Using information systems for collaboration in a network society

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Abstract. Based upon 11 assumptions a research program is described aiming at support for a network society. An increased focus on business processes will lead to increased outsourcing. Development of web services will make it possible for business processes oriented towards legacy issues to be carried out almost automatically. The semantic integration and the enterprise application integration are key issues in this process. As a result we might achieve a network of small units working together on occasional base. Seeing communication acts and solidarity as the unifying force in society an increased attention to value matters is identified. This goes hand in hand with the post modernistic orientation towards personalisation and customer orientation. The main asset in this new network society will be the personal experience, which thus requires some sort of support system.

1 Introduction

In the "Call for papers" to this conference it is written: "*Are we at the edge of a new wave of information systems development facing new application performance requirements and managerial challenges?*" The question might seem provoking, but we have a much greater challenge: *Can information technology be used as a vehicle for creating a new and better society*? This is a more bold, offensive and normative approach to the question about new technology and new ways to develop use of this technology. Can we indicate a positive answer to the latter question; then we have in fact answered the first question in a stronger way than it was put. A new way of information systems development can be used for creating and supporting new organisations, new working styles and even be a driving force in a new "Network Society" (Castells 1996, 1997, 1998). In this paper, some indications will be provided, indicating that the answer to the second question is positive.

The paper is not a conventional research paper. It is rather a description of a research program, which perhaps should be carried out on nationwide base. The method used is mainly a conceptual-analytic approach according to Järvinen (1999), but presented in a form resembling theory testing. The main result will be a normative approach, an indication of using information technology as a tool in this revolutionary process. The method has also certain elements of artefact construction, mainly as artefact pre-evaluation, if we consider "a better society" as an artefact. Using Habermas' theory for a reconstruction of society based upon communicative acts indicates these possibilities.

2 Initial assumptions

For many years, community researchers such as for instance McLuhan, Toffler, Habermas and Castells have indicated a new revolution in our society; a revolution comparable to the industrial revolution. The new society that would emerge, the third wave according to Toffler, I will call the *network society*, based upon Castells (1996, 1997, 1998) ideas. However I will concentrate my discussions on the business world.

As a starting point I want to describe a traditional business process as it is described in many textbooks, as for instance Reynolds (1998, chap 6).
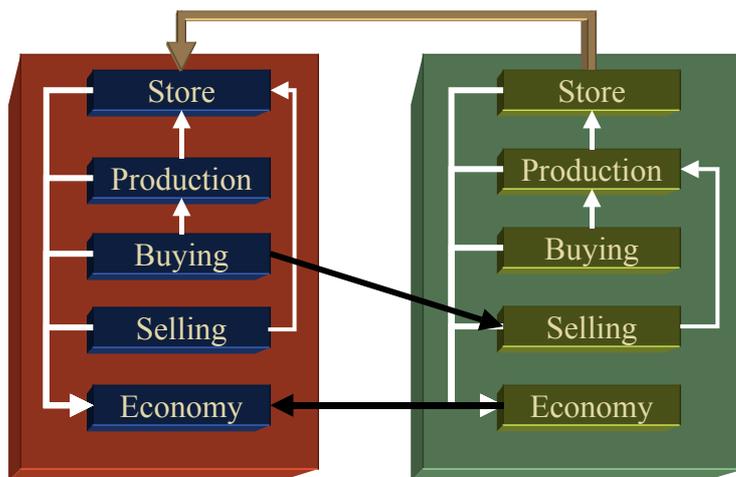

Figure 1. Traditional business processes is carried out in a functionally oriented organisation. The internal transactions costs are cheap, but contacts outside the organisation are expensive. Therefore, the goal is to minimise them and do as much as possible within the own organisation. We have a Weberian bureaucracy.

