that of an organism. Social institutions, such as the family, religion or education, are viewed as interdependent subsystems of society in the same way that the heart, lungs and nervous system are interdependent. Society, similar to an organism, has certain basic needs that must be met for the sake of its continued existence. Social institutions are meant to fulfil these needs (Haralambos and Heald, 1985: 522). For example, the family fulfils the societal needs of sexual reproduction and the socialisation of new members; these are termed the *functions* of the family. One of the challenges experienced by functionalist researchers is to identify the functions of particular subsystems, since one cannot isolate or remove societal institutions experimentally as one can a biological entity's organs.

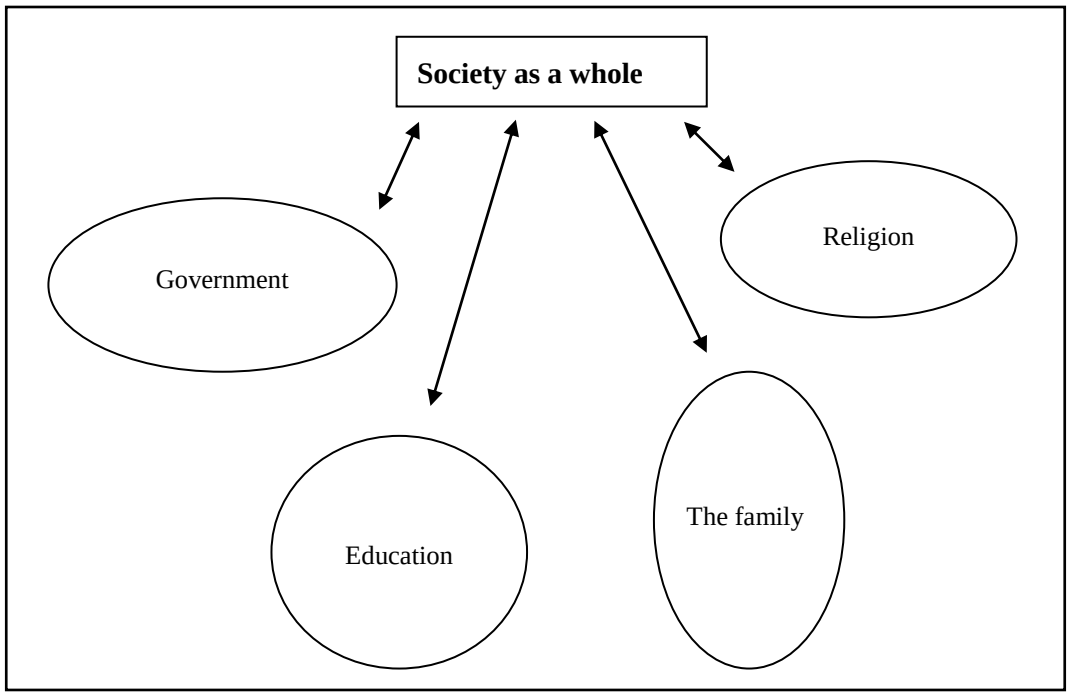

Figure 5.1: Society, with some of its social institutions

Figure 5.1 indicates some of the social institutions which form part of society. As indicated by the arrows, the relationships and functions studied by the functionalists are those between individual institutions and society as a whole.

The functionalist view is teleological. Ultimate goals are assumed for the social system or society as a whole, namely its survival, continuity and orderly existence. The value of social institutions is seen in their contribution towards these goals. Haralambos and Heald (1985) criticise this teleological view, arguing that it ends up confusing effects for causes. That is, what an institution *does* is regarded as a basic *need* of society: if an economic system leads to social stratification, functionalists will argue that social stratification is a requirement of an orderly society.

Another distinguishing factor of functionalist thinking is the striving towards balance, order and moral consensus (Giddens, 2001: 16). A properly "functioning" society is considered to be an orderly one. Functional institutions or practices are those that help maintain an ideal state of equilibrium in the society, namely a stable version of the status quo. A disruptive activity or practice is viewed as a dysfunction. Functionalists have concentrated positively on the functions within society rather than dysfunctions (Haralambos and Heald, 1985: 524).

From Turner (1991), it appears that the thinking underlying functionalism, being teleological as well as normative in its striving for social cohesion and shared values, has been deeply influenced by the Christian religion. Parsons grew up as a reformist Protestant which directly impacted his thinking. Similar to (and influenced by) Weber and Durkheim before him, he was personally interested in the role of Christianity in shaping western capitalist society (Turner, 1991: xxi).

In the sections that follow, the views of some leading social theorists who contributed to functionalist thinking will be briefly investigated. These people have not only influenced our modern day thinking around social systems, but also produced the grounds for criticism against functionalism and associated concepts such as structuralism and teleology.

5.3.3 Durkheim's use of systems concepts

Durkheim believes that society has an existence independent of its human actors (Haralambos and Heald, 1985: 524). The system of society is constituted of social facts, or beliefs and moral codes. Social facts, rather than individual consciousness, direct and constrain human

behaviour. The origins of social facts are the social facts preceding them, and the way they are appropriated and passed on between actors depends on their usefulness.

According to Durkheim (cited in Haralambos and Heald, ibid.), the system of society has certain functional requirements, and the most important one is social order. A society without cohesion and social order will fall apart. Thus, social facts that assist in maintaining social order, such as shared values, are useful to the continuance of society. As an example, the institution of religion has functions which are useful as social facts. These include uniting people by means of a shared faith, providing a sense of belonging, reminding people of their social duties, and instilling a shared set of values (Haralambos and Heald, 1985: 526).

5.3.4 Parsons' functionalism

Talcott Parsons is one of the most influential contributors to modern sociology, and simultaneously one of the most criticised (Turner, 1991: xviii). Reactions to his work include Giddens' structuration theory, much of which was developed in reaction against Parsons' views, and the neofunctionalist stream of social theorists who simultaneously accept particular criticisms against Parsons' work and defend it in general (Bailey, 1994: 8). According to Turner (ibid.), two major influences on Parsons' work were his Protestant background and his personal interest in biology and medicine. Parsons' theory of human action is value-based, while his views on social structure are systems-based, with a biological /organism grounding.

Parsons argued that the dominant rational view of society in his time did not explain social order and cohesion. If all humans were selfish, rational, economic beings, this would not necessarily lead to social order and harmony. The basis for order is shared values; this is necessary for unity and cooperation (Turner, 1991: xxix; Haralambos and Heald, 1985: 527). Shared values imply common goals, and attaining these goals requires cooperation. In practice, specific roles are needed to work towards such goals. Combinations of roles are found in social institutions. Each role is accompanied by a set of norms that provide a code of conduct, such as for a medical doctor or a parent. It can be seen that Parsons' society is guided by shared values at all levels. According to Parsons, social values become institutionalised, and this leads to a stable system that displays a state of "social equilibrium". Equilibrium is maintained in two ways: by the socialisation of new members via the family and education systems, and by social control.

Parsons' societal system has four main functional prerequisites (Haralambos and Heald, 1985: 528). These functions need to be institutionalised for society to continue effectively. They are summarised by the AGIL acronym: adaptation, goal attainment, integration and latency or pattern maintenance. Adaptation refers to people's need to survive within and control their environment. Institutions that capture this requirement are the economic and industry-related ones. Goal attainment refers to the need to develop joint goals and strive towards them. Government and political institutions help in setting goals and allocating resources. Integration is about the management of internal conflict. The legal system assists in this. Latency or pattern maintenance refers to overseeing the joint value system. The fiduciary system, including institutions of education, the family and religion, fulfils this function. All of these subsystems work towards stability, although change does occur and is explained as follows. Changes that are necessitated in one subsystem, possibly by a changing environment, produce responses in other subsystems in a way that tends toward a new equilibrium.

