

# The notion of Computer Based Information Services

Göran HULTGREN & Owen ERIKSSON  
*Department of computer and information science,  
Dalarna University,  
SE-781 88 Borlänge, Sweden.  
The research group VITS  
e-mail: [ghu@du.se](mailto:ghu@du.se), [oer@du.se](mailto:oer@du.se)*

**Abstract.** This paper presents a definition and a structural model of computer based information services (CBIS). The definition of CBIS is based on the “Nordic school” of service research and on Information Systems Theory.

One major characteristic of a CBIS is that the interaction in the service encounter between the customer and the service provider is performed through a computer based information system (IS). This implies that the interaction is based on automatic or interactive use situations from the view of the customer and/or the service provider. This also means that a CBIS is less situated (to place and time) compared to services which are not based on IS. In service theory it is claimed that services cannot be stored because of their situated interaction character. However, in the context of CBIS communication actions and information can be stored in databases, and as programmed instructions based on an action logic, which can be used for interaction whenever the customer need the service.

In the paper, CBIS are also described in a structural model composed of the service concept, service resources and service processes. The services processes describe, on a type level, how the service concept should be delivered and produced, and the service resources show the resources needed to do that. In this context infrastructure is a core concept because CBIS implies a strong dependency of an infrastructure in order to be developed and delivered.

## 1 Introduction

If we want to characterize the development and use of information technology (IT), a computer based information system (IS) is not the only concept that we would come up with. Today we speak of computer based information systems services (CBIS) like mobile positioning services, traffic information services or banking services on the Internet. These services are based on channels like the Internet and mobile telecommunications. With the help of these channels information and functionality are delivered by service providers, and are used by customers with the help of IS.

Saying that IS are means for delivering services is changing the way we look upon IS and the discipline of Information Systems. The discipline was defined by the use of information technology for administration. Theories and methods for the development, use, and evaluation of administrative information systems were focused upon. The old way of looking at IS is that we are dealing with technological support for bureaucratic factory organisations [1].

An important feature of CBIS is their strong dependency on infrastructure in order to be developed, delivered and used. The term infrastructure is normally used for the

stable structure of roads, harbours, railroads, airports, energy systems and telephone networks (e.g. [2]). This implies that the concept of infrastructure is often used for describing a basic physical and technical foundation for the production and delivery of products and services in a society.

To produce and distribute computer based services, a broader view of the concept of infrastructure is needed, which consists of both a *technical part* and a *soft part*. The technical part consists of a wide range of equipment, e.g. mobile units for communication, wireless telecommunication, positioning systems (GPS) and GIS-technology. The soft part of the infrastructure consists for example of information and databases, functionality that is used for accessing, manipulating and organising information, and communication standards that facilitate the communication between different actors and information systems.

Today we can also see the convergence of computers, telephones and media with Internet, and how information technology is developed to support transport and travel activities, shifting the focus from the use of information systems in offices and factories, to the use of CBIS in society and on the market [1].

In order to be able to deal with the change of focus from information systems as tools for administrative support to means for delivering services there is a need for determining what the concept of service really means in the context of IS.

The purpose of the paper is therefore to *define* the concept of CBIS and to present a *structural model* of CBIS based on Service Theory and Information Systems Theory. In the future the definition and the structural model are to be empirically tested and further developed.

The paper is structured as follows: In chapter 2 information services in general are defined. According to this view the services are produced in (physical) interaction between a service provider and a customer. In chapter 3 this definition and view of information services are put in the context of IS, resulting in a definition of CBIS. According to this view the interaction is accomplished via the IS as a medium. In chapter 4 a structural model for CBIS is presented based on service theory. Finally section 5 concludes the paper.

## 2 Information Services

In this chapter the concept of *information service* is discussed and analysed, because the notion of information service is a core concept in computer based *information services* (CBIS). In order to define information service (in section 2.3), services (2.1) and information (2.2) are discussed.

### 2.1 Services

The service sector is composed of a wide range of different types of companies and activities like transport, tourism, education, health care, security, entertainment and so on. In this section the service concept will be described from the perspective of “The Nordic School” of service research. The reason for choosing The “Nordic School” as the starting point of our discussion is that it represents an internationally well-known and accepted way of looking at the service concept.

Edvardsson et. al. [3] defines the service concept as:

”... a chain of (sequential, parallel, overlapping and/or recurrent) value creating activities or events, which form a process. In this process customer often takes part by performing different elements in interaction with the employees of the service company (other customers or equipment) for the purpose of achieving a particular result.”

From the definition we can see that a service consists of a number of value creating activities that are performed in the interaction between the customer and the service provider (service company). The customer may also interact with other customers or equipment during the service process. One important aspect stressed by ”The Nordic School” is that the service concept is described as *situated interaction*, i.e. the service is delivered and produced within the actual service encounter when the customer (physically) meets the actors who represent the service provider.

This implies that a service is situated in time and place because the customer and the service provider have to meet and interact. As a consequence the production of the service is dependent on the customer’s and the service provider’s position in physical space. It also implies that the customer and the service provider have got to have time for each other.

The description of the service concept as situated interaction implies that the production and consumption of the service is simultaneous, and that the service is co-produced. In this co-production the customer performs activities in the process, e.g. deliver information or some other input into the service process [3].

Because of the customer’s involvement services are heterogeneous. The customer’s involvement in the production process implies variation in demand, expectations, production and result. This makes it hard to standardise and control the service and implies a decentralised production process. As a consequence the service production has limited economy of scale. (see e.g. [3, 4])

To describe the service production process as *situated interaction* implies that material acts and communication are performed in the process. The service encounter also implies that actor relationships are created and maintained in the process, and that the interaction often is based on long-term relationships. In this interaction human communication is of great importance. We can also see that there is a growing interest in communication in the service area. Several researchers within the service area (e.g. [5, 6, 7]) stress the importance of communication for the service process and service quality.

