

# 2 NETWORKS: THE NERVOUS SYSTEM OF SOCIETY

## THE NETWORK SOCIETY AND OTHER CLASSIFICATIONS

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Several concepts are available to indicate the type of society that evolves under the influence of the use of information and communication technology. The most popular concept is the information society. In this book that concept is used in combination with the concept network society to typify contemporary developed and modern societies marked by a high level of information exchange and use of information and communication technologies (ICTs). In the concept of an information society, the changing *substance* of activities and processes in these societies is emphasized. In the concept of a network society, attention shifts to the changing organizational *forms* and (infra)structures of these societies.

I start with my own complete definitions of these types of society and continue with a number of qualifications of these definitions and their relationships with other classifications such as capitalist society and (post-)modern society.

In an **information society** the information intensity of all activities becomes so high that this leads to:

- an organization of society based on science, rationality and reflexivity;
- an economy with all values and sectors, even the agrarian and industrial sectors, increasingly characterized by information production;
- a labour market with a majority of functions largely or completely based on tasks of information processing requiring knowledge and higher education (hence, the alternative term *knowledge society*);
- a culture dominated by media and information products with their signs, symbols and meanings.

It is the intensity of information processing in all these spheres that allows us to describe it as a new type of society. The common denominator of the changes produced by the increasing information intensity of all activities is the semi-autonomous character of information processing. Most activities in contemporary society are dedicated to *means*, in this case means of processing and producing information. These activities tend to keep a distance from their ultimate aims and to gather their own momentum and reason to exist. Manuel

**Classifications of contemporary society**

**Information society definition**

Castells (1996) even claims that information has become an independent source of productivity and power.

**Network  
society  
definition**

The **network society** concept emphasizes the form and organization of information processing and exchange. An infrastructure of social and media networks takes care of this. So the network society can be defined as a social formation with an infrastructure of **social and media networks** enabling its prime mode of organization at all levels (individual, group/organizational and societal). Increasingly, these networks link all units or parts of this formation (individuals, groups and organizations). In western societies, the individual linked by networks is becoming the basic unit of the network society. In eastern societies, this might still be the group (family, community, work team) linked by networks.

**Mass society  
definition**

This book compares the network society with the so-called mass society preceding it. The mass society can be defined as a social formation with an infrastructure of *groups, organizations and communities* ('masses') shaping its prime mode of organization at all levels (individual, group/organizational and societal). The basic units of this formation are all kinds of relatively large collectivities (masses) organizing individuals.

**Qualifications**

Later in this chapter, in the section From Mass Society to Network Society, and in the remaining chapters of this book I will elaborate the network and mass society concepts. Here I want to draw attention to a number of qualifications of the information and network society concepts. With good reasons, both concepts are contested. Webster (2001) concludes that all definitions of the information society refer to more *quantity* of information, information products, information occupations, communication means and so on, but are unable to identify the *qualitatively* new (system) character of this type of society. Manuel Castells (1996) also rejects the concept of information society as all societies in the past have been based on information. Instead, he proposes the concept of 'informational society': 'a specific form of social organization in which information generation, processing and transmission become the fundamental sources of productivity and power' (Castells, 1996: 21).

In the next section we see that all human societies since the invention of speech have been partly organized in networks. The idea of the network society as something particularly new has been called a fashionable and shallow concept with no theoretical basis. The fact that I try to improve the status does not deny that currently this statement is basically true.

**Other  
classifications**

These qualifications suggest that other classifications of contemporary society remain valid anyway. All of them are abstractions. Concrete human societies always are combinations of abstract relationships on several fields grasped with similar abstract concepts. From an economic point of view, almost every contemporary society is capitalist. The one type is called developed, the other developing. In political terms, a society is more or less democratic. Government might be called 'statist' as in the few remaining communist countries, a 'developmental state' such as in most East Asian countries, a welfare state such as in most European countries and a (neo)liberal state serving a market economy such as the United States. From a social and cultural

perspective, present-day societies may be called modern, post-modern and late-modern, whatever term one prefers, or traditional. In ecological terms, contemporary societies may be more or less sustainable.

In this book the general classifications of information and network society will be related to these other classifications. For example, in Chapter 4 we will see that a network economy changes capitalism, in Chapter 5 it will be argued that a network state and digital democracy are able to alter government and in Chapter 7 and 8 that networks such as the Internet transform social living and culture in (post-)modern society. In several parts of the book it will be questioned whether ICT favours or harms a sustainable society.

A final qualification to add is that the information and network society concepts indicate long-term evolutionary processes of human society. They are not concrete societal forms with precise historical beginnings and ends. To clarify this one might say that the information society did not start in 1751 with the appearance of the first part of the *Encyclopédie* of Diderot and d'Alembert and the network society did not appear with the installation of the first telegraph line by Samuel Morse in 1844. In the 19th century, after the industrial revolution, modernizing western societies gradually became information societies (Beniger, 1986). In the twentieth century, their social structure, modes of organization and communication infrastructure together typifying a mass society progressively changed into a network society (Castells, 1996; Mulgan, 1991; van Dijk, 1991, 1993a). So, contemporary societies are in the process of becoming information and network societies. Developed, high-tech societies have gone further down this road than developing societies that still are in the stage of being mass societies. However, the history of human networking is much older than the last two centuries.

## Long-term evolutions

### A SHORT HISTORY OF THE HUMAN WEB

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Social networks are as old as humanity. Human individuals have always communicated more with some people than with others since the time they lived in small bands and tribes. The bands and tribes of ancient human history consisted of a few dozen (bands) to hundreds (tribes) of people. This number was big enough to have people maintain very intensive relations with some members (direct family and kin) and less intensive relations with other members of the band or tribe. The obvious biological necessity was a scale of coupling and mating that prevented inbreeding.

According to the historians J.R. and W. McNeill (2003) the human web dates at least to the development of human speech. 'Our distant ancestors created social solidarity within small bands by talking together, and exchanging information and goods. Furthermore, bands interacted and communicated with one another, if only sporadically' (2003: 4). Their 'bird's eye view of world history' as a series of expanding and thickening webs, published in their brilliant book *The Human Web* (2003), is this section's guide.

## Networks in ancient history

### Five successive worldwide webs

The McNeills portray world history as a succession of five worldwide webs. The extension of these webs was not only driven by biological necessity, but also by the need and desire to make new discoveries and material conquests to improve the conditions of life. In these webs, not only speech and information in general were exchanged, but also goods, technologies, ideas, crops, weeds, animals and diseases.