In a modern society, where individual institutions become increasingly more specialised and differentiated, social integration becomes more of a challenge. Again, Parsons turns toward the shared value system to resolve this issue. He argues that the values that successfully maintain such a system are more generalised and diffused ones, not closely linked to a particular culture or religion. These are values such as universalism and achievement (Haralambos and Heald, 1985: 530). The difference between traditional and more modern societies can be characterised by different sets of "pattern variables", with universalism, achievement and affective neutrality being some of the pattern variables that characterise modern society, compared to traditional society's respective pattern variables of particularism, ascription and affectivity (Thomas and Noble, 2004: 89).

5.3.5 Merton's contribution

Merton, a contemporary of Parsons, presents three criticisms against assumptions commonly held by functionalists (Haralambos and Heald, 1985: 530). As such, his contribution is towards a more nuanced application of functionalism with a more careful treatment of generalisations. Firstly, he has a problem with the notion that each subsystem contributes functionally to the entire social system, or "functional unity", especially in the case of complex and highly differentiated societies. For example, in a society with multiple faiths, religion may in fact divide rather than unite. Also, some subsystems may be relatively autonomous so that their functionality is not available to the rest of the system. Second, Merton (cited in Haralambos and Heald, ibid.) argues against the assumption that all

institutions make a positive functional contribution to society. Rather, one needs to assume that a subsystem may be functional, dysfunctional or non-functional. In addition, one needs to ask: functional to whom? He gives the example of poverty, which is dysfunctional to the poor but may be functional to the non-poor. Merton's third criticism is against the notion that some institutions are indispensable to society. This assumption is often made for religion or the family. He suggests that communism, for example, may to some people provide a functional substitute for religion.

Merton argues that functional analysis should start with an investigation into the "effects" of social institutions, regarded with a more open mind. This will remove the ideological, value-based prejudice for which functionalism is criticised. Although Merton is critical of some aspects of functionalist thinking, he is still referred to as a functionalist, e.g. by Giddens (2001) and Haralambos and Heald (1985).

5.3.6 A critique of functionalism

Haralambos and Heald (1985) raise four areas of criticism against functionalism. The first one is its teleological view. As mentioned before, this could result in confusing effects for causes: if an institution displays certain characteristics (its effects) that are regarded as beneficial to the social system as a whole, it is assumed that the system exists because of these characteristics or contributing functions. This is a logical problem, since effects cannot precede causes. A more sound way of analysis would be to consider the effects of an institution, as argued by Merton, with the assumption that the institution continues to exist because it is doing something beneficial to society. In biology, the contribution of an organ can be assessed by the fact that the organism dies if the organ stops working. However, "societies change rather than die" (Haralambos and Heald, 1985: 532). Also, there are agreed upon measures for an organism's health, but nothing similar for a society. (Personal comment: Haralambos and Heald ignore substantial work that has been done on wellness measures and indexes, such as the Human Development Index, although there is also controversy around some of these). One cannot conclude that an institution has a beneficial effect on society as a whole, just because the institution as well as society continues to exist. The arguments above indicate the problems that arise when trying to use an organism analogy to study society.

The second concern with functionalism is the importance attached to value consensus. Haralambos and Heald (ibid.) provide examples to show that value consensus is neither a necessary nor a sufficient condition for an orderly society. A variation in values could enable a

stable social stratification, and consensus on values that are extremely competitive or counter to human rights could be destructive. They argue that the content of values (such as values that promote harmony) rather than value consensus, is important for social order.

Functionalism is also criticised for the view that social life is determined by the social system: humans are "programmed" according to the norms and values of the system during socialisation, they are kept in line by means of social control, and assigned roles in institutions that meet the requirements of society. The social system is elevated to an external and very powerful actor that structures human life. The counter-argument is that humans shape their own social world.

The fourth point of criticism by Haralambos and Heald (ibid.) is that functionalism underplays existing conflict, instability and disorder that are integral to a system where power and resources are distributed unequally, as in reality it always is. Conflict is not merely a symptom of a value consensus that is not well enough exercised.

Buckley's (1967) main criticism against functionalism is a point he raises against all biologically-inspired organism analogies in social theory. According to Buckley, the main difference between a social system and an organism is the social system's ability to continually and rapidly adapt and change: "it is change rather than stability we must account for" (Deutsch, cited in Buckley 1967: 15). Societies can entirely change their structure, and change into new but stable states. Biological approaches are interested in studying self-regulation based on the concept of homeostasis, which allows for very limited change and a return to previous states. Buckley argues that it would have been more appropriate to liken society to a collection of organisms (a species, or ecological system) than to an individual organism. The flexibility in the arrangement of components of a species or ecology more closely resembles that of a human society.

According to Buckley (ibid.), functionalism is worse than other biological models, because it over-emphasises stability and order, thus making it even less suitable to represent the dynamic nature of a social system.

5.4 Other systems contributions in social theory

A selection of other systems-related work in social theory, many of which developed in response to functionalism, is presented here. General overviews of systems thinking in social

theory are found in Buckley (1967) and Bailey (1994), who also propose approaches they personally favour, typically as alternatives to functionalism. The discussion below indicates a variety of ways that systems concepts have been used in social theory, and does not claim to be comprehensive.

5.4.1 The work of Buckley

Buckley (1967), in "Sociology and Moderns Systems Theory" presents an in-depth study of the use of systems concepts in sociology to that date. Buckley reacts against mechanical and biological systems views used in the social domain, and in particular against functionalism. He promotes an alternative social systems approach based on principles from general systems theory and cybernetics. Buckley also uses concepts associated with complexity theory.

According to Buckley, a social system differs from a biological one in its variability and adaptability; it continually changes its structure in response to external or internal conditions (Buckley, 1967: 18). Buckley views society as a complex adaptive system that uses internal feedback processes to adapt its structure, in order to better survive in a fast-changing and turbulent environment (Mingers, 2006: 169). Not only does the organisation of the components change, but the parts themselves are altered while they participate in the system's activity (Buckley, 1967: 46). Mingers criticises open, information processing systems views, such as Buckley's, for placing the system and it parts at the mercy of the environment, as if it were the environment that determined the system (Mingers, 2006: 169). Nevertheless, Buckley presents an alternative to functionalist thinking that better accommodates aspects of the social nature of a social system.

5.4.2 Giddens and Luhmann's use of systems concepts

Giddens, from the 1970s onwards, criticised the biological view as limiting and from his structuration theory gave a new definition to social systems. Another prominent sociologist who applied systems thinking is Niklas Luhmann. Luhmann integrated a variety of theories in his work, including those of Parsons (so that Luhmann is mentioned together with neofunctionalists in Turner (1991: xix)), Husserl's phenomenology, von Foerster's second-order cybernetics, Spencer Brown's calculus of distinction, as well as Maturana and Varela's concept of autopoiesis, or self-producing systems (Seidl and Becker, 2006: 10). Luhmann believed that communicative acts form the basis of the societal system (Scott and Marshall, 2005: 656). The work of Giddens and Luhmann is discussed in more detail elsewhere in the

thesis: Giddens later in this chapter and Luhmann in Chapter 6 that deals with autopoiesis, since Luhmann's work draws heavily on autopoiesis theory.

5.4.3 Alexander's neofunctionalism

Alexander coined the term "neofunctionalism" in 1985 to emphasise a simultaneous critique and continued application of Parsons' thinking (Bailey, 1994: 8). Alexander (cited in Bailey, ibid.) admits as problematic Parsons' positions on equilibrium and order, as well as his normative and teleological thinking. At the same time, Alexander argues that contemporary social theorists, even non-Parsonians, often return "to some core elements in Parsons' earlier thought" (Alexander and Colomy, cited in Bailey 1994: 8). These include Parsons' theories on "action and order, conflict and stability, structure and culture" (Bailey, op.cit.). Alexander attempts a synthesis between functionalist theory and subsequent social theory.