Quality is a core concept in the service production process and the service is what the customer perceives in the actual interaction with the service provider when the service is produced [3]. When quality is discussed a distinction is made between the technical and functional quality [8]. Technical quality has to do with the output of the process and the functional quality has to do with how interaction is performed and the quality of the relationship in the interaction (ibid.).

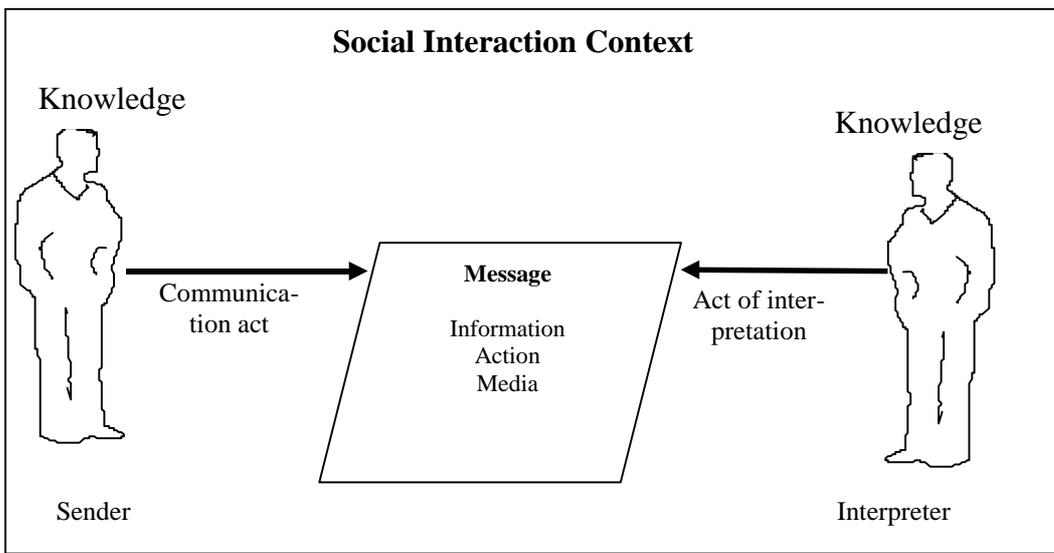
The focus upon the service as situated interaction and on the customer’s perception of the service encounter means that the service is described as an immaterial and abstract entity when compared to a physical product. This implies that it is hard to *store* a service and difficult to *evaluate* a service in advance. (e.g.[9, pp 48])

## 2.2 Information

In order to talk about information services we have got to have an idea of what the notion of information means. Information and data are two concepts that are closely related and information can be described as interpreted data. According to Langefors, information is every kind of knowledge or messages that can be used for decision-making [10, pp 257].

This implies that the notion of information is related to the notions of meaning and knowledge and that we have to analyse how information is used for communication.

If we want to analyse how information is used in communication it is important to recognize that communication does not only mean the transmission of information; it also implies *action*. This is also the main idea in speech act theory [11, 12]. In these theories, language is considered as an instrument for human communication and social interaction within a social interaction context. Typical actions performed through the use of language include: making a request, stating a fact, expressing a wish, and making a promise. According to speech act theory the meaning of a speech act has to be interpreted in a social interaction context. Auramäki *et al.* [13] define the context of a speech act to be a combination of *speaker, hearer, time, place* and *possible world*. This can be described with the help of the communication model presented in figure 1.



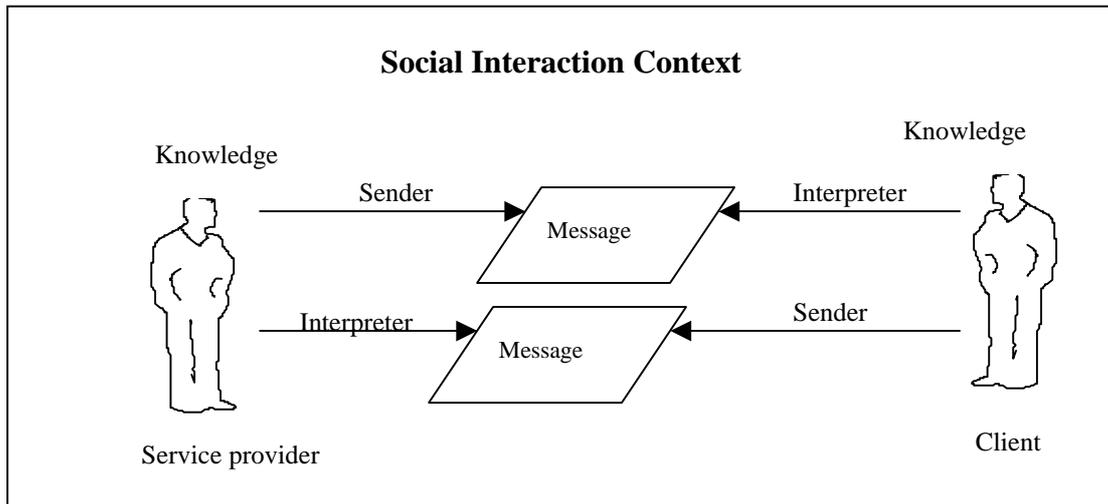
**Figure 1. A model for human communication.**

In the model the sender (speaker) performs a communication act which is communicated in a message. In the model we use the term sender instead of speaker, communication act instead of speech act, and interpreter for the listener. The reason for this is that the speech act can be performed by other media than spoken language i.e. paper documents and electronic media. The communication act is performed in a social interaction context. If the interpreter understands the communication act, the sender and the interpreter have reached a mutual understanding (knowledge about something in the world) [24]. This also means that the actors create an actor relationship based on mutual understanding (knowledge), which is or can be used for consequential actions.