In the *first worldwide web*, human kind spread around the world in hunting and gathering tribes. The exchange of ideas and cultural expressions (song and dance), technologies (bows and arrows, the control of fire) and genes (exogamous marriages between members of different bands and tribes) swept across Africa, Asia, and Europe and into the Americas and Oceania. This first human web remained very loose until the invention of agriculture about 12 000 years ago. Settling enabled humans to sustain more continuous interactions among a larger number of people at a local level.

About 6000 years ago the local webs of settlements grew into *metropolitan or city webs*. They served as storehouses of information, goods and infections. In this way, the first civilizations of Mesopotamia, Egypt, the Indus, the Yellow River (China), Mexico and the Andes were created. These civilizations first established connections among thousands and then among millions of people. This was the first time in history that those connected actually remained strangers for each other. 'For the first time, key relationships and important everyday transactions routinely transcended the primary communities within which human beings had previously lived' (McNeill and McNeill, 2003: 41). These civilizations were connected by caravans of transport animals across land and by ships along sea coasts and rivers.

The third human web was the *Old World Web* that grew out of the contact between and partial fusion of civilizations in Eurasia and North Africa about 2000 years ago. It meant the rise of large bureaucratic empires in India, China, the Mediterranean (Greece and Rome), Mexico and the Andes. Transport and communication improved considerably with the invention and spread of hub and spoke wheels, better roads, ships with higher capacity and alphabetic writing. The first tensions in the worldwide web appeared as epidemics spread, religions clashed and different civilizations and their rural hinterlands not only borrowed ideas, habits and customs from each other, but also rejected them, defending their own.

From about 1450 onwards, oceanic navigation brought the Eurasian and American civilizations into contact with each other to produce a truly worldwide *cosmopolitan web*. It was a violent clash of European civilizations overruling the native American ones. The result was an exchange of everything these civilizations had to offer, including lethal diseases. Between 1450 and 1800 more and more people moved to cities and became enrolled in larger and larger social networks. The result was that information circulated faster and more cheaply than ever before. However, the majority of people in 1800 still lived on the land as farmers: 'they knew little about the world beyond their own experience, because they could not read and they only occasionally met strangers' (McNeill and McNeill, 2003: 212).

The fifth type of human web changed this last point: the *global web* that covers the last 160 years. This period is characterized by urbanization and population growth. The human web was not so much widening anymore, but thickening. The volume and velocity of communication increased markedly. The number and use of new means of transport and communication exploded with trains, automobiles and aeroplanes, together with telegraphs, telephones, radios, televisions and, finally, computers and networks.

In this book, the first period of this era of the global web is characterized as the mass society marked by mass communication networks. In the second period, the network society evolves. With the thickening of the global human web, it has turned inwards into society. It is no longer only quantitatively extending across the globe and becoming more voluminous, but it is also qualitatively changing the infrastructure and working of current societies. This comes to rest upon social and media networks of all kinds and at all levels of society.

Before I explain the role of networks and the characteristics of the network society in detail, I want to focus on the four important conclusions the McNeills have drawn from the history of the human web (McNeill and McNeill, 2003: 5–8). The first conclusion is that all webs have combined cooperation and competition. Communication sustains cooperation among people. Within a cooperative framework, specialization and division of labour are able to make a society richer and more powerful. They also make it more stratified and unequal. This inequality within society, together with the inequalities between societies, has always produced competition. Rivals share information too. It urges them to respond, for instance by cooperation with others.

The second conclusion is that the general direction of history has been toward greater social cooperation – both voluntary and compelled – driven by the realities of social competition. Groups and societies who cooperated most improved their competitive position and chances of survival. It gave them economic advantage (by the specialization of labour and exchange), military advantage (quantity and quality of warriors and the organization of armies) and epidemiological advantage (building immunities against diseases by close contact).

A third deduction from history is that, over time, the scale of human webs has tended to grow. So too has their influence on history. The current global web is truly worldwide. Practically no human society exists in isolation any more. The volume, velocity and importance of messages exchanged has become so large that their impact on contemporary society is incomparable to the effect of communication systems in ancient societies. This impact is a major reason for the emphasis of the network society concept in this book.

Finally, it has to be concluded that the power of human communication, both in its cooperative and competitive forms, has also affected the earth to an ever larger degree. Increasingly, economic and population growth, urbanization and technology have produced an ecological impact. ‘We would not be 6 billion strong without the myriad of interconnections, the flows and exchanges of food, energy, technology, money that comprise the modern worldwide web’ (2003: 7).

## **Conclusions network history**

**Definition of  
a network**

What actually is a network? This question comes to mind after this broad description of networks in human history. After all, the concept appears in both natural and social sciences. Unfortunately, the following definition and account has to be rather abstract, but a precise definition and elaboration of the network concept here will enable better future understanding. A network can be defined as *a collection of links between elements of a unit*. The elements are called nodes. Units are often called systems. The smallest number of elements is three and the smallest number of links is two. A single link of two elements is called a relation(ship). Networks are a mode of organization of complex systems in nature and society.

In simple systems of nature and society, a static and hierarchical organization characterizes the relation of elements. For example, the relation between the elements or parts of atoms, molecules and chemical substances is fixed and has a particular order. Change means a transition to another (kind of) unit. When matter gets more complicated, especially when it becomes life, the elements have to be organized in more complicated ways. Life organizes these ways while it exchanges energy with the environment and adapts to this environment for survival. Networks are relatively complicated ways of organizing matter and living systems. They produce order out of chaos linking elements in a particular way. Chaotic situations always appear as soon as the elements of matter and living systems become less fixed.

Emphasizing the organization and the relation of elements entails less attention to the elements and units themselves. The characteristics of units and elements, among them human individuals, and the way they are made up, are not the focus of attention. Instead every network approach in the natural and social sciences stresses the relations of elements. It is opposed to atomistic views of reality and methodological individualism in research (measuring social reality by adding individual attributes).

**Occurrence  
of networks  
in nature  
and society**

So, networks occur both in complicated matter and in living systems at all levels (see Table 2.1). Buchanan (2002) mentions a couple of examples of physical networks. The first one is an ecosystem of earth surfaces, flora and fauna and the second one a river network organizing its downward water flow in branches adapting to the ground and all kinds of obstacles. Examples become more numerous in living systems. All organisms with many cells organize these cells in networks. When they become larger they create special (network) systems such as a nervous system and a blood stream. As a matter of fact, cells themselves contain networks. The most important one is the DNA string of genes (molecules). Nowadays it is common scientific understanding that the complexity of life is not determined by the number of genes but by their relationships.