5.4.4 Graaff's overview

Romm and Sarakinsky's (1994) volume on social theory contains a chapter on systems thinking in sociology by Graaff (1994). Graaff presents an introduction to the topic based on Buckley's (1967) views. Graaff (1994: 209) proceeds to claim that the "important contemporary social theorists who have taken up systems theory" are Habermas, Luhmann and Giddens. Graaff provides no grounds for this claim and does not mention Habermas or Luhmann again, although he mentions a few instances where Giddens makes reference to systems. Graaff (ibid.) continues with an analysis of the systems thinking in the World System Theory developed by Immanuel Wallerstein in the 1970s. Graaff's conclusion is that although Wallerstein's theory has benefited from systems concepts, it is not exemplary in its use of systems thinking. "World system theory is a theory of the world system without a system theory" (Pieterse, cited in Graaff, 1994: 206).

It is not clear why Graaff chose Wallerstein's work to analyse, especially since he has nominated three other candidates for their contribution. Regardless, Graaff presents a valid and accessible critique of World System Theory, which by virtue of its name could be mistaken for a systems theory in the social domain.

5.4.5 Bailey: promoting recent systems thinking to sociologists

Kenneth Bailey provides an overview of systems thinking applied in sociology, as at 1994 (Bailey, 1994). While Buckley (1967) presents "modern systems theory" to his readers, Bailey

is excited about the "new systems theory", referring to developments that occurred since the 1960s, and in particular since Buckley's overview. According to Bailey, social systems theory had by the 1990s outgrown the functionalism that first characterised it. Bailey promotes three relatively recent systems theories that have the potential to make a contribution to social science, namely social entropy theory (Bailey's own social systems theory), living systems theory (the work of James Grier Miller) and autopoiesis (Maturana and Varela's theory). According to Bailey, these theories each in their own way deal with important societal processes, such as entropy, self-production, matter-energy processing, information processing as well as control processes, more effectively so than existing social theory is able to do. As opposed to early mechanical and biological systems thinking that emphasises equilibrium (as does functionalism), these theories have all progressed beyond assumptions of equilibrium.

The three theories that Bailey promote are discussed below. Although only one of these is his own theory, the overall discussion relies heavily on Bailey's (1994) monograph, and as such, the theories are discussed under Bailey's name. Autopoiesis is discussed in more detail elsewhere and also taken further into this thesis' systems framework.

5.4.5.1 Living systems theory

James Grier Miller was a qualified psychologist and psychiatrist, and regarded as the "father of the American clinical psychology movement" (Swanson, 2006). However, his living systems theory, published in 1978, was developed as part of an interdisciplinary research endeavour that involved an esteemed systems scholarship group (Bailey, 1994: 168).

Living systems theory "was built upon a search for the common properties of *all* living systems" (Bailey, 1994: 171). Bailey terms it a general systems theory, which claims that living systems are open systems, processing matter-energy and information, while maintaining a steady state of negative entropy (relative orderliness). According to Miller's theory, all living systems are composed of twenty subsystems, these classified according to whether they process matter-energy, information, or both. (The two subsystems processing both are the "reproducer" and the "boundary" subsystems.) Although the subsystems serve different functions, Miller steered away from using the term "function" and the accompanying functionalist assumptions. Each subsystem has a clear role that can be associated with system input, processing and output. Living systems also occur at eight different levels: the cell, organ, organism, group, organisation, community, society as well as supranational systems. At each level, the living entity is composed of the entities at the previous level, from which it has

evolved. Also, each level has emergent properties that cannot be reduced to the system properties at the previous level. For each of these 8 levels, its 20 subsystems take on a different nature, that can be presented in a 8x20 matrix. For example, the "reproducer" subsystem of a cell is its DNA and RNA molecules, the organism's is its reproductive organs, the society's is the convention that writes its constitution, and the supranational system's is the United Nations (Miller, cited in Bailey, 1994: 182). Practical applications of living systems theory include a major study involving the US army, as well as studies of the family and small groups (Bailey, 1994: 207).

According to Bailey (1994, 2006) the contributions of living systems theory include the following. The identification of the 20 critical subsystems (required "functions" of all living systems) makes the theory comprehensive, as other systems models generally only include a subset of these. The identification of the 8 hierarchical systems levels is a major cross-disciplinary achievement. Most academic disciplines limit themselves to only one of these levels. The exact number of subsystems and hierarchical levels are not of importance, since some of them could be collapsed or expanded; of importance is the spectrum that they cover. A further contribution is that Miller makes it possible to identify concrete systems at each level, and concrete examples of subsystems, on which hypotheses could be tested. This is in contrast with Parsons' work, which remained at a more abstract level. Also, Miller included in his analyses less straightforward concepts such as physical space and time, information processing, matter-energy processing, and entropy. Bailey (2006: 296) states that "living systems theory clearly represents the most comprehensive analyses of living systems ever made".

The publication of Miller's theory in 1978 had a largely positive reception. However, Boulding implied that the theory had an overly biological emphasis, and Parsons admired the thoroughness of Miller's approach but wished him to have rather focused on abstracted systems (Bailey, 1994: 208). The major limitation of Miller's theory was his decision to shy away from values and similar subjective aspects and to regard these as outside the realm of science. According to Bailey (1994: 210) this is the weak point of living systems theory when relating it to sociology. Other limitations mentioned by Bailey (2006) are projects that Miller did not complete, namely his wish to quantify the theory, and to develop abstract concepts to complement the concrete focus of the theory.

In comparing Miller's thinking with other social systems theories, Bailey (1994: 213) claims that there is not much in common between living systems theory and functionalism or

neofunctionalism. He does find compatibilities with Giddens' structuration theory, such as in the treatment of time and space. Where it differs from Giddens' thinking, it is not contradictory.

5.4.5.2 Social entropy theory

Social entropy theory (SET) was published by Bailey in 1990 and pertains to human systems in particular (Bailey, 1994: 164). According to Bailey (1994: 219), it was inspired by an in-depth study of functionalism. Bailey recognised the need to depart from functionalism's equilibrium-based thinking, and to develop a social systems concept that could more adequately represent a complex society.

The equilibrium-based thinking of functionalism is challenged by the notion of entropy. The concept of entropy was initially captured by the second law of thermodynamics, which specifies that, in a closed physical system, there is a trend towards disorder, also referred to as energy dissipation, randomness or thermal equilibrium (Capra, 1997: 47). Based on Prigogine's work in 1955 on entropy in open systems, Bertalanffy in his General System Theory states that living systems are open systems and maintain themselves in a steady state or dynamic balance, far from equilibrium. This dynamic balance is associated with low entropy, and a dynamic orderliness (Capra, 1997: 49; Bailey, 1994: 150). Bailey (ibid.) spends considerable effort in developing the theoretical basis of a social systems construct that accommodates non-equilibrium thinking (social entropy) as well as equilibrium.

From Bailey (2006) it appears that SET is an extension of living systems theory, and aimed to complete Miller's unfinished task of developing key systems variables. Bailey developed six macro-sociological variables, namely "population size (P), information (I), level of living (L), organization (O), technology (T) and space or territory (S)" (Bailey, 2006: 297). Bailey later adds energy (E). The EIPLOTS variables jointly describe the state of a social system, including its entropy. These variables could be applied to any of Miller's eight system levels and forms the basis for quantification. Bailey (2006: 299) claims that the first four variables in EIPLOTS directly measures entropy. Zero levels for energy, information, population and level of living would indicate the system's death, i.e. maximum entropy. For the sake of the human system, entropy needs to be kept low by the 20 subsystems of Miller.