### 2.3 Information Service

The discussion in section 2.1 above shows that the concept of service is described as a number of *value creating activities* performed in *co-operation* between the service provider and the customer in the *service encounter*. This implies that the service concept is described as *situated interaction*. From the discussion in section 2.2 we can see that if we want to understand the notion of information; communication performed in a social interaction context is a core concept. This implies that in order to talk about an information service we got to analyse the concept from a *situated communicative perspective*.

Figure 1 above showed the activity of performing a single communication act. However the communication that takes place when actors are trying to reach understanding can generally be described as a process where several communication acts and interpretations of these acts are performed. In this process the actors alternately take the role of sender or interpreter whilst at the same time acting their roles as social actors. This implies that if we adjust the communication model in figure 1 to the assumptions that exist in an information service context it can be described as in figure 2 below.



**Figure 2. A model for communication in the context of information services.**

The model in the figure is based on face-to-face communication. In service theory, it is stressed that the service encounter between the service provider and the customer is face-to-face. This implies that the basic face-to-face communication situation makes a good starting-point for our discussion about information services.

Based on the concept of services and information in the context of social interaction, the following definition on an *information service* can be introduced:

*An information service consists of one or several value creating communication actions performed by the service provider in a social interaction context. In this interaction the customer takes part either by acquiring knowledge and/or performing communication actions, for the purpose of achieving a particular result.*

Both the service provider and the customer can of course acquire knowledge and accomplish results in the interaction. However in service theory there is a focus on the customer and the results of the customer. That is why the service providers' acquired knowledge and results are excluded from the definition.

In the next chapter this definition and perspective is used as an important part of the concept of CBIS.

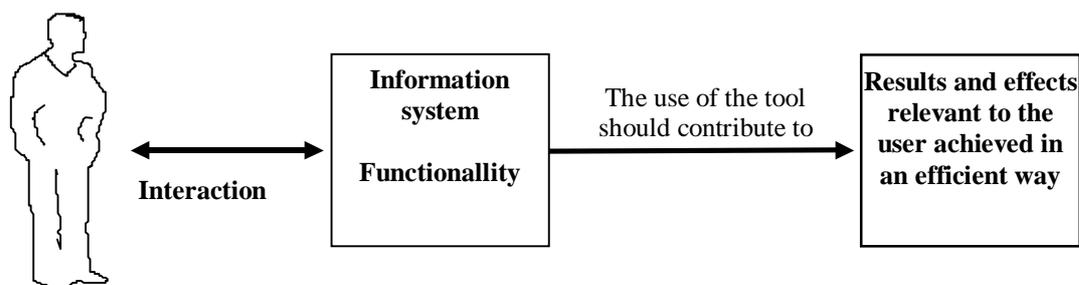
### **3 Computer based information services – definition**

In this section the concept of CBIS will be defined. The CBIS is a subtype of the information service, and based on the use of an IS as a medium. In order to talk about CBIS the concept of IS has to be described. However, the problem is that there is not just one description of the concept, there are many, and we have to choose a perspective of IS which is in line with our definition of an Information Service. The chosen perspective presented at the end of this chapter is grounded on three theories from the Information Systems area.

A classical view of IS is a functional and systems perspective of information systems grounded in systems theory presented by Langefors [10]. The general idea is that the IS is composed of a number of general functions: the input, storage, processing and output functions, which are used for the storing and processing of information, and to communicate messages. Langefors (ibid.) claims that the IS is a part of a larger business system and that the overall aim with an IS is to support the users with information, knowledge and messages which can be used for making decisions, and to solve problems in the business.

If we analyse Langefors' view of IS from an information service perspective, we can say that some characteristics are in line with our view but some are not. In our definition of an information service it says that the customer takes part in the interaction "either by acquiring knowledge, or performing communication actions, for the purpose of achieving a particular result". The part that says that the customer should acquire knowledge is obviously in line with the representative view of IS. However, there are other characteristics that are not. The most obvious is that the representative view of IS is not based on a situated interaction perspective, which is the basic perspective in our definition, so we have to look elsewhere for such a view of IS.

A frequently used perspective on IS, which is based on situated interaction, is the *tool perspective*, and in the tool perspective the concept of usability is central. For example in HCI-research the User-Tool-Task model [14] is used. According to this model usability is something that is created in a *use situation* where the *user*, *tool* and *task* are brought together. The tool is the computer together with the functionality of the system. The idea is that there is a functionality built into the system (the tool) that can be used by the user to accomplish user tasks. This implies that it must be possible for the user to do the right things with the tool. The tool must also be flexible and it must be easy for the user to learn how to use it. The tool should also contribute to the efficiency and productivity of the user (figure 3). The discussion about usability is focused on the inter-action between the user and the system.



**Figure 3. A tool perspective of information systems.**

The advantage with the tool perspective is that it:

- is focused upon the situated interaction between the user and the system;
- describes the IS as a personal flexible tool that should be adjusted both to the actor and the context where the system is used,
- shows that the system is used for activities in order to accomplish a result (a task).