Company Left will buy something from company Right (figure 1). The buying department sends a letter with the order to the selling department of company Right. They send a letter back, acknowledging the order and saying when they think it can be delivered. In order to get this date, they must first ask the production department about the capacity etc. The production department have to ask the store if they by chance have any of the desired items in stock, if not they have to be manufactured. If so, material and other supplies must be bought, so the production department ask the buying department to carry this out. Eventually and in due time the items are manufactured by company Right and delivered to company Left. A little later the economy department of company Right sends an invoice to the economy department of company Left. This invoice is based upon

economical reports delivered regularly during the production process. Both company Left and company Right have probably sophisticated and computer-based information systems, taking care of the information processing within the companies. But as soon as information is transferred outside the company, human beings are involved. This costs a lot so as a general trend, we see a maximisation of transactions within the company and minimisation of transactions between companies. One reason for this is transaction cost. Using internet and e-commerce is supposed to reduce it (Benjamin & Wigand, 1995). It is however not consensus about this. For instance Rose et al, (1999) argues that the major benefits of the Internet may not be the network as a cheap carrier of transactions. Rather, they relate to production efficiencies many times larger than the size of the transaction costs in most organizations.

In any case, when internet became available to the companies it was possible to exchange information between them at almost no cost and with strict control. One implication of zero cost transactions is that all functions dealing with information processing can be performed anywhere on earth. One implication is that the business processes, at least in part, can be designed irrespective of organisation borders. (van der Aalst, 2000). This opens up for many new opportunities and the organisations can be highly specialised as indicated in figure 2. The business processes can also be separated from the organisation and stored in a central business process repository (Metz, 2001, Willaert, 2001).
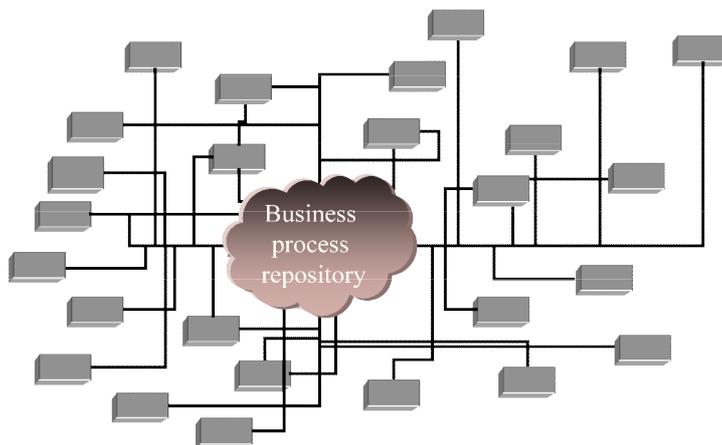

Figure 2. If transaction costs are reduced to almost zero, we are not bound to the traditional organisation, but can instead organise the work according to the business process. In fact the business process per se can be designed different for to every transaction. The web services help to identify reliable vendors and suitable business processes. We have highly specialised units and extremely flexible processes

An absolute prerequisite for e-business is the possibility to transfer information between the companies business systems, which by no means is any trivial task (Bouzeghoub, M, Lenzerini, 2001) *System integration, information mapping* is increasingly more important. The main obstacle for integration is the semantic differences (Embury et al, 2001). These are supposed to be solved by standardisation of the business process, but that possibility is in my mind doubtful, since the customers demand personalised service (Keen, 2000). Standardisation can certainly be possible at the component level, but not for the whole business process.

In order to make e-business B2B easier so called *web-services* emerge (Metz, 2001, Willaert, 2001, White & Hall, 2000, Ströbel 2001). These are web-based services carrying out a small part of a business process in order to making reliable B2B. There are lots of them and vendors fight in order to make to market accept their standard. In the end, say in about ten to five years, most basic business might be carried out automatically and it may be outsourced to specialized companies (Hooft & Stegwee, 2001).

The result might be a set of highly specialised organisations, everyone doing only a small part of a business process. We also have possibilities for very flexible design of the business processes; in fact, it can be changed for every individual transaction or even changed during the execution.

The mere idea of ebXML and UDDI is based on a business process model as in figure 2. It does not mean it is widely adopted or even accepted, but the big actors, such as IBM or Microsoft, within the area seem determined to support a similar business process model.