5.4.5.3 Autopoiesis

This paragraph deals with Bailey's motivation of applying autopoiesis theory in the social domain. The principles of autopoiesis, a biological theory of self-producing living systems, are introduced and discussed later, in Chapter 6. The reason for keeping Bailey's discussion here, is because he recognised the potential merits of the theory as a sociologist, and the discussion belongs as part of a social theory perspective on systems approaches.

According to Bailey (1994: 285), "autopoiesis is one of the most exciting new notions in systems theory in particular, and in social and behavioural science in general". Bailey regards autopoiesis to be "a highly sophisticated model developed in the best sense of classical systems theory", and also finds appeal in its epistemology (which emphasises the role of the observer) as well as its hermeneutic, interpretive and non-functionalist approach. Bailey identifies as problematic the inaccessible terminology and writing style of Maturana and Varela. He argues that these are hindrances which have prevented the wider spreading and acceptance of autopoiesis.

Bailey sets out by trying to present autopoiesis terminology and concepts in an understandable format to his readers. Following this, he compares these concepts with systems concepts from living systems theory and social entropy theory, looking for similarities in thinking. From this comparison, he shows that living systems theory, which allows for concrete reproduction at all system levels, may be able to support an argument that social systems are autopoietic. Bailey spends some effort in trying to address the question of whether social systems are autopoietic, which he claims is not a straightforward matter at all (Bailey, 1994: 292). Bailey highlights the dilemma of trying to directly transfer a biologically defined physical component production process to social systems. Of the various views and contributions towards social autopoiesis, Bailey favours Luhmann's redefining of autopoiesis in the abstract domain, based on communication. When comparing autopoiesis to existing mainstream sociological theory, Bailey singles out Giddens' structuration theory as having parallels with autopoiesis. He does this on the strength of Mingers' (1989) claims of compatibility between the two theoretical notions. However, in 1989, Mingers' ideas on the fit between structuration theory and autopoiesis were still preliminary; they were only developed further after Bailey's publication.

In the light of the lack of consensus on whether autopoiesis applies to social systems, Bailey is carefully optimistic about the value of autopoiesis to sociologists. He regards concepts such

as recursive self-production and structural coupling as promising, and concludes that the exploration of the social application of autopoiesis is worth further attention.

5.5 Giddens and social systems

Giddens' structuration theory and his related views on social systems are introduced here. Giddens' work is voluminous and full of nuances which are difficult to do justice to in a summary. The section that follows attempts to present the basic ideas related to structuration theory, and their implications for systems thinking as developed by Giddens. It also attempts to surface the similarities between autopoietic or self-producing systems and Giddens' social structuration, which will be returned to when dealing with social autopoiesis.

The key sources for the summary below are Giddens (1984) and Mendelsohn and Gelderblom (2004). The latter is the study text of a social theory module, for students majoring in sociology. It is based on a range of Giddens' publications on structuration theory, as well as a number of commentaries on Giddens. As such, Mendelsohn and Gelderblom (2004) cover a wider spectrum of Giddens' work than what is contained in his 1984 publication.

5.5.1 Background: Structuration theory

According to Giddens (1984: xiii), Parsonian sociology and in particular functionalism came to dominate sociology internationally after World War II. During the late 1960s and early 1970s, many alternative theories came to the fore or received attention by sociologists, including symbolic interactionism, phenomenology, the critical theory of the Frankfurt school, hermeneutics and language-centred philosophy. Although there was a broadly interpretive tendency among them, there was an overall disarray of thinking with no single contestant to take the position that functionalism used to occupy. Giddens wanted to step in and sort the disarray. Of primary concern to Giddens was the schism that developed between subjectivist and objectivist schools of thought. The aim of structuration theory was to overcome this divide, borrowing selectively from both schools to develop a duality from the existing dualism.

The objectivist school refers to functionalism, structuralism and Marxism (Mendelsohn and Gelderblom, 2004: 11). This school focuses on the determining role that social structure or the social environment has on human behaviour. It over-emphasises the constraints of external factors on individual action. Giddens is particularly critical of functionalism, so much that his

work is called a "non-functionalist manifesto" (Giddens, 1979). Within the objectivist school, he primarily makes use of structuralism (such as the work of Lévi-Strauss) to contribute to structuration theory. Structuralism explains behaviour as generated by structures or rules, genetically encoded or socially formed. Giddens (1984) develops the concept of "social structure" that refers to the tacit rules (sense-making and normative), as well as the resources (material and those of social authority) drawn upon in social action.

The subjectivist school focuses on the agency of individual actors, which they believe cannot be generalised or predicted. Giddens extracts a number of general features from the various interpretive approaches, these being hermeneutics, phenomenology, ethnomethodology and symbolic interactionism, towards building a concept of agency (Mendelsohn and Gelderblom, 2004: 30). He takes the idea that social action is a type of rule-following behaviour. People can choose whether and how to apply rules, which means they have a capacity to act in one or more ways. Their capability to act gives them social power. In order to act, they also have to have knowledge of social life. According to Giddens, most of this knowledge is practical or built-in knowledge, which people draw upon without necessarily being able to express it. Finally, their actions are embedded in time. Giddens believe that actions should be seen as an ongoing stream rather that a set of discrete events. Giddens does not provide explicit dimensions of agency, but from his work Mendelsohn and Gelderblom (2004) distil the headings of temporality, capability and knowledgeability by which to further discuss agency.

Giddens brings together objectivist and subjectivist thinking and defines structuration theory as follows. The researcher has italicised phrases referring to recursion, which will become important when structuration theory is likened to autopoiesis at a later stage:

"The basic domain of study of the social sciences, according to the theory of structuration, is neither the experience of the individual actor, nor the existence of any form of societal totality, but social practices ordered across space and time. *Human social activities, like some self-reproducing items in nature, are recursive. That is to say, they are not brought into being by social actors but continually recreated by them via the very means whereby they express themselves as actors*" (Giddens, 1984: 2).

Central to structuration theory is the notion of the duality of structure:

"The constitution of agents and structures are not two independently given sets of phenomena, a dualism, but represent a duality. According to the notion of the duality of structure, *the*

structural properties of social systems are both medium and outcome of the practices they recursively organize" (Giddens, 1984: 25).

The two faces of the duality, social agency and social structure, will subsequently be considered in more detail.

5.5.1.1 Social agency

Giddens' social actor is situated in the mundane everydayness of social life, where much of the action is habitual. The actor simply "goes on", while routinely monitoring their action and that of others. Giddens distinguishes between three "levels" of monitoring, namely reflexive monitoring of action, rationalisation of action and motivation of action. Reflexive monitoring is expected of competent members of society, making use of their discursive consciousness to account for their actions. It also refers to the tacit monitoring of daily ongoing action. Rationalisation of action refers to the actual performance of activities in a purposive way. A knowledgeable actor figures out an effective way of performing a routine in the process of doing it repeatedly, without necessarily consciously reflecting on it. Motivation of action refers to the unconscious motives or wants that prompt action, and which actors cannot necessarily account for. The most significant one is the avoidance of anxiety. The need for ontological security is also present as a motivation, and is satisfied by means of participation in predictable routines (Mendelsohn and Gelderblom, 2004; Giddens, 1984).