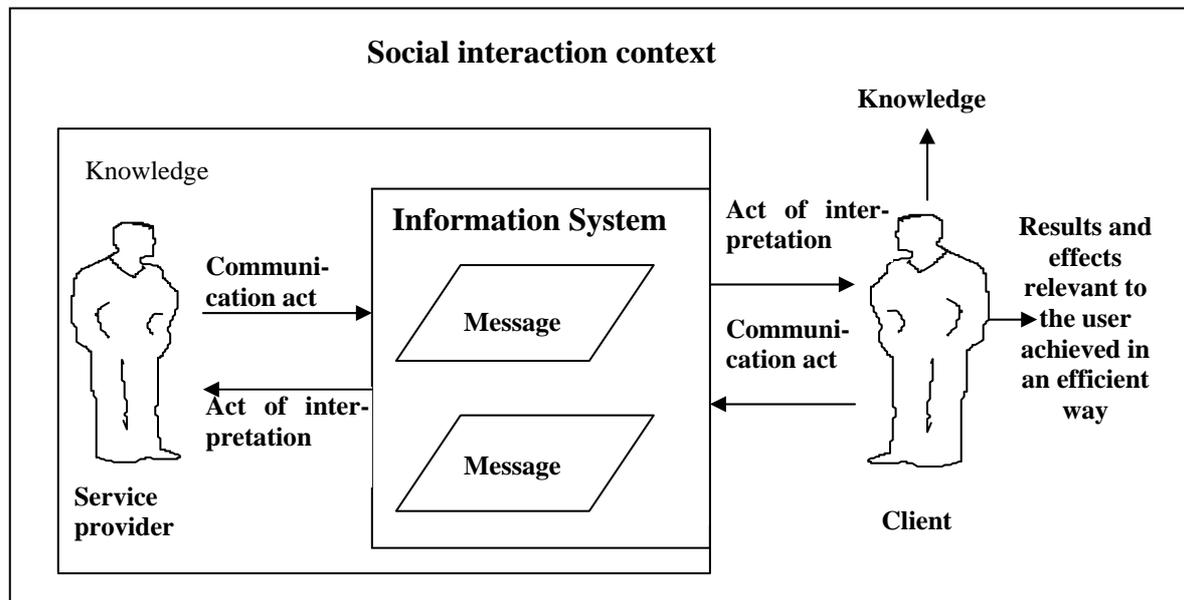
This is in line with our *situated interaction* perspective. However, there are also some problems with the tool perspective. One problem is that it does not focus upon concepts like *information* and *communication*, which are central if we want to understand the notion of CBIS. This is a problem because IS are not only technical tools that are used by individual users, they are also social tools used for communication in a social interaction context. Therefore we have to look further for a view of IS that is based on a social interaction perspective.

A social interaction perspective of IS is represented by the authors of speech-act theory (e.g. [13, 15, 16]). In these definitions IS are regarded as systems used for *performing speech acts* (communication acts). Ågerfalk et. al. [17] have presented an *actability* view of information systems, based on the idea that IS are action systems used for performing speech acts. The definition of actability is described like this (Ibid.): “An information system’s ability to perform actions and to permit, promote and facilitate users to perform their actions both through the system and based on messages from the system, in some business context”.

An IS has a dual action character; it can be used [17]:

- for performing *automatic* communication actions independently of the users but on assignment of the user;
- to *interactively* perform communication actions towards the IS.

Such a perspective of information systems is in line with our view of information services as situated interaction and, furthermore, it is based on the idea that IS are used for performing communication actions. However in the context of CBIS the focus on the informed customer and the IS as a tool (a medium) have to be strengthened in relation to the actability perspective. This can be illustrated with the help of figure 4 below.



**Figure 4. A model for an information system in the context of information services.**

In the context of CBIS, the social interaction between the service provider and the customer is performed *through* the IS. As a consequence the concept of social interaction has to be reinterpreted in that context. The fact that the interaction takes place through the system implies that the IS can be used *automatically* or *interactively* from the view of both the service provider and the customer. This implies that the service provider and the customer do not have to meet in time and space.

We can conclude our discussion about CBIS in this section by presenting a definition on CBIS based on our definition of information service (presented in section 2.3), and on the chosen view of IS:

*A computer based information service presupposes a computer based information system which is used by the service provider to perform value creating communication actions in a social interaction context. In this interaction the customer takes part by using the system to acquire knowledge, and/or performing communication actions through the system, for the purpose of achieving a particular result.*

## 4 Computer based information services - structure

The aim of this chapter is to outline a structure for CBIS based on Service Theory and Information Systems Theory. The point of departure is a structural service model in service theory that will be adjusted to the context of CBIS. The structure is outlined in order to be used in analysing CBISs.

According to service theory (e.g. [3, pp120-122]) the service structure can be viewed in a model composed of three components: service concept, service process and service resources. Service concept refers to the overall description (from the view of the service supplier) of the service offer in relation to customer needs. Service process shows the chain of activities that have to be performed in order to realise the service concept. In the service process, the customer participates as a co-producer. The service system refers to resources necessary to perform the service, like customers, organisation, IS, physical and technical resources, staff and management.

In chapter 3 it was shown that CBIS might affect the time and space dimension. In service theory the service encounter between the service provider and the customer implies constraints because they have to meet at the same time and place. This physical time-space constraint can be changed and overcome in the context of CBIS, because the IS can be used for delivering the service.

Figure 5 below shows a tentative structure for a CBIS based on the three components: service concept, service process and service resources. The model has been re-interpreted and adjusted due to the special characteristics of CBIS.

The service provider is to attain the service concept by virtue of the service process utilizing the system resources. These three components in the structure are described and further explained below.