The type of work carried out in figure 2 is either some sort of knowledge work or production work (Kühn Pedersen & Holm Larsen, 2000). Due to increased capacity in the logistics systems we have for some years seen an increased amount of subcontractors as well as higher demands are put on them. In knowledge work we have not seen the same phenomenon except for in selected areas such as "programming around the world". There might be some cultural and legal issues as obstacles for hiring support from the other side of the world, but bodies from the right cultural and national sphere might, in my opinion at least, have a competitive advantage due to low costs and high specialisation. In certain lines of business, such as the music production industry, we see this kind of organisation; small groups working together in occasional projects. The underlying rationale is to understand the actions of the buyer and seller, and the longitudinal development of their relationship. This network perspective has recently attracted considerable attention. (Anderson et al 1994, Axelsson & Easton 1992, Möller & Wilson, 1995, Webster, 1992, Keen, 2000).

As I have tried to argue above there might be kind of a revolution going on within the business systems area. We see a development towards network-based business, concentrating on building relations and creating values for the customers. Based upon this development we can foresee basic changes in our society. I will, based upon the arguments presented above assume the following about our new society, which I call "the network society":

1. In the network society the old function-oriented view on organisations is replaced by a view focusing on business processes.
2. This change will lead to increased outsourcing and to small organisation working together on occasional base.
3. Moving information from one system to another (Enterprise application integration, EAI) will be one of the key problems in systems development the next few years.
4. The key problem in EAI is in the semantic integration.
5. Business in the network society is customer oriented.
6. Business in the network society is oriented towards value creation and establishing relations.
7. Business processes oriented towards legacy issues can be carried out almost automatically in the network society, giving more time for establishing relations and creating values.
8. In the network society, there is more need for personalisation.
9. In the network society, communication and solidarity will be the main uniting forces.
10. Personal experience will be the main asset in the network society.

The two last assumptions need to be discussed and argued more. Concerning assumption no 9 my main arguments is fetched from Habermas, Concerning no 10, I have to relay upon my own ability to convince.

3 Communication and solidarity as main uniting forces

The assumption that in the network society communication and solidarity will be the main unifying forces is the most crucial one and on the same time the most subjective and based on a certain world view. My ideas are based upon Habermas and his theory about communicative actions (Habermas 1984, 1988). One reason is that he tries to develop a holistic theory of society covering all aspects, inclusive the theory itself. Another candidate could have been Castells, who has developed a similar theory; the difference is, in my mind, that Habermas' theory is based upon a much stronger normative framework. Castells has wonderful analysis and explanations, but not that strong ethical imperative as Habermas has. Another reason for choosing Habermas in favour of Castells is that Habermas base his theory on communication and communication acts, which is at higher abstraction level than Castells who talks about technologies.

Habermas' starting point for the analysis is the three knowledge interests identified by him (Habermas 1972): *Technical, practical and emancipatory knowledge interest.*

Jürgen Habermas

Technical knowledge interest refers to the way one controls and manipulates one's environment. Habermas call actions within this field *instrumental action* - knowledge is based upon empirical investigation and governed by technical rules. The criterion of effective control of reality direct what is or is not appropriate action. This knowledge interest is also associated with work. Applied to information systems this type of knowledge refers to the control dimension (Flensburg 1986).

The *practical knowledge interest* identifies human social interaction or simply communication between people. A meaningful communication requires mutual understanding of intentions between individuals. This kind of understanding is not possible to formalize or describe in formal languages; they constitute the social *praxis*, which to a great extend is tacit. It can be investigated and understood by using social science methods such as hermeneutics, ethnography etc. Applied to information systems we see a lot of research aimed at explaining and understanding why a certain phenomenon is at hand.

However, when you understand a phenomenon you have a tendency to *accept* the phenomenon, to accept the current state of affairs. For social sciences, this is perfectly OK, they strive to explain and understand, but for a design science, as information systems development, it is not enough to understand. Habermas (1972) identified this kind of knowledge interest as *emancipatory knowledge interest*. Emancipation is from organisational or economical forces, which have been taken for granted as beyond human control. Knowledge is gained by self-emancipation through reflection leading to a transformed consciousness, perspective transformation and emancipation from oppression. Examples of critical sciences include feminist theory, psychoanalysis and the critique of ideology, according to Habermas. In my opinion, it should also apply to informatics, since we deal with creation of genuine new business systems.