Related to the monitoring of action, Giddens ascribes three levels of consciousness to an actor, namely discursive consciousness, practical consciousness and the unconscious. Discursive consciousness refers to the ability to account for actions when asked to do so. Practical consciousness is the level where most social action takes place. It is the tacit and built-in modes of awareness and competence which people employ during everyday activities. Actors know a great deal about how to interact socially without necessarily being able to express their knowledge. An analogy is given with the way people use language, drawing on the rules of language as they speak without necessarily being able to formulate the same rules. The third level, the unconscious, is below our level of awareness. A healthy unconscious requires social security and trust. This security is found in the routines of our everyday interaction and its predictability. It is also found in the predictability of other people's actions and reactions, and the tact which people employ so that nobody loses face during interaction (Mendelsohn and Gelderblom, 2004: 68 - 72).

Reflexive monitoring of action	(reflecting)	Discursive consciousness
Rationalisation of action	(doing)	Practical consciousness
Motivation of action	(unconscious motivations)	Unconscious

Table 5.1: Giddens' levels of action

Having presented the levels of consciousness, Giddens (1984: xxx) alerts the person intending to do structuration theory based research on the importance of recognising the practical consciousness of the people studied. Methods that draw only on the discursive consciousness, such as surveys and questionnaires, will not do justice to the bulk of people's knowledgeability, which is enacted by their practical consciousness. In interviews, researchers need to be alert to non-verbal communication. In the light of Giddens' remarks, this researcher regards the use of participant observation as an important information collecting method.

5.5.1.2 The notion of temporality in agency

Giddens' conception of agency is situated in time. Drawing on Heidegger, Giddens argues that agents' existence is essentially temporal. In the present moment, the memory of the past is with us, as well as anticipation of the future. Time is continuous, and along with it social action is a "continuous flow of conduct" (Giddens, 1979: 55). Social action is repetitive within time cycles, whether days, weeks, seasons or generations. The bulk of our actions are part of the "durée" of everyday life, which is reversible because routines can be changed. These daily routines contribute to the life span of the individual, which is biologically irreversible, as well as to the reversible "longue durée" of institutional time (Giddens, 1984: 35; Mendelsohn and Gelderblom, 2004: 60). Structurational research needs to take into account the temporal existence of social actors, and look for the routines in which actions are embedded.

In terms of the duality of structure, the daily social routines of actors contribute to long-term institutional practices, which are also the medium of the daily routines, that is, the daily actions are performed under the security and stability of the underlying "longue durée" (Giddens, 1984: 36; Mendelsohn and Gelderblom, 2004: 65).

5.5.1.3 The notion of capability in agency

With the notion of capability, Giddens does not refer to intentions or the ability to make decisions (Mendelsohn and Gelderblom, 2004: 61). According to Giddens, many of the routinised social actions do not require cognitive effort or conscious choices. Actors simply continue to do things in their routine, and sometimes they do them differently. Capability is about the potential to do something if one could have done otherwise. Action is purposive rather than purposeful. People do not have explicit goals in mind to direct their actions. Sometimes they think about their action (reflective monitoring of conduct) but most often, our stream of conduct is pre-reflexive with little mental application.

Power is an important concept related to action. It refers to the transformative capacity of action. Our ability to act or intervene can result in a change of affairs. A person has power when they have the ability to make a difference in a situation; otherwise, they are powerless. Power is more than a force, it is the medium of agency or change, as time is the medium in which action occurs.

Giddens mentions two kinds of power: strategic and relational. Strategic power refers to the general ability to intervene, get things done and effect change. Relational power refers to the ability to influence the agency of other people in order to achieve an outcome (Mendelsohn and Gelderblom, 2004: 62).

Capability relates to the duality of structure as follows. Resources (allocative or material resources, and authoritative resources or social power) are the structural elements that are drawn upon to exercise power. The action or transformative capacity to exercise power in turn produces these resources.

5.5.1.4 The notion of knowledgeability in agency

Knowledgeability refers to what social actors know about society and how to act in it. Giddens is highly critical of the way that functionalism and Marxism downplay agents' knowledgeability (Mendelsohn and Gelderblom, 2004: 64). He believes that we are not puppets acting an institutional script, but we know, interpret and reflect. Giddens' "knowledgeability" is conceptualised making use of Schutz's stocks of knowledge (interpretive schemes plus commonsense beliefs) and Garfinkel's indexicality. Indexicality refers to a commonly understood shorthand for communication: people understand the abbreviations used by others and also know the meaning of what is left unsaid. In people's

ongoing action, they have devised social recipes which guide their actions. These stocks of knowledge are commonly held in society, and present the background knowledge or context within which to understand other people's actions.

Knowledgeability plays out in the duality of structure as follows. Knowledgeable agents implicitly know and apply rules of structure during social action, and in turn generate those rules of structure. Social rules are the abstract property of knowledgeable agents. These rules are absent (exept as memory traces) but made present through the knowledgeability of actors (Mendelsohn and Gelderblom, 2004: 65).

5.5.1.5 Social structure

Social structure refers to the "patterning of social relations" (Giddens, 1984: 16). Structure is both absent and present. It is absent in that it does not exist in time and space. It exists as memory traces in the minds of actors, and is made present as it is instantiated in the social actions of actors, which have structural properties. Structure makes the binding of time and space possible as it allows for similar social rules or practices to be repeated across time and space, and thus become systemised and eventually institutionalised. This repetition of social practices over time and space are referred to as routinisation and regionalisation (Mendelsohn and Gelderblom, 2004: 83). Action repeated over time and space contributes at an individual level to people's ontological security, and at societal level to ensure the reproduction of society. As discussed in the section on temporality above, routinisation binds the "duree" of daily activity with the "longue duree" of institutional time. Repetition in different locales leads to regionalisation. A locale has a social meaning or context. For example, a sports pavilion is associated with certain kinds of social activity and a restaurant with others. People expect a certain kind of behaviour from others in a restaurant and also enact it repeatedly.

According to Giddens (1984: 17), structure consists of rules and resources. Rules and resources do not exist independently: they only exist as part of the structuration process, where the use of rules can be inferred from the knowledgeability of agents and the use of resources from their capability, as observed when they act. Rules and resources are interrelated, and are only separated for purposes of analysis. The application of authoritative resources implies social rules, and the application of rules implies the exercising of power and thus an unequal access to resources (Mendelsohn and Gelderblom, 2004: 87).

5.5.1.6 Structural rules

Rules cannot be observed directly; one can only see the outcome of their application. They can also not necessarily be described or formulated. They are often tacit and part of our practical consciousness. They are part of the context where they are applied and thus adaptable (Mendelsohn and Gelderblom, 2004: 89).

"Rules have two aspects to them… [namely] the constitution of meaning, and …the sanctioning of modes of social conduct" (Giddens, 1984: 18). These two aspects are separated for analytical purposes, into interpretive rules that help to define or understand something, and normative rules that help to sanction or approve social behaviour. The rules of social life are compared to the rules of games, such as chess. Giddens state that the rules of chess are neatly defined and well bounded. They also work together neatly as a coherent whole. In social life, the definition and application of rules are far more messy. They are more like the rules of children's games, which are constantly improvised and in flux, and changed to fit the situation and the whims of the players. Giddens also compare social rules to a mathematical series, in the sense that the next action can be inferred from the existing history of instances, so that in knowing its history, one also knows how to continue its application, without necessarily being able to express it.

5.5.1.7 Structural resources

Resources have to do with people's capacity to perform tasks. Different people have different resources to their disposal, enabling some people to be more powerful or to dominate a situation socially. Power in itself is not a resource, but people who are able to mobilise resources are powerful. Two types of resources are distinguished: allocative and authoritative. Allocative resources refer to material things which help to command the natural world. These can be raw material, technology or goods produced as a result of the combination of these (eg material wealth). Authoritative resources refer to the capability to command people; to coordinate or control social interaction. It is the ability of people to promote themselves or their ends given their social skills. As with other concepts in structuration theory, these are interdependent, as allocative resources can be used to effect social power and vice versa (Mendelsohn and Gelderblom, 2004: 89).