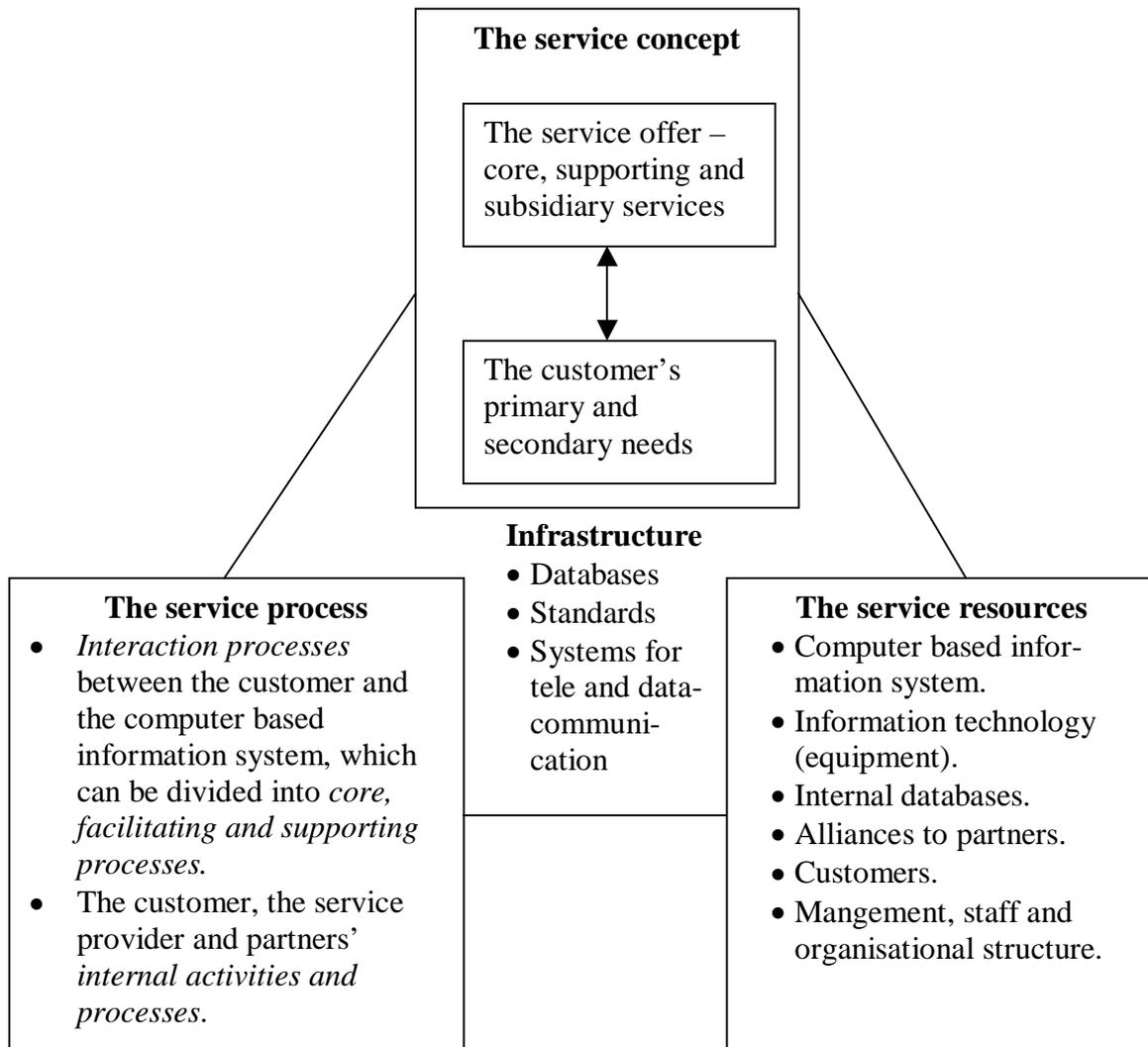
### 4.1 The service concept

According to service theory, the service concept is a description of customers' needs and the service offer [3, pp 47]. *Customer needs* are based on the division between primary customer needs and secondary needs (Ibid.). The *service offer* is based on three types of components or sub services as parts of a service package (e.g. [8, pp13]):

- *Core services* constitute the fundamental cause of the existence of the service. In a flight the core service constitutes of the transfer of a person from place A to place B.
- *Facilitating services* are essential services that make it possible for the customer to consume the core service. In the flight example check-in services are needed to make it possible for the customer to be transferred.
- *Supporting services* add to the service package in order to make the service more attractive to the customer. In the flight example the service on board and fast transports to and from the airport can be examples of supporting services. Supporting services are means for competition.

The customers' primary needs are related to the core service, and their secondary needs to the support services.

At the *instance level*, a service is what the customer experienced during the service encounter [3, pp 42]. This implies that a service is based on the experiences of a specific customer in a specific situation. At the *type level* the total service offer or a sub-offer are focused on from the view of the service provider.



**Figure 5. The structure of a CBIS.**

In the context of CBIS the service concept concur with the corresponding meaning according to the service theory. Primary and secondary needs should be related to the core service and to support services. Facilitating services ought to harmonize with the service package or (better) be invisible for the customer.

Table 1 defines the service concept for an Internet-based personal insurance consultancy. In the CBIS example in the table, primary and secondary customer needs are related to core service and supporting services. A facilitating service is related to the service providers' need for customer information.

From the type level the service concept of a CBIS, like the one in table 1, can be viewed as the complete offer and a readiness (from the view of the service provider) to produce and deliver the service to a number of customers. The core service and the support services specified can be considered as sub services and be viewed from a subtype level.

On the instance level the service concept implies a specific customers view and his experiences of the received (specific) service. The sub services are the ones the customer is actually using, and the total perceived experience of the service encounter is important for the quality of the service.

**Table 1. An Internet-based personal insurance consultancy – the service concept.**

Core service	which meets	primary customer needs
Consultants about appropriate personal insurance.	—————→	To get trustworthy advice about appropriate personal insurance.
Supporting service	which meets	secondary customer needs
Advice about the most suitable insurance company.	—————→	To get trustworthy advice about which insurance company to choose.
Support when providing medical declaration.	—————→	To get help completing the medical declaration faultlessly and easily.
Handling of application and contact with the relevant insurance company	—————→	To get help with taking out an insurance policy.
Facilitating service	necessary for the	service provider
Compile the customer's personal profile.	—————→	Relevant information about the customer.