Based upon these three knowledge interests, Habermas tries to find a theory for design of the society, in the meaning that it should emancipate the people from established and oppressing

structures. He warns for using science as a pure technical knowledge interest, and goes back to Aristotle and his way of distinguish between *techne* (technical knowledge) and *phronesis* (wisdom). But Habermas realises that epistemology is based upon how the single person gain knowledge, while it takes many people to create a society. He thus turns his focus to mechanisms for establishing or creating societies and ends up with the language as the most basic phenomenon in establishing a society.

Habermas means that we human beings lives in three worlds, which in everyday life are united:

> *The objective world*, dealing with facts
> *The social world*, dealing with norms and values
> *The subjective world*, dealing with feelings and hopes

Our relation to the objective world is based upon *correctness* (Flensburg 2001), to the social world upon *norms* and to the subjective world on *expressions*. We use the language to say that something is *correct* (corresponding to facts), *right* (in accordance with accepted norms) or *appropriate* (in accordance with subjective experience and feelings). Habermas (1984) now means that the whole process of arguing about the facts, rights or appropriateness is the deepest meaning of language; it serves as a vehicle for us to agree, to understand and to accept each other. Thus, language is the vehicle for designing a society and speech acts are the manifestations of this design. Speech act theory was originally formulated by Austin (1962) and later refined by Searle (1969), Habermas (1984) and several other scholars. Speech act theory has also been subject for a series of conferences (LAP, arranged yearly) within informatics. We even have a PhD-thesis by Owen Eriksson (2000) seeing communication quality of information systems and business processes in the perspective of speech act theory and Habermas. The fundamental speech act thesis is that speech should be seen as a special kind of action; it is not just describing the world, it is also creating (i.e. designing) the world.

Besides the three worlds described above Habermas also identifies two other worlds, partly overlapping and that is the *systemworld*, a concept fetched from system theory, and the *lifeworld*, a concept fetched from phenomenology. In the *systemworld,* peoples acting are coordinated through power and money; here we have system integration. In the *lifeworld,* the coordination is done through social integration and shared values. Information system designers deals normally exclusively with the *systemworld*, but the result of their action, the information system, also influence the *lifeworld* of its users. Habermas (1984) also notes that the *systemworld* seems to spread over to the *lifeworld* and dominate it. However, he notes that it is within the *lifeworld* the possibilities for integration and reconstruction of society exists and he takes a clear standpoint against too much *systemworld*, too much instrumentalism. In this standpoint, I agree.

For now I will stop my argumentation in this issue, I realise much more is needed and in due time more reports will be written. Let me just give some examples where even non-scientific authors support my ideas. Kelly (1998) is talking about virtual communities, saying that the general concept of virtual communities is to gather people and make them communicate. She gives in fact a strong support for Habermas in saying: "Communication is the foundation of society, of our culture, of our humanity, of our own individual identity, and of all economic systems". In the internet magazine E-Commerce Times, Ryan (1999) argues that the lifeworld even in business will play a greater role: "As the online retailers take the consumer further away from the familiar human interaction, the demands on merchants to provide a human-scale experience grow".

4 The personal experience in the network society

The main aspects of this new network society should be value creation, customer orientation and personalisation. The importance is not on selling things, but on creating value. In achieving this, knowledge is an important resource. As Nilsson (2000) writes:

> In our contemporary society, physical resources are considered being of minor importance for creating and sustaining competitive advantage. Instead, it is the IC in general and knowledge in particular that is considered being the assets in order to reach sustainable competitive advantage (see e.g. Drucker, 1995; Nonaka & Takeuchi, 1995; Quintas, Lefrere & Jones, 1997).