The largest nervous system of organisms on earth is to be found in the human brain. An increasing number of neurobiologists and psychologists agree that the human mind works with neuronal networks that are organized on a higher level in mental 'maps' in particular regions of the brain. The

TABLE 2.1 Types of network

Physical networks	Natural systems of higher complexity: ecosystems, river networks
Organic networks	Organisms: nervous system, blood circulation, strings of DNA in cells
Neuronal networks	Mental systems: neuronal connections, mental maps
Social networks	Social systems with concrete ties in abstract relationships
Technical networks	Technical systems: roads, distribution networks, telecommunication and computer networks etc.
Media networks	Media systems connecting senders and receivers and filled with symbols and information

connection between these maps (themselves being neuronal networks) also reveals a network form. Gerald Edelman, one of the best known of these neurobiologists, argues that even human consciousness emerges from such connections of mental maps (Edelman and Tononi, 2000).

Human beings have created social networks at least since the invention of speech, as was explained in the previous section. In these networks, the elements are social agents (individuals, groups, organizations and even societies at large) and the links are created by communicative (inter)actions. Below I argue that social networks figure at all levels and subsystems of society. In the course of history, humans also have created a number of technical networks. Examples are roads, canals, all kinds of distribution networks and the telecommunication and computer networks that are an important subject matter in this book. When the latter networks are filled with symbols and information to connect human senders and receivers, they become media networks.

This book is about the relationship between social, technical and media networks. Together they shape the infrastructure of the network society. Even organic and neuronal networks receive some attention, for instance in Chapter 9, which discusses the psychology of new media use. However, the primary focus of attention is social networks supported by media networks.

Social networks supported by media networks are available at all levels and subsystems of society. Four levels can be distinguished. They are portrayed in Figure 2.1, which shows the first picture of the abstract concept of the network society in this book.

The first and most basic level is the level of *individual relations*, not that of the individual because units and elements are not the prime focus of attention in a network perspective but relations (Brass, 1995; Wellman and Berkowitz, 1988). This level corresponds to the common sense meaning of (social) networking: individuals creating ties to family members, friends, acquaintances, neighbours, colleagues, fellow sportsmen, and so on. Currently, this level is supported and intensified by the rise of the media networks of the Internet (email) and mobile or fixed telephony.

The second level is that of *group and organizational relations*. Individuals create all kinds of groupings or collective agencies, some of them temporary and loose (such as project teams and mailing lists) and others permanent and fixed (institutions and corporations). All contemporary groupings are

**Networks at  
all social levels**

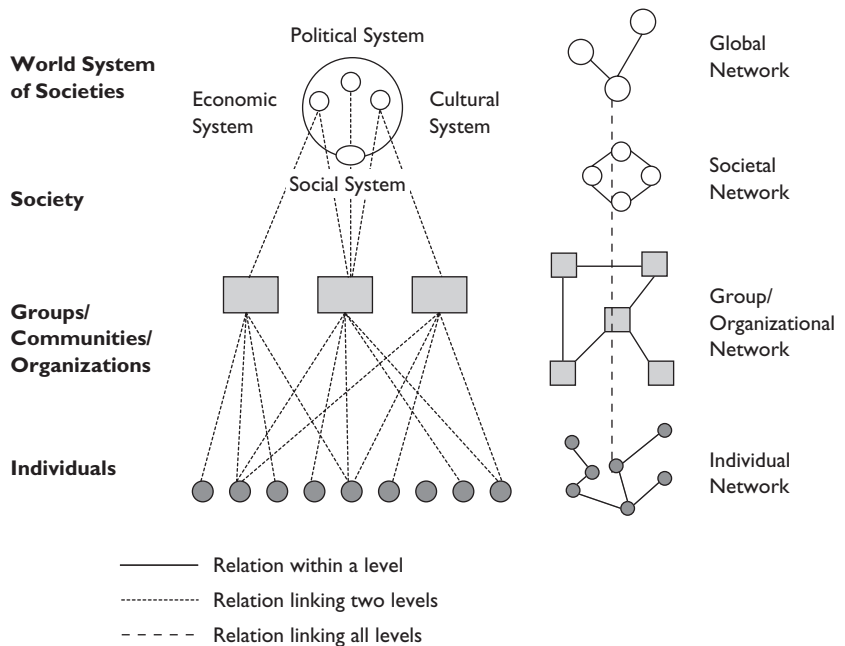


FIGURE 2.1 Four social units and levels linked by networks

supported by telecommunications and computer networks. They tend to loosen fixed group and organizational structures because they enable virtual organizing at every scale. Internally, many organizations have become network organizations of largely independent teams and projects. Externally, they assemble to form network organizations cooperating in the execution of a particular task. They may even become virtual organizations that are more or less independent from spatial, temporal and physical conditions as these conditions are substituted by networks of information and communication technology.

The third is the level of *societal relations*. Individuals, groups and organizations shape a society that is built on, and linked by, social and media networks. This goes for all subsystems of society. One increasingly uses the phrase 'network(ed) economy', which is sometimes called a 'new economy'. In politics, some people talk about a 'network state'. Internally, this state links the bodies and institutions of the government and the public administration at every level. Externally, it maintains strong relationships with organizations of citizens and with semi-autonomous or privatized public institutions (Castells, 1997; Fountain, 2001; Guéhenno, 1993; van Dijk, 2000a; Goldsmith and Eggers, 2004). In the cultural sphere, the Internet has created a vast hyperlink structure of sources and artefacts of human activity (de Kerckhove, 1998). Finally, the societal infrastructure of interpersonal and group relationships has been intensified by the ever-stronger links between social networks and telecommunication networks using email and mobile or



fixed telephony (Katz and Rice, 2002; Wellman, 2001; Wellman and Haythornthwaite, 2002).

The final level is the level of *global relations* in the world system of societies and international organizations (Slaughter, 2004; Urry, 2003). We have entered the era of the global web as it was explained in the previous section. This is created by expanding international relations and a scale extension of organization. Both are strongly supported by international broadcasting, telecommunications and computer networking.

It is vital for the understanding of the network society to analyse it in terms of levels of networking. In their helpful overview of contemporary *Theories of Communication Networks* (2003), Monge and Contractor have made a strong argument for multilevel theories of networks. The word theory is used in the plural as they also defend a combination of theories to explain phenomena at the different levels distinguished. An important part of their argument is that the levels are linked themselves. They build their own theory relating statements at the level of the individual, the dyad, triad, group, organization and at the interorganizational level.