#### 4.2 The service processes

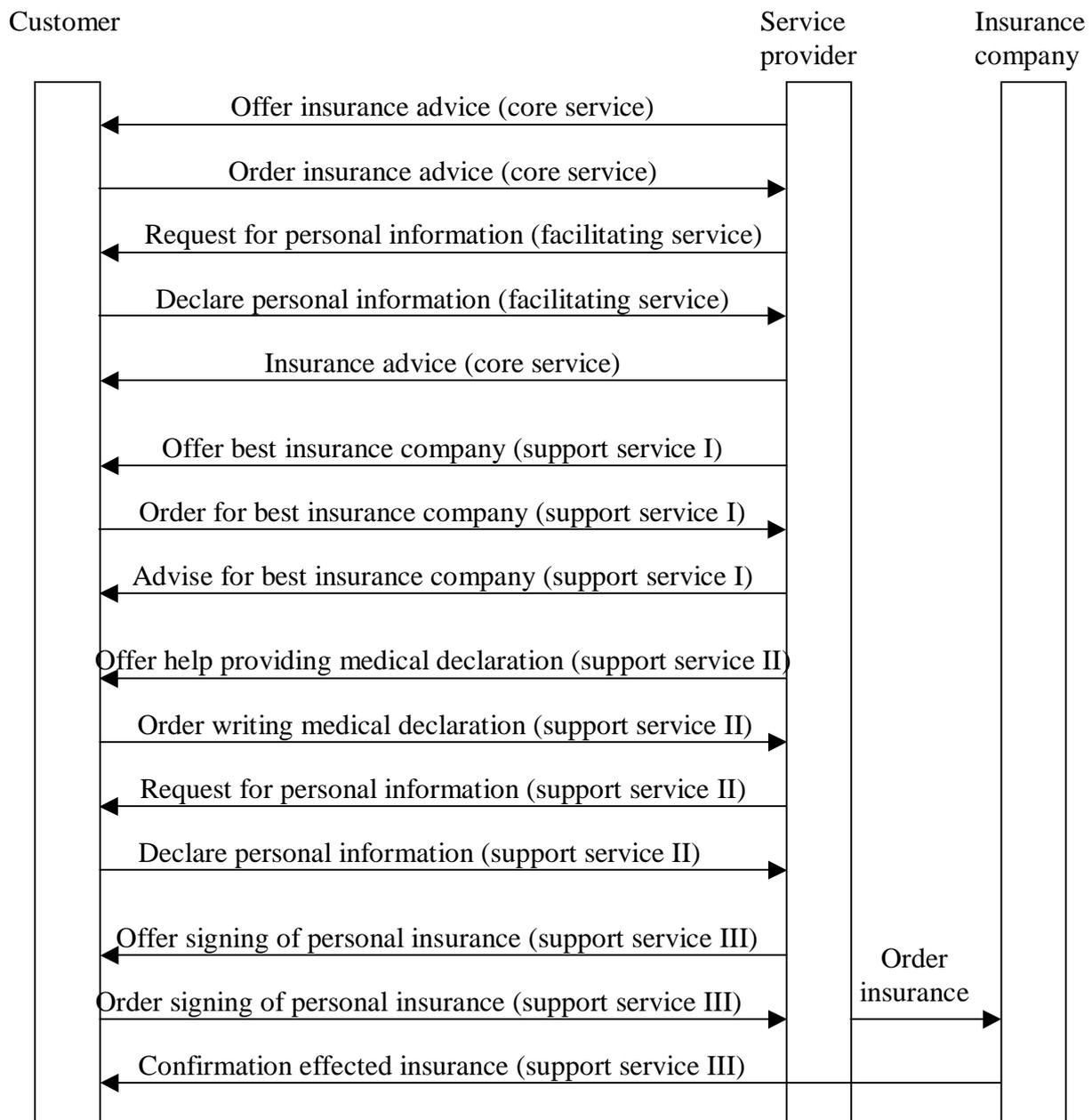
The service processes constitute, together with the service resources (described in the next section), the requirements of the service provider to realize the service concept. The service processes can be described as a chain (or parallel chains) of activities. The service processes utilizes the service resources.

According to service theory the services are produced and delivered in an interaction between a customer and a service provider. The customer processes and the service provider processes are regarded as separate from each other as generic customer and supplier processes. The customer is a co-producer and the service *is* what the customer experienced. A service is then *situated interaction*.

The service process ought (as a consequence of service theory) to be regarded both from the type level and from the instance level. From the type level the service process is composed of complete readiness, i.e. prepared prerequisites for action to produce and deliver a service concept for a number of customers. On the instance level the service process is composed of a specific service process where a specific service has been produced, delivered and experienced by a customer in interaction with a service provider.

The service process can be viewed as a composition of several sub processes where the interaction between the service providers' information system and the customer are in focus. Several core, facilitating and supporting processes can be identified, which provides important prerequisites for corresponding core, facilitating and supporting services.

The subject field of Information Systems provides several methods for describing actions from a process perspective. To focus on the interaction between the service suppliers' information system and the customer, i.e. actions directed towards each other, interaction diagrams [18] can be used. The interaction for the Internet-based personal insurance consultancy is exemplified in figure 6 below. In the interaction diagram communication actions have been focused upon for all sub processes (i.e. all core, facilitating and support processes) that are prerequisites for the service.