The main interest will, in my opinion, not be in increasing efficiency in the business processes, but instead in making information available for intelligent use by human beings. This is called "*content management*" a new buzzword arising among the actors on the market. If these trends are taken into their uttermost consequences, we see almost single persons organisations working on project basis and engaging in organisation or personal networks. As said before, in certain business lines, as for instance in the music industry we see exactly this happening. The information systems needed to carry out such an organisation are very different from the one we have today.

First we realise that traditional business transactions can be carried out almost automatically in the business process. You pay for execution of a certain business process, either in agreement with the customer, or chosen in a standardised way. Every type of book-keeping, tax paying etc. is taken care of in those processes. If further conciliation is needed it can be carried out ad hoc, since the business process should be component based and any component could be changed or "handmade" very easy. Personalised software agents supply necessary personal information and the single individual person can concentrate on "the job", the relation building. This allows for other values than economical to be heard, it allows for societal, ethical and other considerations. We see a network society where the work is highly outsourced. The business processes (or rather interaction processes) are all personalised and small project groups are formed around a great deal of them, in order to increase the value for the customer. Many researchers have talked about this new society, let me here just mention Bo Dahlbom and his "talk society". Emphasis will be on personal relationships, just as Habermas indicates. The very interesting question in this context is of course: What kind of information systems is needed in order to support this network society?

In traditional systems development you concentrate on the structured information and mass transactions. First it should be emphasised that these kind of information processing of course still exist in the future and also need a lot of attention. However, in *this* paper these aspects are omitted. The main approach will be according to a concept "*network-based information systems*"

One important prerequisite for a such system is that it should be possible to very easy and fast exchange information between different such systems, both concerning form of but yet more concerning the content of the information. Thus *content management* must be a very important framework. The content of the information, the semantic, has been treated within the informatics research area for many years. In database theory lots of efforts have been invested in the area (see for instance older efforts such as Griffith, 1982, Subieta 1985, Peckham & Maryansky, 1988, and newer such as Syu & Deo, 1996, Doan et al 2001, Ströbel 2001, Kim 2002. In modern time web-services are claimed as the solution of transferring information from one system to another (Alpher 2001,

Devendorf 2001, Allen & Fjermestad, 2001, van Hooft & Stegwee, 2001) The problem of reconciliation is also recognised (Embury et al, 2001, Fan et al 2001) but still, as far as I can see, the semantic problem remains unsolved to a great extend as long as the involved partners does not use the same standard vocabulary or business process. Seen in the perceived need of personalisation, this is not likely. We need other more powerful approaches. Such an approach could be based upon learning, i.e. certain procedures are memorised by people in the organisation (Lehner, 2000).

The base for learning are the *experiences* and thus the general idea is based upon a *personal experience repository*. Such a repository holds many kinds of knowledge. We have procedural knowledge, meaning knowledge about how to do a thing, *knowing* according to Cook & Brown (1999), we have factual knowledge which *might* be useful, but usually not, we have anecdotal knowledge which is important for creativity and making metaphors etc. Part of this knowledge is written down in personal documents, e-mails, reports, applications etc, part is remembered but not documented and part is unconscious and implicit.

The experiences are personal, but in part they can be communicable to other, in part (not necessary the same part) they can be computer supported and when shared they always increase in value. This seems to be in accordance with the society based upon solidarity, that Habermas (1988) describes. We see a need for exchange of genuine knowledge, of joint efforts to increase the combined experience, because we have a win-win situation. The main force keeping society together is the communication between people.

For experience systems, in my mind, the easiest way should be to allow user development and thus let the users themselves build in the semantics. In fact similar ideas, but in a different context, was proposed in my thesis (Flensburg 1986). When data exchanged is needed with other systems, the users agree upon the meaning before exchange is carried out. It could be a sort of computer-supported negotiation, as suggested by Bleek & Mack (1999). The chosen settings should be stored and remembered until the next time data is exchanged with the same person. Gradually the settings evolve and communication is made easier and easier.