5.5.1.8 The dimensions of the duality of structure

For purposes of analysis only, action and structure can be separately studied, and three dimensions can be separated. In practice, all three are interrelated and occur together, as is the case with agency and structure (Giddens, 1984: 29; Mendelsohn and Gelderblom, 2004: 93). The diagram below is an integration of the way it is presented in Giddens (1984: 29) and in Mendelsohn and Gelderblom (2004: 93). The modalities of structuration, inserted between agency and structure in Figure 5.2 below, mediate between agency and structure. They enable actions and assist to reproduce structure. For example, the activity of speaking or communication is associated with the structural aspect of interpretive rules (of signification). These two aspects are mediated by interpretive schemes or stocks of knowledge.

INTERACTION	communication	power	sanction
MODALITY	interpretive schemes	facility	norm
STRUCTURE	interpretive rules (of signification)	resources (domination)	normative rules (of legitimation)

Figure 5.2: Dimensions of the duality of structure

Social institutions are characterised according to which of these modalities feature stronger or are more salient in their instantiation of social practices. For a symbolic institution, such as a professional society, the modality of signification is most salient. For a political institution, authoritative domination is more salient. For an economic institution, it is allocative domination, and for a legal institution, the modality of legitimation (Giddens, 1984: 33; Mendelsohn and Gelderblom, 2004: 97).

5.5.2 Social systems

Structure is virtual, but the social systems and institutions resulting from it (and giving rise to it) are present in time and space (Mendelsohn and Gelderblom, 2004: 83).

The following “levels” of socially embedded structure exist:

- Social practices: social activities which are regularly repeated by actors;

- Social systems: social practices repeated over time and space, by many actors;
- Institutions: social practices deeply embedded in time and space; and
- Society (Giddens 1984: 164): a strong cluster of institutions, often going along with a particular locale or type of locale, over which the society believes it has a claim. There is also a shared social identity, whether it is explicitly labelled as such or not. Our idea of society should not be limited to present-day nation states, the latter which happen to be well defined and well bounded.

Whereas in functionalist systems theory, a system's structure is a physical presence that can be studied independent of functioning, a societal structure only exists insofar as the society is functioning. A social system is the result of repeated social practices by many actors: social systems "consist … in the persistence or repetition of social relations" (Mendelsohn and Gelderblom, 2004: 86). Similarly, Delaney et al. (2008: 9) interpret Giddensian social systems to be "reproduced relations between actors or groups, organized as *regular social practices* that occur in time and space." Social systems have structural properties that can be inferred from observing the acting out of social practices.

The *boundaries* of a social system are more open than that of a society, and can span two or more societies. The boundaries are fluid over both time and space, unlike that of a physical or biological system. People may belong to a number of different social systems at the same time (Giddens, 1984: 164). The *scope* of a system refers to the amount of time and space that it binds or takes up.

Giddens distinguishes between social integration and system integration. He views social integration as the level of integration *within* a social system. This integration is higher if there are more face-to-face interactions, regularised ties and reciprocity of practices within the system. System integration refers to the level of interaction *between* groups or social systems. He believes that individual social action is the foundation for system integration and disagrees with functionalists that want to understand integration from analysing collective behaviour (Mendelsohn and Gelderblom, 2004: 87).

On feedback in a social system, vs. reflexive monitoring of action: Giddens (1979: 75) accepts Buckley's argument that the systems notion of feedback is a higher order notion that distinguishes social systems from mechanical systems. However, according to Giddens, the reflexive monitoring of action among human actors is a notion superior to that of system

feedback. In other words, Giddens holds that the human notion of reflexive monitoring cannot be reduced to a system feedback process.

5.5.3 Assessment of Giddens' social system

Bailey's (1994: 13) take on Giddens' systems views is that there is an amazing correlation between Giddens' statements and the "new systems theory" advocated by Bailey. According to Bailey, both he and Giddens have independently applied the learning and insights that followed earlier social systems views (in particular functionalism), and come to similar conclusions, even if worded differently. The implication of Bailey's reflection is that Giddens' social systems views are in line with the latest insights on social systems at the time. Bailey claims that if Giddens put his mind to it, he could have developed a coherent social systems theory, fragments of which are visible or implied in Giddens' writing.

A personal reflection is that whereas Giddens provides a fresh new way of viewing social systems, not all of his systems notions are credible. For example, his conception of homeostasis in Giddens (1979: 78) appears to be problematic. He tries to improve on the functionalist definition of feedback, but then only incorporates one kind of causal loop, namely a self-reinforcing one. The poverty cycle is given by Giddens as an example of a homeostatic social cycle. However, we know from systems theory (Chapter 4) that homeostasis involves corrective or "negative" feedback. Personally seen, the relationship between educator and pupil would provide a better example of social homeostasis, involving a combination of affirmative and disciplinary feedback loops.

Despite the above example, Giddens' overall conceptualisation of social systems, based on structuration theory, provides a conceptually sound construct that can be well used when describing social systems.

5.6 Assessment: systems thinking in social theory

5.6.1 Reflection on systems thinking found in social theory

The use of systems concepts in social theory is fragmented, and at times selective and superficial, as shown out by e.g. Buckley (1967) and exemplified by Graaff (1994). Remnants of mechanical thinking are still entrenched, as can be seen in everyday vocabulary when people talk about "mechanisms for change" or "guiding forces". Whether such thinking is

seated deeply in our world views, or is superficial and limited to phrases of which the origins are not queried, as argued by Buckley, is not clear. Biologically-based concepts appear to have been used widely in social theory, with functionalism its major and most well known proponent. Unfortunately, extreme functionalism with its connotations of teleology, its strong normative slant, and its obsession with social order at the cost of recognising inherent and necessary drivers of change, has been made a straw dog and ridiculed. It has given organism-based social system views a bad name, which a small group of neofunctionalists are attempting to recover. For example, Luhmann's work shows a careful application of functional principles together with other theory, such as autopoiesis, to contribute to the understanding of subsystems in society. Giddens' structuration theory, developed partially in response against functionalism, has managed to synthesise opposing social theories. He provides a fresh approach and definition to a social system. Bailey argues that Giddens' skeletal social systems ideas are in line with the latest insights on social systems at the time, and could have been developed into a substantial social systems theory.

In general, it can be seen that people have used new developments in scientific as well as systems thinking to make sense of society, as with the mechanical and astronomy-based social systems views of the 17th century, in Pareto's and Parsons' work, and in the influence of general systems theory and cybernetics, for example in Buckley's work.

An interesting point on social systems is suggested by Buckley (1967): that a social system differs in nature from a mechanical or biological system in its ability to change and renew itself, possibly developing to new societal states that cannot necessarily be imagined from a study of the status quo. The insight that biological species that are not adapted die out, whereas social systems do not die but change, is also significant.

Bailey's (1994) overview is regarded to carry weight, since it is relatively recent and presents the work of a sociologist who has expended effort in finding the most promising post-functionalist systems theories and studying their fundamentals, to assess their social applicability. Two of the three systems theories he highlighted, were his own (SET) and one related to his own (living systems theory). The third was autopoiesis. Whereas he could be expected to be subjective about the first two, the same cannot be said for his inclusion of autopoiesis. Bailey recognised the merit of further exploring autopoiesis' social conceptualisations, such as by Mingers. Bailey's position on autopoiesis (of which he shows the merits as a systems concept, before studying its social application) has to be read together

with Bailey's position on Giddens' social systems, to see the value implied in a structuration-based social autopoiesis.