### **Multilevel theory of networks**

Previously, I also advocated a multilevel theory of the network society (van Dijk, 2001). This advocacy did not only lean on the historical rise of media networks that are used at every level, but also on basic views on the composition and (infra)structure of society. Such a basic view is developed in Kontopoulos' methodological and conceptual book *The Logics of Social Structure* (1993). According to him, the world must be analysed as a level structure. 'Levels are not juxtaposed layers; every level is rooted to lower levels, down to the chemical and physical ones. Therefore, same-level or intra-level analysis must be supplemented and enriched by cross-level or inter-level analysis' (1993: 63). At every level, particular properties emerge that only apply to that level (the individual, group, organization, society, world system). Examples of such properties are the personality of an individual, the measure of formality of a group, the extent of centralization of an organization and the phase of development of a society.

In this book about the network society, such a basic view is needed to explain the character of networks as a particular mode of social organization. Kontopoulos makes a distinction between hierarchical and heterarchical modes of organization of the world. Networks clearly belong to the last mode. In a hierarchical mode, the lower levels are fully included in the higher levels. The units at these levels are simply aggregated to form units at a higher level. Individuals add to groups and organizations and both add to society. A second property of the hierarchical mode is that the lower levels are superseded by the higher ones. This might mean that the higher level controls the lower one. This is the common meaning of the term hierarchy.

In a heterarchical mode of organization, the lower levels are only partially included in the higher levels. The units concerned contain relations and structures that overlap with those at higher levels. Networks belong to these relations and structures. They cut right through all levels, and they connect these levels (see Figure 2.1 again). Networks realize complex interactions within and between levels. In this way, they increase the flexibility of organization.

In terms of determination, the heterarchical mode means that neither the higher nor the lower levels are in control. Instead, a very complicated picture appears of determination from below, determination from above and determination at the semi-autonomous level in focus itself (1993: 55).

Examples of this cutting through all levels of networks are individuals who pass the borders of the units they belong to (families, groups, departments, organizations) to establish links with other individuals in groups, organizations and societies they do not belong to, in this way creating their own structures. The same goes for organizations passing the borders of their societies or nation states.

The use of telecommunication and computer networks strongly supports these practices. They also link the types and levels of interpersonal, organizational and mass communication. For the first time in history we have a medium, called the Internet, directly linking them simultaneously. Telephones, letters, documents, computer files and meetings served interpersonal and organizational communication, and mass communication was realized by broadcasting and the press. However, with the Internet, this traditional split has dissolved, as it is used for communication at all levels.

**A moderate  
network  
approach**

So, networks organize relations within and between levels or units of social reality. As has been argued before, every network approach stresses the importance of the relations as compared to the units that are linked. The traditional network approach defends this position in a radical way. It gives priority to forms instead of substances. The social network analysis following this approach emphasizes the morphology of ties and nodes to such an extent that it downplays the attributes of the social units and what happens inside or between them, that is, the communicative action of people who are using and creating rules, resources and meanings. In this book, I reject this formalistic and superficial approach. Instead, I defend a moderate notion of a network approach. This means that, first, not only are relations stressed, but also the characteristics of the units they link. The most interesting things occur when relations and the characteristics of units come into conflict. This happens, for example, when the new digital communication networks, with relations transcending space and time in the global 24-hour economy, collide with the limitations of the biological human organism (unit), with its daily rhythms and routines or needs for rest that cannot fulfil the expectations of the technology and economy concerned.

A second qualification of the radical network approach is that, in this book, networks are not supposed to be the basic units of contemporary society as they are in the view of Manuel Castells (1996, 2000, 2001). Instead, these basic units are held to be individuals, households, groups and organizations *increasingly linked by social and media networks*. In modern western societies, the individual is becoming the most important basic unit of society. In others, this frequently is the family, kinship group or local community. The combination of social and media networks produced by both organizational and technological innovation forms the all-embracing network structure of modern societies. This combination justifies the use of the strong metaphor of networks shaping the nervous system of advanced high-tech societies.

## CAUSES OF THE RISE OF NETWORKS

What are the causes of the rise of networks in contemporary societies? It is relatively easy to describe a number of historical and social reasons. It is far more difficult to uncover the basic social infrastructures and modes of organization of societies explaining the rise of network structures. Let us start with the historical and social reasons. The McNeills would explain the current rise of information and communication networks as the last stage of the evolution of the global web. This web is no longer primarily widening, but it is thickening. Ever more persons, animals, plants, diseases, goods, services, pieces of information, messages, new ideas and innovations are exchanged globally and at ever faster rates.

**Historical and social causes**

Social explanations will emphasize the social need and appropriateness of the creation and use of networks at all levels. At the *individual* level we are witnessing the rise of networking as an explicit and increasingly systematic method of making contacts and improving social relations. Below, the concept of network individualization is used to describe this phenomenon. The use of networking is an evident social need in an individualizing society. Networks can be seen as the social counterparts of individualization. At the level of *organizations*, corporations and institutions are no longer working alone. They have become a part of a comprehensive division of labour. Increasingly, this division is organized in networks of cooperating organizations. Moreover, organizations have to open themselves more and more to their environment to survive in competition (business) and societal demand (government and non-profit organizations). Traditional internal structures of organizations are crumbling and external structures of communication are added to them. Acquiring new combinations of internal and external communication they are better equipped to adapt to a swiftly changing environment.

Networks also cause a comprehensive restructuring of *society at large*. They are breaking old modes of organization as they help organizations in their search for new scale levels, new markets and new ways to govern and control. Networks link the processes of scale extension and scale reduction occurring simultaneously in modern society. At the one side they support globalization and socialization and at the other side localization and individualization. In this way, they have accelerated modernization (Barber, 1996; Castells, 1996; van Dijk, 1993a).

All of these historical and social explanations are valid, but they fail to answer the question of why networks are built to satisfy these social needs. What is the presumed superior organizational quality of networks and networking? To answer these questions we have to dig deeper and consult network theory, a theory that has made considerable progress in the last five years. Unfortunately, this means that the exposition has to become fairly abstract again.

Networks are structures and they organize systems. Network theory is usually some kind of structural theory and systems theory. The most general one is systems theory. In terms of this theory a network can be defined as

**Systems causes: Adaptation and evolution**

*a relatively open system linking at least three relatively closed systems.* The relatively closed system is the unit. As we have seen, we need at least three of them to create a network. These units can be conceived as relatively closed systems because they contain elements that primarily act among themselves to reproduce the unit in a (pre)determined way. As soon as these closed units are forced, for one reason or another, to interact with their environment and to link themselves to other units in a network, they create an open system. In an open system, complete determination is lost and replaced by chance and random events. That allows change and new opportunities. This process of opening up closed systems is the secret of networks or networking as an organization principle.