5 Some implications for the future

This section describes some research activities already started and also indicates some areas suitable for further research. In Växjö we have adopted content management as a common research strategy. In co-operation with 11 companies we study and develop methods for content management in the business area in a project called Viggen CMC[1]. Our aim is a joint development of sustainable methods and techniques. We have many tasks going on:

> Collecting resources about content management and present them in a framework which should be possible to adjust according to the single user; a further development of the Forest resource platform as described by Flensburg (2000).
> Post-Hoc Work notes, meaning the development of a demonstrator for how everything that happened during a meeting, a conference, discussion etc. is recorded and stored for later

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[1] CMC means Content Management Consortium but Viggen means must remain a mystery.

retrieval. Demonstrator does not mean that a prototype should be developed, only a thorough and convincing description of how this prototype might be build and used.

Develop models for evaluating web services.

Investigate different techniques and models for integrating enterprise applications, especially with emphasise on the semantics.

Description of business processes allowing for easy implementation of web services.

Investigating security issues within content management

All these activities are mainly oriented towards short- and middle term activities. It is because the main idea of today's companies is to get as much business as possible into the net using various kinds of web-services. IT-companies are of course very eager to develop and sell such services. However, since business systems are not standardised, there are problems using these web-services, since they are all based upon certain assumptions, both concerning format but mostly concerning semantic. All the big IT-companies with Microsoft and IBM in the leading edge, try to establish *their* standard of both format and content. That means that Microsoft wants to control the meaning of the words we are using when we buy things and which procedure we should use. This is in great contrast to the strive for personalisation it is talked about in the post modernistic society.

We see a possible conflict, a contradiction, which must be resolved. Relying to activity theory (Engeström 1987) and the dialectics of Hegel (1970) there is a possibility for even a small actor, such as the universities to influence this process and give it a push in the right direction. One force strives for central control, another force strive for freedom for customer. But it is the customer who has the power and the companies are more and more emphasising customer orientation. Customer service is an important way to differentiate the company from its competitors, especially in a market where products and services become more commoditized (Williams, 1999). Creating values, establishing relations for the individual customer are repeated like mantras by marketing consultants. Indeed, as White & Hall (2000) argues

> "personalization and analysis are now de rigeur in enterprise-level commerce applications, and since both require sound content management practices, they have become the most logical convergence points — as evidenced in notable recent acquisitions by e-commerce vendors".

Keen (2001) goes even further in saying that relationships is everything in the online economy. By providing tools for managing them, an IT company can get a considerable advantage, but it requires much basic research and new orientation towards the users. This is the opportunity for a value-based, ethically sound, sustainable and user oriented approach to be accepted. But will this happened? Will Microsoft support the users on their own conditions? The answer is of course "yes", if M$ think it can increase its receipts. Obviously there is a good chance, since a lot of quite new applications are needed. However, there are also obstacles.

One such comes from the IT-department, which will resist increasing end user computing, motivated with the need for support of the users and thus increasing costs for the IT-use. The resistance might be successful in the beginning, but in the end, I think the decentralisation and distribution forces in the shape of outsourcing, business process orientation as described above, will make such a resistance obsolete.

Another obstacle comes from a not perceived need for new kinds of applications: for maintaining and creating the experience bases. We have today knowledge management systems, based upon intranets and similar artefacts. This is a step on the way, but they mostly need a centralised administration, which is not at hand in the new experience systems. Instead, we have to look at the

open source movement and the peer-to-peer technology, which might provide suitable tools. Fortunately, many programmers, capable of writing these kinds of programs, are already working in networked settings where experience systems are needed. Raymond (2000) describes an interesting way of developing open source program called *the bazaar style*.

However, the biggest obstacle of them all might be the security issues. If you can't relay upon the information, if it is not available when you need it, then you have no use for it. Availability and trust are security issues which in the end are much more important than the latest virus protection or to prohibit intruders. The security systems are today based upon central management, central policies and central rules. There are much complain about the rules not being followed and thus demand for more and stricter rules. Maybe the security issues are not solved by central control, but instead in allowing users taking the full responsibility for their work. I think here is a great need for research on local, distributed and user managed security systems.

To conclude, there are three great challenges lying ahead of us:

1. The semantic mapping between enterprise applications
2. The management of personal experience repository
3. Security issues concerning trust and availability

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