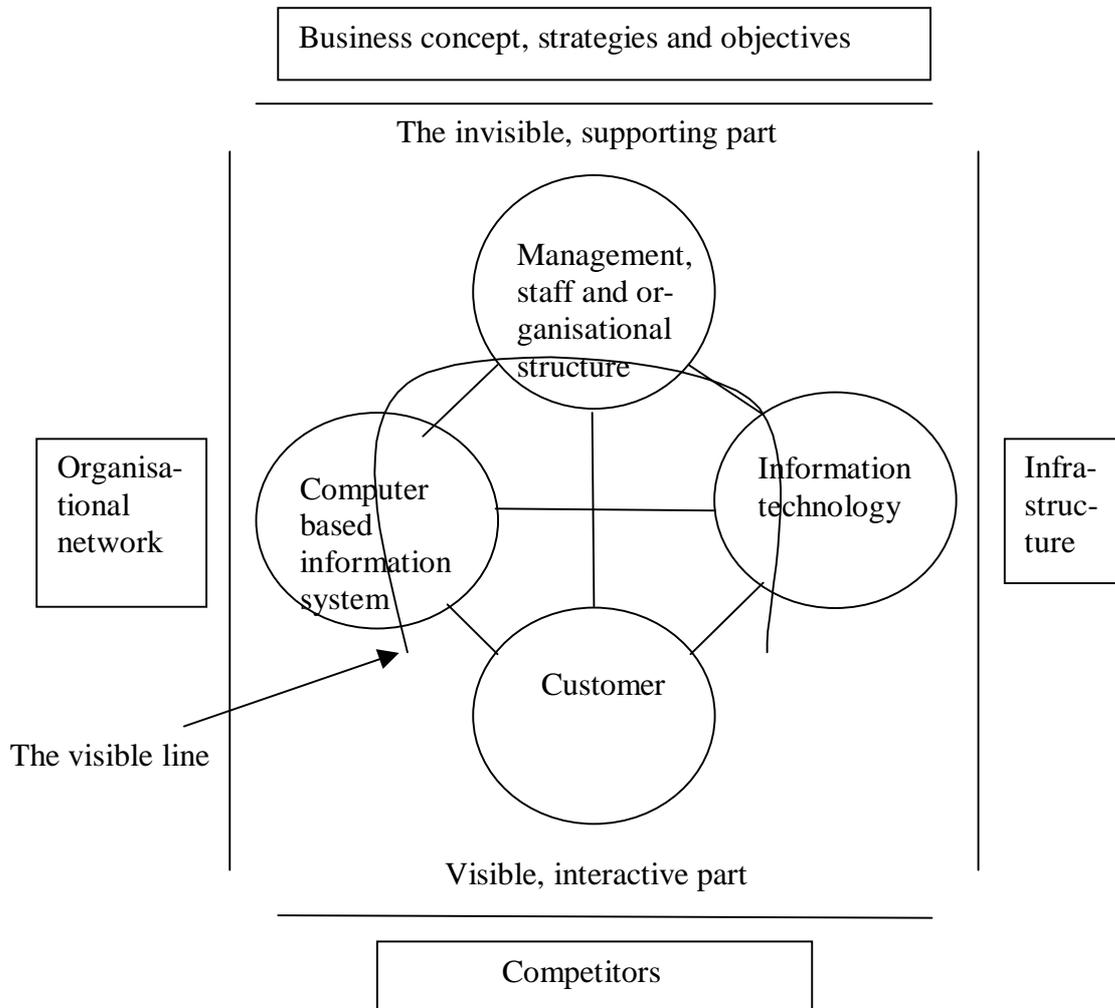
**Figure 6. Interaction diagram for the Internet-based personal insurance consultancy.**

### 4.3 The service resources

The service system resources, along with the service processes (which were described in section 4.2 above), constitute the service provider's requirements to realize the service concept.

According to service theory elements of service resources are: organisational structure and systems, management and staff, technical resources and physical products, customers as co-producer, business concept, strategies and objectives and competitors and infrastructure. The service system resources can be divided into a visible (interactive) part and an invisible part (back-office) in the eyes of the customer [3, pp 48].

In the context of CBIS, the IS and information technology (with regard to equipment) are characteristic resources. The visible part (or sensuous part) is a matter of interaction between the customers and visible parts of the IS. These parts constitutes by the *functionality* and *information* which are possible to use with the help of the IS. Visible technical equipment in the interaction between the supplier and the customer are included in this interactive part. In chapter 3 (figure 4), our view of the situational interaction was outlined. The resources are illustrated and further explained in figure 7 below.



**Figure 7. The service system resources for CBIS. Source: Reinterpretation from Edvardsson [19].**

*Management, staff and organisational structure* are almost invisible for the customer because the IS constitutes the interface between the customer and the service provider. A CBIS is often delivered and produced in the context of an automatic use situation, from the view of the service supplier.

A *computer based information system (IS)* is the basic prerequisite for the CBIS, and the user interface constitutes the major part of the visible line between the customer and the service resources. The IS contains the functionality and information available to the customer.

*Information technology resources* refer to equipment used as prerequisites for the CBIS like computers, terminals, servers, networks, mobile phones, operating systems and the web browser.

*The customer* is placed between the visible part and the competitors in the model. Customer technology has to be adapted to the demands of CBIS, i.e. it has to be compatible with the IS.

*Business concept, strategies and objectives* ought to guide management and staff as support for the CBIS. The significant quality here is the intention to further service development and systems administration.

*The infrastructure* is mainly outside the visible for the customer. The IS and the information technology that is used (equipment) have to be adapted to the infrastructure. To take advantage of existing infrastructures is vital to a CBIS. An infrastructure is characterized by its enabling function, its shared use and its open structure [20, pp 200]. An infrastructure is both heterogeneous and complex (Ibid.). The concept of “soft infrastructures” [21] can be used to emphasize important infrastructures in the context of CBIS, like public databases, distribution channels, payment systems and geographical information systems.

*Organisational network* refers to the surrounding (external) networks that are needed by the service provider in order to reach external resources and infrastructure. The organisational network is then the means of accessing necessary resources that the service provider doesn't have on its own. To become a member of an organisational network is about collaboration and adoption [22]. In order to become a strong actor in an organisational network, the concept of virtual organisations [23] can be a guideline for the service provider.

The service resources for the Internet-based personal insurance consultancy are exemplified in table 2 below.

**Table 2. The Internet-based personal insurance consultancy – the service system resources.**

<i>Resource category</i>	Visible for the customer	Invisible for the customer
<i>Management, staff and organisational structure</i>	The brand of the service provider, web master, who is legally responsible etc.	Management, system administrator, support and the organisational structure.
<i>The computer based information system (IS)</i>	Functionality and information via the interface. Some of it can be internalized from the infrastructure (e.g. insurance information from an insurance company).	Code, databases etc.
<i>Information technology (equipment)</i>	The web browser and the customers' terminals (clients). Some of the equipment can be internalized from infrastructure through co-operation.	Servers, internal networks etc.