This propensity of change is explained differently by two versions of systems theory that have inspired network theory. The first version has a biological inspiration and the second a physicist and mathematical inspiration. According to the biological inspiration, systems are conceived as organisms that have to adapt to a physical environment to survive (among others, Maturana and Varela, 1980, 1984; Prigogine and Stengers, 1984). This is the propensity of change here. In this reading, networks can be seen as adaptive systems. Our brain is a complex adaptive system. The same goes for our bodies. Increasingly our organizations and societies also are complex adaptive systems. All of them are relatively closed. However, they have to adapt to an ever more complex environment. Here they get the assistance of networks as relatively open systems. According to Axelrod and Cohen (1999), adaptation occurs in three successive processes they derive from evolution (systems) theory: variation, interaction and selection. However, I think the right order in this theory is interaction, variation, selection and retention and I will treat them in this order.

First there is interaction. Networks support interactions within and between system units. For example, inside organizations they help to break through the divisions of departments to enable the communication of more members than before in shifting teams and projects. This offers them opportunities for changing and (self-)steering the organization. Between organizations, networks, particularly telecommunication and computer networks, are reducing the limits of time and place that were formerly keeping their members' communicative (inter)actions apart.

Increasing or intensifying interaction leads to more variation. First of all, there is variation of scope as the reach of information retrieval and communication is enlarged by new network connections. Every one engaged in networking will recognize this idea: one has to break out of one's own small circle of people to obtain experiences and contacts outside, even when they are very superficial. Granovetter (1973) called this idea the strength of weak ties. Accepting the value of weak ties, one should not deny the importance of strong ties. Variation also reaches into depth. Our own familiar environment offers opportunities of interaction and information by means of intensive ties and high-quality communication. It is the combination of variation in scope and in depth that makes networks strong as relatively open systems emerging from relatively closed systems, but always remaining linked to them.

A person engaged in networking is not a roaming nomad, but someone who keeps a home base.

The final process is selection. Here the goal of networking is reached: choosing the most successful actions and actors. This serves the adaptation and survival of the particular system concerned: retention. For example, an unemployed individual gets a job, a company finds the best chain of suppliers and customers and a society adopts a particular policy, organization and provision to uphold itself in the process of globalization.

The second version of systems theory reveals a mathematical and physicist inspiration. Here systems are conceived as units, both in nature and in society, containing elements that can be connected in ordered (clustered) and disordered (random) ways. Here the propensity to change is the tendency of nature to produce order out of chaos. For ages now, networks have been studied as mathematical objects called graphs. Graphs depict the potential links between a collection of elements in a particular unit. A social-scientific application is the discovery by the psychologist Stanley Milgram (1967) that on average every inhabitant (element) of a given unit, in this case the United States, is linked by six intermediary persons, in the so-called *six degrees of separation*, to every other inhabitant. This peculiar fact can only be explained by the other fact that groups of people are closely linked and organized in clusters. These clusters are often linked by so-called weak ties, a phenomenon described by the sociologist Granovetter (see above). In the tradition of Milgram and Granovetter, a number of mathematicians and physicists have made their way to social science to produce important discoveries in network theory that will be represented in the sections and chapters that follow (Barabási, 2002; Barabási & Albert, 1999; Buchanan, 2002; Watts, 2003; Watts and Strogatz, 1998).

This version of network and systems theory tries to explain how randomly distributed elements of a unit or system link to each other in clusters and these clusters in a single whole (a particular order). In this way, a complex system is created, in this case a complex society that is highly adaptable to environmental change. The question remains how order appears in a system without a pre-existing centre but with a number of interacting equals. The answer is connectivity: at a critical point, a phase transition in the system, ‘all parts of the system act *as if* they can communicate with each other, despite their interactions being purely local’ (Watts, 2003: 63). This critical point appears as a sufficient number of (random) long-distance links connects a large number of local individual units ordered in all kinds of clusters (groups, communities, organizations). In this way a so-called *small world* is created within a large-scale or global environment. These small worlds have internal links and reveal order because two elements that are connected to a common third element are more likely to establish a link to each other than two elements picked at random. You will more easily get acquainted with the friend of your friend than with a stranger. Figure 2.2 portrays a network connecting a number of small worlds (clusters with strong ties) with long-distance (weak) ties.

Social and media networks in contemporary society increasingly create small worlds and clusters in such a way that any pair of individuals or

**Systems causes:  
From chaos  
to order  
(complexity)**



FIGURE 2.2 Picture of a network connecting small worlds (Clusters)

organizations can be connected via a short chain of intermediaries. This leads to statements, almost platitudes in the mean time, that we live in a connected world and that society is ever more connected. In short, that it is becoming a network society.

#### FROM MASS SOCIETY TO NETWORK SOCIETY

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**Comparison** Now we are ready to understand the main characteristics of the network society as compared to that of the mass society. This comparison is made in Table 2.2. It will serve as a summary of the argument in this section and an introduction to the following chapters where the network society is described in detail.

The mass society was defined earlier in this chapter as a social formation with an infrastructure of groups, organizations and communities ('masses') that shapes its prime mode of organization at all levels. The main components of this formation are all kinds of relatively large collectivities. Historically, the mass society characterizes the first phase of the era of the global web as it is called by the McNeills (2003). This society evolved during the industrial revolution when large concentrations of people came together in industrial towns and trading centres. Typical of these concentrations was that the traditional communities already existing in neighbourhoods and villages were largely maintained when they were combined on a larger scale in cities and nations.



TABLE 2.2 A typology of the mass society and the network society

Characteristics	Mass Society	Network Society
Main components	Collectivities (Groups, Organizations, Communities)	Individuals (linked by networks)
Nature of components	Homogeneous	Heterogeneous
Scale	Extended	Extended and Reduced
Scope	Local	'Glocal' (global and local)
Connectivity and Connectedness	High within components	High between components
Density	High	Lower
Centralization	High (few centres)	Lower (polycentric)
Inclusiveness	High	Lower
Type of community	Physical and unitary	Virtual and diverse
Type of organization	Bureaucracy Vertically integrated	Infocracy Horizontally differentiated
Type of household	Large with extended family	Small with diversity of family relations
Main type of communication	Face-to-face	Increasingly mediated
Kind of media	Broadcast mass media	Narrowcast interactive media
Number of media	Low	High

The basic components of mass society are large households and extended families in the rather tight communities of a village or a city neighbourhood. In large companies, other mass associations appear, such as closely cooperating shifts and departments. The basic components or units of the mass society are homogeneous. This does not mean that internal conflict or opposition is absent, but that all units concerned largely reveal the same characteristics and social structures. For example, the large households consist of standard nuclear families with a mother, father and many children. Local communities also are relatively homogeneous or unitary and they are marked by physical proximity.