5.6.2 Applicability of social systems theories for use in this study

Of the social systems theories reviewed, which are feasible candidates for describing the social context of ICT4D, and which would also be able to assist in assessing an ICT4D project's impact on the social system(s) served?

The researcher's assessment is that earlier systems views, such as mechanical and functionalist views, cannot be seriously considered. Despite the work of Merton and the neo-functionalists to address problems within functionalism, most of the critique discussed above is still valid, such as its teleological view and its over-emphasising of orderliness and regulation.

Buckley's view of society as a complex adaptive system that uses internal feedback processes to adapt its structure appears promising, at least in theory. Luhmann's work, proposing that social systems self-produce by means of communication, also appears to be a possible candidate. However, Luhmann's work on social subsystems of modern-day society that include political, economic, scientific and education subsystems (more detail in Chapter 6) would not necessarily be appropriate for a rural African society. The subsystems of significance in rural Africa may be very different ones, requiring revisiting Luhmann's theory. Giddens' conception of a social system based on structuration theory appears to provide exciting theoretical constructs when used as a social systems approach. The three systems theories suggested by Bailey for social application, namely social entropy theory, LST and social autopoiesis, also appear to be potentially suited candidates.

A challenge presented by all of the above candidate theories, is that since they originate from social theory, they are more suited for conceptual application than empirical application. Most of them do not have a history of having been applied to a detailed, specific social context. A possible exception is Giddens, whose work has been used before in an IS and ICT4D context (see Chapter 7). However, where Giddens' structuration theory has been empirically applied before in ICT4D, it was without making use of his social systems concepts.

Having provided an overview of systems thinking in social theory in Part I of this chapter, Part II moves to the selection of a social systems theory.

Part II: Selecting a social systems theory

5.7 The challenge of selecting a social systems theory

In this section, the challenge will be addressed of selecting a social systems theory or approach from the candidates presented in this chapter as well as in Chapter 4. Overall, a diverse array of systems approaches or theories have been introduced and discussed. In Chapter 4, it could be seen that general systems concepts have been applied directly to social systems, but also modified in various ways to accommodate character traits of social systems such as pluralism, coercion and complexity. In this chapter, it was shown how social theorists incorporated the systems thinking of their time into social theories, leading to a range of thinking about social systems in sociology: from functionalism through to Luhmann's and Giddens' very different respective approaches.

After having performed basic feasibility assessments of the systems approaches and theories presented, there are many possible candidates that remain. How does one go about selecting among these candidates, that is, how does one decide which social systems theory or approach is most suited to apply in a particular social setting? Are there any best, or at least superior social systems approaches? Personal consideration of this question has led to the conclusion that even after the assessments provided, such prioritisation will be subjective, with a likelihood of not doing justice to all candidates. (As it is, the candidate theories or approaches introduced in Chapters 4 and 5 do not form an exhaustive list). Rather, what is proposed is a general set of criteria for selecting a social systems approach. The suggested criteria are given below. For a particular approach to be feasible, the responses to the criteria need to be *mutually compatible*. The set of criteria below bears similarities with the "questions of context" suggested by Mingers (2006: 219) as a departure point for a multimethodology process. Mingers' questions can be used to enrich the questions stated below, in relation to the stated criteria.

5.7.1 Objective of the systems exercise

Gregor (2006: 611) identifies four goals of using a theory, namely "analysis, explanation, prediction, and prescription". Similarly, a systems exercise can be done for reasons ranging from description, for the sake of better understanding of the situation, to its being the basis of a practical intervention. Mingers (2006) suggests that an OR exercise will aim towards appreciation, analysis, assessment and/or action, these being the different phases of an OR

intervention. Daellenbach and McNickle (2005: 23) state that we "view something as a system for a given purpose". Some systems approaches will suit the particular purpose better, for instance SSM is an interventionist approach meant to involve all role-players, whereas most of the social theories incorporating systems thinking will be better suited to description, analysis and perhaps explanation.

5.7.2 Nature of the social system

Checkland (1999) argues that the nature of a human activity system is different from a natural or designed system, which means that it requires a different approach when engaging with it. Further, he argues that social systems have elements of both human activity systems and natural systems, and so both have to be recognised in a social systems approach (1999: 121). Rosenhead and Mingers (2001) distinguish between well-defined and messy systems, the latter always having a social component, and requiring an approach that can deal with the messiness. A messy system may be unstructured, ill-managed, politicised and/or undergoing radical changes. Further, one can ask if a system has an identifiable structure, such as a traditional western business organisation. How easily can boundaries be drawn? What are the defining features of the system, and what rate of change needs to be taken into account?

5.7.3 Characteristics of the social systems approach

As with a theory, a systems approach focuses on particular aspects of a situation, or particular variables and the interaction among these. Will the approach be able to assist the analyst or researcher in achieving the goals of the exercise? If they are research goals, will they assist in addressing the research problem and questions? Is the approach appropriate to the nature of the system investigated? Being a social systems approach, does it recognise the characteristics of a human activity system, as well as its natural systemic nature (Checkland, 1999: 121)?

Truex et al. (2006) propose four aspects to be considered when adapting a theory from another domain into IS research: the fit between the theory and phenomenon of interest, the theory's historical context, the fit between the theory and research method, and the contribution of the theorising process to cumulative theory, meaning that the new theory should be compared to existing theories when arguing for its value addition. These aspects can similarly be considered when introducing a social systems theory into ICT4D.

5.7.4 Preferences of the analyst(s)

The prior knowledge, background, personality and personal preferences of the analyst will play a role in the successful application of a particular approach. Mingers (2006: 219) suggests some questions to assess the compatibility between the analyst and potential approach. Walsham (2006: 324) contends that in interpretive research, "the choice of theory is essentially subjective", and that apart from rational motives of choosing a theory, it needs to "speak" to the researcher. He suggests that researchers choose a theory firstly because they feel personally comfortable with it and it appears insightful to them. However, there should be a basis to motivate for its use. If the potential value of using a theory needs to be confirmed, he advises a preliminary analysis presented as a working paper or at a conference, with the author requesting feedback. From this, the researcher deduces that subjectivity in preference is acknowledged, although it needs to be an informed subjectivity.

5.7.5 Presenting and motivating for a candidate

Rather than rating all the identified candidate systems theories or approaches against the criteria presented, the researcher will present her own preferred candidate for scrutiny against the criteria. As such, the criteria will be used to motivate the researcher's subjective preference. The researcher's own preference was informed by bounded rationality (Simon, 1979) which is characterised by a process of sequential searching and satisficing. Satisficing entails looking for a solution that is good enough, but not necessarily optimal.

The researcher's personal choice is one suggested by Bailey (1994) in his discussion of relatively recent systems theories that have the potential to make a contribution to social science, namely social autopoiesis theory. Bailey's describes autopoiesis as "one of the most exciting new notions in systems theory in particular, and in social and behavioural science in general" (Bailey, 1994: 285), and shows his satisfaction with its epistemology as well as its hermeneutic, interpretive and non-functionalist approach. Following Bailey's publication in 1994, more work has been done to theoretically conceptualise social autopoiesis, notably by Mingers (1995; 2002; 2004; 2006). Mingers suggests a conceptualisation of social autopoiesis that makes use of Giddens' structuration theory to define a social system. The notion of social autopoiesis will be developed into a systems framework for data collection and analysis on an ICT4D case study (Chapter 7), prior to which the concept of social autopoiesis is assessed in more detail to confirm its theoretical suitability (Chapter 6). Before proceeding with such an exercise, the suggested theory is motivated by means of the criteria presented above.