## 5 Computer based information services – conclusions

In the paper, we have argued for a *definition* of CBISs based on the “Nordic school” of service research and an actability view of information systems supplemented by aspects from Langefors' view of information and from the tool perspective of IS. Based on this definition, a *structural model* has been presented which can be used for analyzing CBIS. The aim has been to present a tentative result to be used and further elaborated in empirical

studies. To accomplish the definition and the structure, ideas from the subject fields of services and information systems research have been combined.

The aim of the paper has been to investigate if Service Theory and Information Systems theory could be used together in order to understand the concept of CBIS. According to our opinion the answer is yes to that question. The main reason for this is that the service concept is described as *situated interaction* in service theory, and a situated social interaction perspective of services is well in line with an actability perspective of IS which is the main perspective in the view of IS. The idea both in service theory and actability theory, is that the quality of a service, or the quality of an IS is created in a situated interaction context. The tool perspective gives additional focus on the situated interaction.

The concept of CBIS implies new constraints, possibilities and insights both in the subject fields of services and information systems. According to service theory a service is situated in time and place because the customer and the service provider have to meet and interact, and this creates problems. A possibility with CBIS is that the time and space restrictions of the service encounter can be changed, because the IS can be used for delivering the service through the IS. In service theory it is also claimed that services cannot be stored because of their situated interaction character. However in the context of CBIS communication actions and information can be stored in databases, and as programmed instructions based on an action logic, which can be used for interaction whenever the customer need to interact. This means that the presumptions for the interaction and service can be stored in the system [17].

In the discipline of Information Systems the view of IS as means for delivering services will change the way we look at the development process. The traditional view is that IS are specified and developed in an in-house development process that involves users. This is different compared to the development of CBIS because it should be possible to deliver CBIS anywhere and anytime based on the customers time and location, e.g. in the home, in the car or on the street. This implies a strong dependency of an infrastructure in order to develop and deliver CBIS. As a consequence the development of CBIS has to take place in a complex inter-organisational network market context. The reason for this is that there is no single actor who controls the infrastructure, and furthermore the development has to be made for *assumed* customers.

The inter-organisational focus needed when developing CBIS involves also contributions to the discipline of Service Theory where Service development usually is viewed as internal activities at the service provider.

## References

- [1] Dahlbom, B. (2002). *From systems to services*. [www document] <http://www.viktoria.se/~dahlbom/get/getContent.php3?style=./config/styleNEwin.css>.
- [2] Gurlanik, D.B. (ed.) (1979). *Webster' New World Dictionary of the American Language*. New York: The World Publishing Company.
- [3] Edvardsson, B., Gustafsson, A., Johnson, M.D & Sandén, B. (2000). *New service development and innovation in the new economy*. Lund: Studentlitteratur.
- [4] Zeithaml, V., Parasuraman, A. & Berry, L. (1985). Problems and strategies in service marketing. *Journal of marketing*, vol 49, No 1, pp 34-46.
- [5] Gummesson, E. (1995). *Relationsmarknadsföring: från 4p till 30 R*. Malmö: Liber ekonomi.
- [6] Grönroos, C. (1996). *Marknadsföring i tjänsteföretag*. Malmö: Liber-Hermods.
- [7] Zeithaml, V., Parasuraman, A. & Berry, L. (1990). *Delivering quality service : balancing customer perceptions and expextations*. New York: Free Press.
- [8] Grönroos, C. (1998). *Service marketing theory – back to basics*. Swedish School of Economics and Business Administration, Helsingfors, Finland.

- [9] Grönroos, C. (1995): The rebirth of modern marketing: six propositions about relationship marketing. Meddelanden från svenska handelshögskolan. Helsingfors: Finland.
- [10] Langefors, B. (1966). *Theoretical analyses of information systems*. Lund: Studentlitteratur.
- [11] Austin, J.L. (1962). *How to do things with words*. Oxford: Oxford University Press.
- [12] Searle, J.R. (1969). *Speech acts – an essay in the philosophy of language*. London: Cambridge University Press.
- [13] Auramäki, E., Lehtinen, E. & Lyytinen, K. (1988). A Speech Act Based Office Modeling Approach. *ACM Transactions on Office Information Systems*, 6(2), pp. 126-152.
- [14] Schackel, B. (1984). The concept of usability. In Benneth, J., Case, D., Sandelin, J. & Smith, M. (eds.), *Visual Display Terminals: Usability Issues and Health Concerns*, Englewood Cliffs.
- [15] Winograd T., Flores F. (1986). *Understanding Computers and Cognition - A New Foundation for Design*. Reading: Addison-Wesley.
- [16] Dietz, J.L.G. (2001). DEMO: Towards a Discipline of Organisation Engineering. *European Journal of Operational Research*, 128(2), pp. 351-363.
- [17] Ågerfalk P., Goldkuhl G., Cronholm S. (2001) Actability Design – Developing IT-systems for Business Action, Version 1.0.
- [18] Christansson, M.T. (1998). Inter-organisatorisk verksamhetsutveckling – metoder som stöd vid utveckling av partnerskap och informationssystem. (Licentiatavhandling). Avhandling 16, IDA, Linköpings Universitet.
- [19] Edvardsson, B. (1996). *Kvalitet och tjänsteutveckling*. Lund: Studentlitteratur.
- [20] Hanseth, O. (2000) Infrastructure. In Braa, K., Sorensen, C. & Dahlbom, B. (2000). *Planet Internet*. Lund: Studentlitteratur.
- [21] Statskontoret (1999:40). Informationstjänster i fokus. Elektroniska informationstjänster och mjuk infrastruktur i Sverige.
- [22] Håkansson, H. & Snehota, I. (1995). *Developing relationships in business networks*. London: Rotledge.
- [23] Hedberg, B., Dahlgren, G., Hansson, J. & Olve, N.G. (1997). *Virtual organization and beyond: discover imaginary systems*. Chichester: Wiley.
- [24] Habermas, J. (1984). The theory of communicative action. Volume One. *Reason and the Rationalization of Society*. Boston: Beacon Press.