The mass society is marked by scale extension. Corporations, governments and other organizations grow larger and larger and they become bureaucracies. They spread across nations and the world at large to create a global web of 19th-century empires and multinationals. However, the scope of the mass society remains local: the organization of its basic components is tied to particular places and communication is still overwhelmingly local. The mass society is an assembly and connection of relatively homogeneous separate local places.

These basic components or units of the mass society are marked by the physical co-presence of their members. This means high connectivity inside and relatively low connectivity outside. The mass society is very much clustered with strong ties of high density (in local communities and extended family structures) and it contains relatively few weak ties connecting these clusters at long distances in diffuse network structures.

The internal relations in the units of the mass society are centralized. Bureaucratic and vertically integrated modes of organization prevail. There

#### Mass society characteristics

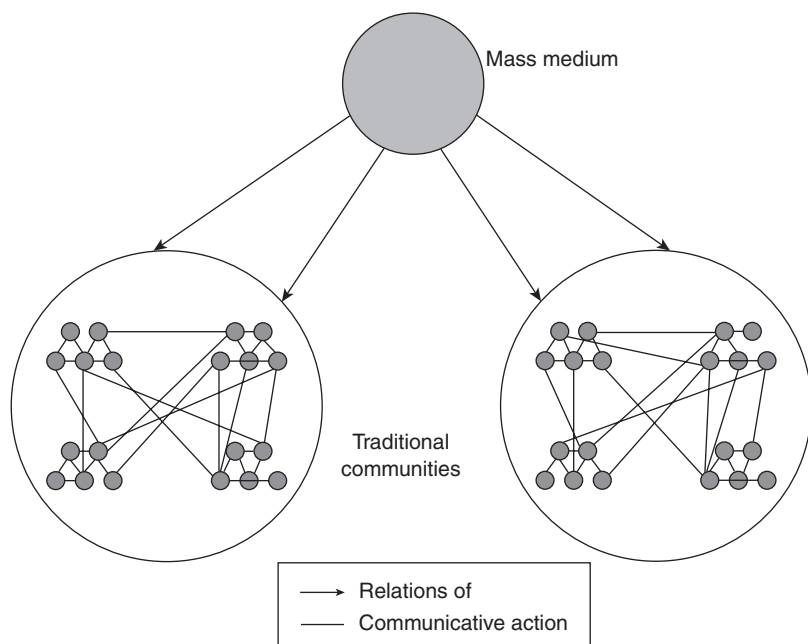


FIGURE 2.3 The structure of mass society

are relatively few very influential centres: the national, regional and local state, the army, a number of large corporations, churches or other cultural institutions and a limited number of mass media. The complement of centralization is that the inclusiveness of relations is high as well. The number of connected members is high and few of them are isolated or excluded. The mass society is marked more by solidarity than the network society.

In the mass society, every unit (community, household) has access to only one or perhaps a few of each type of mass media, such as one local newspaper, followed by one national newspaper and one or a few radio and television channels. So, the number of media is relatively low as compared to the current standards in network societies. Essentially, they are all broadcast media. However, generally speaking, face-to-face communication is much more important than mediated communication in the mass society.

In Figure 2.3 an attempt is made to depict the social and communicative structure of the mass society.

In the course of the 20th century, the structures of the mass society were gradually replaced by the structures of the network society. This happened first of all in developed or modern societies. The reasons for this replacement will be discussed in the following chapters, as they derive from problems of organization and communication in the economic, political and cultural systems and the general social infrastructure of these societies. The characteristics of the network society are described below in order to compare them with the mass society.



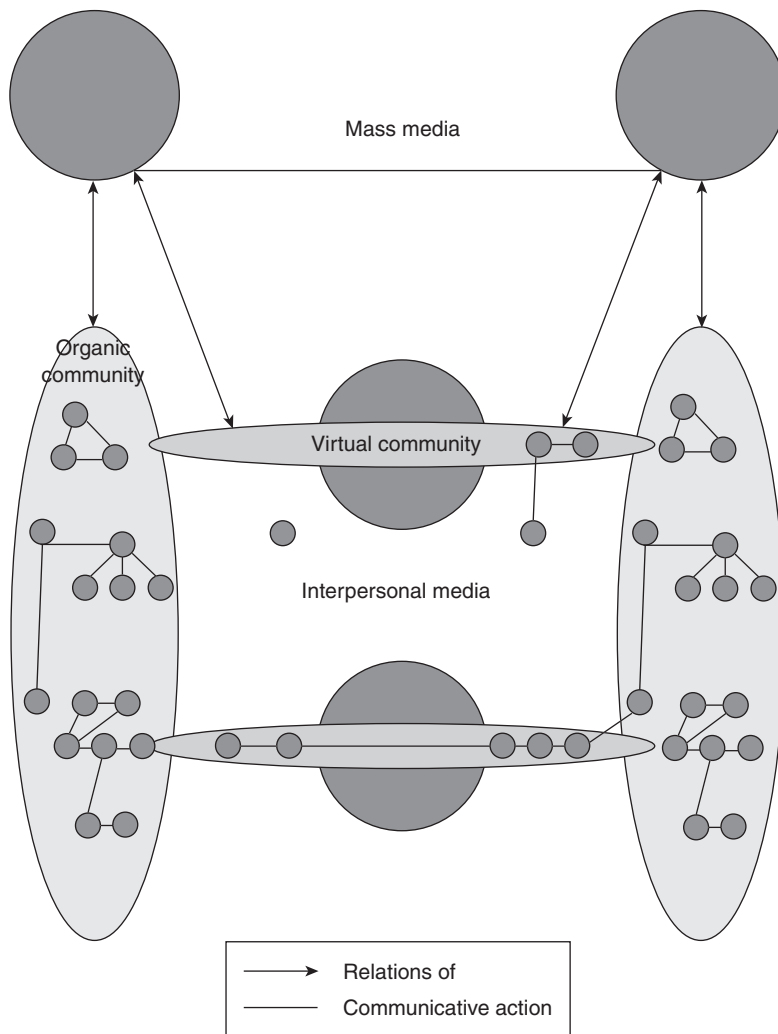


FIGURE 2.4 The structure of network society

As has been argued above, in the contemporary process of individualization, the basic unit of the network society has become the individual who is linked by networks. Traditional local collectivities such as communities, extended families and large bureaucracies are fragmenting. This is caused by simultaneous scale extension (nationalization and internationalization) and scale reduction (smaller living and working environments). Other kinds of communities arise, consisting of people who on the one hand continue to live and work in their own families, neighbourhoods and organizations, but on the other hand frequently move around in large-scale social networks that are much more diffuse than the traditional ones. Daily living and working

**Network  
society  
characteristics**

environments are getting smaller and more heterogeneous, while the range of the division of labour, interpersonal communications and mass media extends. So, the scale of the network society is both extended and reduced as compared to the mass society. The scope of the network society also is both global and local, sometimes indicated as 'glocal'. The organization of its components (individuals, groups, organizations) is no longer tied to particular times and places. Aided by information and communication technology, these coordinates of existence can be transcended to create virtual times and places and to simultaneously act, perceive and think in global and local terms.