5.7.5.1 Objective of the systems exercise

The goal of the exercise is to describe and analyse the social context in which an ICT4D project is undertaken, in order to assess the influence or impact of the ICT4D project on the encompassing social system. The impact of interest is that of socio-economic development, in particular Roode et al.'s (2004) notion of self-reliant human-scale development that includes interdependence with specific neighbouring systems. The notion of self-reliance is related to autonomy and sustainability. The impact of the ICT4D intervention on the autonomy and sustainability of the social system is hence of interest.

Social autopoiesis theory makes use of concepts from structuration theory as well as autopoiesis. Structuration theory is a descriptive social theory that is widely recognised and used in IS and ICT4D, to describe the underlying social structures in a community, and the manner in which these social structures are recursively recreated by human actors. The theory of autopoiesis is concerned with identifying, describing and analysing the self-producing mechanisms of a system, and among other, the processes of structural coupling or interdependence with surrounding systems.

A systems description making use of the above constructs can be performed for an ICT4D project's encompassing social system, as the system served, after which it can be investigated how the ICT4D project, as the serving system, influences these aspects. If social autopoiesis theory is used in this manner, structuration theory can be used to provide a rich description of the social system(s) served by ICT4D, focusing on the system's self-producing structures, and whether these contribute to the system's autonomy. The autopoiesis concept of structural coupling can be used to investigate the interdependence of the social system with neighbouring systems. According to autopoiesis theory, aspects such as the ability to self-produce and to have mutually beneficial structural coupling with its environment, contribute towards the autonomy and hence towards the sustainability of a system.

Autopoiesis theory also includes other theoretical concepts, for example concerning the system's boundary, organisational closure and structural drift. The social application of some of these concepts is contentious and need further investigating. This will be done in Chapter 6. For now, the discussion above has made it clear that social autopoiesis theory, with its specific focus on describing self-producing mechanisms and assessing sustainability and interdependence with other systems, has the potential to meet the above stated goals of the exercise.

5.7.5.2 Nature of the social system

According to the above criteria, the selected social systems approach needs to recognise the characteristics of a human activity system as well as a natural system, as per Checkland (1999). The social definition of the system, making use of Giddens' structuration theory, means that the system is recognised as a human activity system. The notion of autopoiesis has biological or natural system origins, and in a sense still treats the system studied as a natural system, even if it is a social system. As such, social autopoiesis theory recognises the system studied as a human activity system as well as a natural system.

The criteria above also suggest that the nature of the particular social system studied needs to be understood and recognised by the systems approach. In this study, the overall community served is relatively remote, geographically and to a large extent socially isolated. The two systems served within this community, the Zulu and mission social systems, both appear to have strong self-producing social identities. As such, social autopoiesis theory with its emphasis on self-production and influence of social boundaries appears to be suited to the study of these social systems.

5.7.5.3 Characteristics of the social systems approach

In the previous paragraph, it has been argued that the characteristics of the preferred social systems theory are suited to the nature of the social systems to be studied. Further, social autopoiesis theory's means to investigate the self-reliance, sustainability and interdependence of the systems of interest, makes it an attractive means to study the notions of sustainability and socio-economic development in an ICT4D context.

The criteria proposed by Truex et al. (2006) when applying a theory from outside of the IS domain, summarised in section 5.7.3, are addressed as follows:

- The fit between the social systems theory and the application domain (a social system in ICT4D) is argued in section 5.7.5.2 above;
- The historical contexts of the theory's building blocks, including the debates and controversies around them, are considered in Chapters 4 to 6;
- The fit between the theory and the research methodology is discussed in section 3.2.6; and

- The contribution of the theorising process to cumulative theory is addressed in Chapter 2, when arguing for a systems approach in ICT4D to address concerns such as sustainability and development at the level of the encompassing social system, since these concerns are not sufficiently addressed in current ICT4D research.

5.7.5.4 Preferences of the analyst(s)

The researcher, as analyst, has a personal interest in applying systems thinking to social systems in novel and different ways. Her background in Operations Research and working with systems engineers while trying to address large-scale social problems, has prepared her for doing such an exercise. Her interest in social theory, systems theory and interdisciplinary work means that a social autopoiesis theory is aligned with the background knowledge and personal interest of the researcher. In Walsham's (2006) words, the theory "speaks" to her.

Her subjectivity is an informed one, based on a wide literature review on systems thinking applied in the social domain. Social autopoiesis' combination of autopoietic principles and Giddens' structuration theory was found intuitively attractive to the researcher, while she could also motivate that it integrated sophisticated recent systems thinking with some of the best social theory available, to promise a good social systems theory. Since a theory such as this is not typically used in an ICT4D context, and it is not a mainstream theory even in the systems field, there was a need to test out the idea with experienced researchers. This has been done by means of writing a paper and eliciting feedback informally from colleagues and experts, and formally by presenting it at two conferences.

5.7.6 The way forward with a social systems theory

Having motivated for a social systems theory that holds promise for application in the ICT4D context, the theory will hence be studied further and its theoretical applicability will be confirmed in Chapter 6, before proceeding with its practical application.

5.8 Conclusion

In this chapter, the second half of the journey to search for social systems approaches to apply in an ICT4D context was documented while addressing the research question:

- How does the literature approach social systems, from systems thinking and from social theory perspectives?

A chronological overview of systems thinking in social theory started by showing the use of mechanical metaphors during the enlightenment, and biological analogies used since the nineteenth century. Functionalism, the most well known biologically based social theory, was also deeply influenced by the Christian religion. Functionalism is value-based and strives towards balance, order and moral consensus. While functionalism was very prominent in the mid twentieth century, it elicited strong criticism, which served to inspire new theories. Among these are Buckley's work, which emphasises the variability and adaptability of social systems, and Giddens' structuration theory, which attempts to synthesise functionalist and interpretive thinking. Other systems-based social theories of the twentieth century include Living Systems Theory and Social Entropy Theory. The biological concept of autopoiesis informed Luhmann's social theory, as well as a social autopoiesis suggestion by Mingers, incorporating autopoiesis and structuration theory.

The literature overview of systems thinking in social theory concluded with a reflection on the applicability of the theories to describe the social context in an ICT4D study. After having scrutinised the systems literature (in Chapter 4) as well as social theory literature for potentially suitable approaches to apply in an ICT4D context, the following question became relevant, and was considered in Part II of this chapter:

- What is an appropriate social systems framework with which to study the impact of an IT intervention on a remote, rural African community?

The sequential descriptions and reviews of social systems theories from the systems as well as social theory literature led to the identification of some feasible candidates. The researcher realised that to select a social systems theory from the feasible candidates was not straightforward. The suitability of an approach depended on a number of factors related to the particular application context. The criteria the researcher came up with bear similarity to Mingers' (2006) criteria for selecting methods as part of a multimethodology approach, as discussed in Chapter 4. The criteria relate to the mutual compatibility of the following:

- The objective of the systems exercise;
- The nature of the social system;
- The characteristics of the approach or theory; and
- The preferences of the analyst.

The decision-making process to select a theory involved a bounded rationality searching and satisficing exercise rather than a rational decision analysis exercise. As such, the researcher chose to assess the 'satisficing' ability of her preferred theory, namely social autopoiesis that includes structuration theory, against the suggested criteria. The assessment against the criteria serves to motivate for the theoretical applicability of the approach. The practical applicability is assessed empirically by means of a case study, which is presented in Chapters 8 and 9.

Before commencing with the practical application of the theory, some further preparation work is required. First, autopoiesis theory is introduced in more detail and its use in the social domain is investigated, to confirm autopoiesis' social applicability. This is done in Chapter 6. In Chapter 7, the theoretical concepts of social autopoiesis theory are developed into a systems framework for practical application, thereby further addressing the research question:

- What is an appropriate social systems framework with which to study the impact of an IT intervention on a remote, rural African community?