The social units of the network society are fragmented and dispersed. This means that the density of contacts and ties *within* these units is relatively low as compared to traditional families, neighbourhoods, communities and organizations in the mass society. Instead, the elements of these units, the individuals, select their own contacts and ties *beyond* these units. Using all kinds of telecommunication they develop an extremely high level of connectivity between themselves as individuals and accordingly between the units of the network society of which they are a part.

Networks are relatively flat and horizontal, so-called heterarchical social structures. However, this does not mean that they do not have centres. Think about the spider in the web. Networks usually do not have a single centre. They are polycentric, as some nodes are (much) more important than others. For this reason, the network society is less centralized in the sense of having single centres in the economy, politics, government, culture and community life. They are replaced by a multitude of centres cooperating and competing with each other.

The network society is less inclusive than the mass society. You may be a member of some part of the mass society by birth or ascription. In the individualized network society you have to fight for a particular place. You have to show your value for every network. Otherwise you will be isolated in, or even excluded from, the network. In the network society, you have to stand firm as an individual. You are not that easily taken along in solidarity by proximate people.

In the network society, face-to-face communication remains the most important kind of communication in many ways. However, gradually it is also partly replaced and supplemented by mediated communication. A multitude of interpersonal and mass communication media are used for this purpose. Broadcast mass media reaching everyone are accompanied by, and partly replaced by, narrowcast interactive media reaching selected audiences. They lead to all kinds of new communication forms and groupings between interpersonal and mass communications, such as chat and instant messaging groups, virtual teams at work and virtual communities of interest. Virtual communities add to the thinned out physical communities of the network society with their small and diversely composed households. Figure 2.4 represents the complicated social and communicative structure of the network society.

## CHANGING RELATIONS IN THE NETWORK SOCIETY

The advent of another structure of a society implies that the relations between its parts are changing. In the network society, both abstract relations and concrete ties between individuals, groups and organizations are transformed. By means of a summary of a large part of the argument in the chapters that follow, I now list ten perceivable trends as changes in these relations. I note that they have both technological and social causes and that they are backed by both media networks and social networks.

Often these changes run against popular views about social and media networks. For instance, one popular view is that networks are not a hierarchic but a 'flat' mode of organization. Most often, horizontal and flexible networks are opposed to vertical and ponderous columns of organizations. Some people even suggest that networks are democratic by nature. Or they suppose that they are more transparent than the institutions they partly replace. Another popular view is that networks are open and accessible to all, contrary to fixed and closed organizations with their memberships. A less positive popular connotation is that networks are breaking the social cohesion of modern societies. They cut right through existing institutions and everyone appears to communicate alongside each other in their own sub-cultural network. A final popular view is that computer networks are no longer tied to place, time and physical conditions and that they are offering us more freedom in this way. In this book, it is argued that these popular views are one-sided, to say the least. Networks are not necessarily more 'flat', democratic, open, free, accessible, physically unconditional or less socially coherent than other modes of organization and communication.

The first, and most important trend is that in the network society the relations themselves are getting more important at the expense of the elements or units they are linking. I call this the articulated relation. Relations float to the surface in every subsystem of society. They are realized by a combination of social and media networks. Their effect substantially changes the economy, politics, government, culture and daily life.

In Chapter 4, we will see that a network economy is created that is sometimes called a 'new economy'. The network relationships between producers in this economy are marked by a combination of cooperation and competition. This may fundamentally change the market as the prime medium of the economy. Anyway, networks in the economy are transforming the relationship between supply and demand. In Chapter 5, it will be observed that institutional politics and public administrations transfer power to other units directly getting into touch with each other via networks: transnational corporations, international bodies, nongovernmental organizations (NGOs), local corporations, individual citizens and their social and political organizations. In this way, the national state may be bypassed as the traditional centre of politics. Reacting to this shift of power, the state itself transforms into a 'network state' linking increasingly independent and privatized government

**Popular, but  
wrong views  
of networks**

**Articulated  
relations**

agencies. In Chapter 6, we will find out that our current law system based on the notion of independent actors, acts and property items is undermined by networks. In Chapter 7, it will be established that we increasingly select and compose our own social relationships as a matter of network individualization. These relationships are less and less imposed by the social environment. Finally, in Chapter 8, we will observe the rise of a digital culture of hyper-linked creations that will completely transform our current reality of separate creations and media practices.

**Substantial  
relations**

A second trend is that, despite their articulation, all social relations in the network society remain inextricably bound up with units and physical environments. I call this the substantial relation. The trend is increasing tension between the rise of networks and the characteristics of units and environments that are relatively fixed and tied to particular places, times and physical conditions. Repeatedly, we will notice contradictions between properties of networks, such as their global scale and flexibility, and the properties of the humans of flesh and blood they are connecting, those poor creatures that are stuck to the biological needs of their bodies and the limits of mobility. For the understanding of this book, it is extremely important to bear in mind my notion of networks as forms and substances relating units or elements with particular attributes (see above). The traditional network approach tends to remove these attributes and the substance of relationships, such as the rules and resources entailed in communicative action, from the formal characteristics of networks as the quantity and quality of ties and media connections.

**Direct  
relations**

In the network society, individuals, groups and organizations are linked in increasingly direct relations, even across large distances. In the 1960s, Milgram estimated that on average Americans are only six intermediary steps separated from each other (1967). It is presumed that the six degrees of separation also hold worldwide; see Watts (2003). In the meantime, this number might have become smaller for several reasons. First, mobility and connectivity, both across large and small distances have increased substantially since the 1960s. Second, intermediary steps can be omitted, as ever more mass media and mailing lists are used to reach people simultaneously (the Milgram experiment organized a step-by-step individual procedure). Third, the use of the telephone and the Internet has considerably enlarged the number of direct relationships. The connections they offer are ever more short themselves. Albert et al. (1999) observed that the distance between one web site to another appeared to be only 19 clicks away on average in 1999. The explosive rise of the number of sites does not result in an equally fast increase in the number of links and degrees of separation. Just like people, sites and their pages are clustered.

The rise of connectivity in the network society has both social and technological reasons. The social reason is the scale extension of social relations in modern society with an increasing number of weak and strong ties across large distances. The technological reasons are the improvement of transport, the growth of the number and reach of mass media and the explosion of the use of telephony and email. The main consequence of these increasingly direct relations is the creation of a connected world that may become more organized, united and coherent in principle.

The fourth trend of the network society is that its relations are ever more realized by a combination of social and media networks. Fifteen years ago, the common opinion was that online activities would *replace* meetings. Those were the days of the electronic cottage as the perspective of future social life. Afterwards it was discovered that online communication *adds to* offline and face-to-face communication. Now the opinion is growing that both kinds of communication should not be separated and that they will be *combined* more and more. Chapters 7 through 9 will show that the future is to social and media networks that are linked and continually switching face-to-face and mediated communication. Probably this will be realized even more in mobile contexts than in electronic homes and places of work, study or leisure.

The combination of social and media networks will create a very strong new infrastructure of our society. Therefore, I am less afraid than most observers of a fragmentation of its public sphere by an increasing number of subcultures that communicate completely separately from each other in using the new media. In Chapter 8, it will be argued that the public sphere will become a *mosaic* of partly overlapping spheres that will keep common denominators.

The use of media to inform and to communicate in society and to realize social relationships is not without risk. Every medium has its own weight and properties such as communication capacities. The combination of social and media networks causes the media to become social environments themselves (Meyrowitz, 1985). Moreover, they are becoming important institutions of society with their own interests. Increasingly, mass media, the Internet included, are referring to themselves, discussing their own role in society and their own programmes or stars, and circulating information among themselves. This means that the relations of communication they realize and support tend to become self-referential.

The media of the network society increasingly lean towards partiality concerning the views and interests they represent (mass media) and link (interactive media). In the mass society, the (mass) media were supposed to stand 'above' society, distributing information objectively and independently. In the network society, the mass and interactive media are embedded in society to a larger degree (compare Figures 2.3 and 2.4). They have difficulty upholding a particular independence and quality. Nonetheless, in forms adapted to the needs of their audiences and stakeholders, quality and objectivity remain important performance criteria of information supply in the network society, as will be argued in Chapter 8.

In the network society, social relations become increasingly interactive by the combination of social and media networks with multilateral communication. Compared to the 'mass society' with its one-way media and centralized institutions, the media and organizations of the network society tend to be more interactive and decentralized. Interactivity is a chain of action(s) and reaction(s). Presumably, it is the growth of interactive relations that has the greatest consequences for the structures of present and future society. In all spheres of society, one is able to observe a shift from the supply-side to the demand-side, from producer to consumer and from designer to user.

**Online  
and offline  
relations  
linked**

**Self-referential  
media relations**

**Interactive  
relations**

This shift cannot be denied. However, it is also exaggerated by many observers who expect that social relationships will be turned upside-down completely. In fact, interactivity means an interplay of supply and demand. Selection, design and production remain with the suppliers; users mainly choose from preprogrammed menus. However, their choice affects the next supply and they may become suppliers themselves. Increasingly, businesses, governments and individuals alternately serve as the (co-)producers of goods, services or policies and as their consumers or executors.

**Highly  
organized  
relations**

The most important explanation for the rise of networks as a principle of organization is their combination of centralization and decentralization. In this way, the relations of the network society become better organized. In this book, it will be revealed that the 'secret' of networks is a very intelligent combination of openness and 'closedness', scale extension and scale reduction, decentralization and centralization of organization.

The use of networks as an organizational and media form is able to reduce more complexity than traditional centralist or mass media forms of organization. Therefore, old modes of bureaucratic organization and central coordination are disappearing. However, organizational control as such does not disappear. In Chapter 5 it will be argued that traditional bureaucracy is replaced by a so-called 'infocracy' that is based on ICT. We will see that networks are combining horizontal coordination and vertical control of activities.

**Coded  
relations**

As a consequence of rising complexity, uncertainty and vulnerability, social and media networks are more and more provided with programmed control and access codes. Networks of ICT in particular require all kinds of programming, codes and access barriers to prevent harmful use. This means that all relations in the network society are in fact programmed and coded more and more. This is quite the opposite of the popular view of networks as relatively informal modes of communication and decision-making. In this book, we will see that all codes used are contested and that none of them is technically neutral. Codes are instruments of power. Among others, they are defining the opportunities of personal autonomy and privacy, values that will receive much attention in Chapters 4 through 6.

**Selective and  
exclusive  
relations**

Among other reasons, the use of codes makes networks more selective in their operations, both inwards and outwards. Though they are appropriate to connect everybody and to spread information and communication in principle, they tend to lead to greater inequality in our present society and in organizations in practice. This is the trend of increasingly selective and exclusive relations in the network society.

There has always been inequality in social networks. When media networks are added to them, a new dimension of inequality is appended. The technology used is divided unequally considering physical access, the possession of digital skills and practical usage. This goes for the expensive, complex and multifunctional ICTs in particular. In the worst of cases, these digital divides (of physical access, skill and usage) might even turn into structural inequalities, as will be demonstrated in Chapter 7. Structural inequality means that differences in positions people occupy in society, in both social

and media networks, become lasting and determine to a large degree whether they have any influence on decisions made in several fields of society.

The final trend to be summarized here is the increasing insecurity of the maintenance of relations. In Chapter 7, the instability of the network society will be highlighted. This society is marked by hypes, cascades of public mood and opinion and other sudden crises because it is changing so fast. Moreover, the use of media networks makes social relations vulnerable, technically and social-psychologically. Creating trust, commitment and sufficiently information-rich communication is both a condition and a problem for social and media networks. Networks of ICTs are particularly vulnerable as technical systems, as will be explained in Chapter 5. Vital functions of our risk societies and organizations are at stake because we have made ourselves completely dependent on new technologies while we cannot call back the old ones just like that.

The use of communication networks does not only rely on vulnerable technology, but also on typically social and mental phenomena such as trust, commitment and richness of information exchanged. A lack of these characteristics also makes network communication insecure and is able to lead to its break-down. They should be available at a particular minimum level. A whole tradition of CMC research in the 1980s and 1990s, which is discussed in Chapters 7 through 9, supports this conclusion.

**Insecure  
relations**