Social Informatics in the Future

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Abstract. The new networked society faces some great challenges from China and India concerning outsourcing of both manufacturing and development of artefacts, both physical and non-physical. We argue that a genuinely new way of doing business must be developed, based upon the traditional Scandinavian values of cooperation and sharing of values. Today it is called social informatics. Education and understanding is the key success factors. Context is the base for both understanding and education and we propose a 3D-model for dealing with context. A short empirical test is described. Finally we describe a strategy for introducing research within the area.

Introduction

This paper is not a traditional scientific paper. It is a story presenting our view on the topic of social informatics. As such, it does not follow the traditional scientific form, instead we have chosen the form of the Catholic mass. That also tells a story and the structure has proven to be sustainable for about 2000 years, which is far beyond the current scientific structure. We have added a section called "Introitus" presenting the structure of the paper and giving a background picture based upon what happened in the past. Most of it is based upon our own experiences, notations and memories. After all, one of the authors have used computers from the very first generation (It was constructed in 1956) to (almost) the latest Apple.

Since this structure is unusual we think we have to explain why and how we have decided to use this crazy idea. The first part, Introitus, gives a background and historical reason why social informatics is important. This is seen from a Scandinavian and mainly Swedish perspective. After that comes the Kyrie,

describing all the miseries we have seen (well, almost all!). It really indicates that something has to be done. The Gloria part praise the new economy and introduces social informatics as the salvation. The next section, the Credo, describes our beliefs, where we want to go. It describes the ideal word we strive for and we have quite a lot of Gloria in it. Next part is Sanctus, which here is interpreted as what we have to do in order to achieve what we believe in – or at least part of it. Finally, we talk about Benedictus, the salvation and the implementation of what we have to do in order to achieve what we believe.

We have chosen this form because the difference between science and religion is not that big, in the end it all boils down to faith (Churchman, 1971). Some has faith in religion and some has faith in Science, still it is faith in both cases. We admit that and chose a structure suitable for faith. That's why we have ended up with the mass, despite the fact that none of the authors are religious or a strong believer. And now, let the organ sound and the community enter!

Introitus

When internet in the middle of the 90's made its breakthrough a revolution occurred which in our mind is compared to the industrial revolution. Suddenly the cost for information transport was reduced to almost zero and genuinely new opportunities arose. In order to understand that we have to examine the current situation concerning economy, industry, politics, environment and religion. The information system is just a part of these bigger systems.

Previously there was a focus on rationalisation and making tings as cheap, automatic and efficient as possible. Partly we saw other trends, seeing the computer system as a tool to help people in their work (Nurminen, 1988). Sometimes there is an awareness about the consequences of the technique, when introduced in society and in companies. Already in 1972 Kristo Ivanov pointed to the fact that the quality of the information can be judged by humans only (Ivanov, 1972). At the beginning of the 70's the ideas of the socio-technique was further developed by Kristen Nygaard, Pelle Ehn and Morten Kyng and put into the trade union conflict oriented framework (Våpenfabrikkens bedriftsklubb et al., 1974, Kyng and Mathiassen, 1997, Ehn, 1979). Internationally these ideas was supported by a few "crying voices in the desert" (Tricker and Boland, 1982, Kling, 1977, Greenbaum, 1979, Kling, 1996, Mumford, 1981, Mumford and Henshall, 1983). In the Manchester Kolloqvium (Mumford, 1985) the specific nature of information systems research was recognised as being non-positivistic and research methods suitable for researching social systems from non-positivistic approaches was approved.

The situation of today is however a misery and here our mass begin.

Kyrie

The global systems

Today the western industry face the challenge from low paid countries. Work, that can be performed by unskilled workers, are outsourced. This applies also for programming and systems construction and those activities are mostly outsourced to India. Today the Indian programmers are very qualified and can fully compete in skill with programmers from west.

Outsourcing of work requires transportation of goods, which is more and more expensive due to increased petrol costs. Thus costs are decreased by demands on chauffeurs to drive longer for lower price. Again, low paid countries do the transports and the environment suffers severe damage.

However, some parts of the globe, for instance China, has an incredible economic growth. Among other things, this will lead to increased prices on raw material, since re-use is not sufficient. This also requires transportation and energy and will put an even heavier load on the environment.

In the customer oriented business of today much emphasis is put on low prices, but despite that, the products should have a high quality. With refined production methods and efficient logistic flows this is possible. We have to keep in mind that about 95% of the time used for production is used for information processing, mostly done by human beings. Here is a big potential to cut costs, but at the expense of human work! Less, but more qualified work are left over. As a consequence, unemployment will increase as well as the economic gaps.

Besides this the water supply in Africa and some part of Asia will be crucial and in combination with increased green house effect, the catastrophes are inevitable! There will temporarily be a growing ground for religious fundamentalism – and terrorism connected to that – but probably the end will be a breakdown of the western economy. The question is of course: Can this be avoided and if so: How? Let us move on to the next part of the mass.

Gloria

Today three things are glorified: Money, money and relations. The capitalistic society is of course interested in us spending as much money as possible in order to create as much benefit for them as possible. Since they posses and control many opinion creating media, the picture of the wealthy and healthy young jet set is glorified and everybody is sophistically encourage to join that group of people. The status of the companies are measured in the stock rate leading to a very short-sighted economy, the quarterly economy. So far this have been a success and unconsciously everybody seems to believe in the infinite growth of the economy.

The new internet economy, with e-business, e-commerce and other e-phenomena seems to support this idea, since there is no loyalty at the net, leaving a company is as easy as clicking link.

However, some researchers and journalists like (Keen, 2001, Kelly, 1998) see another perspective: The competition is hard today and it is mainly based on price. It costs a lot to get new customers that way, a better strategy is keeping the customers you already have. Thus establishing common values and relationships with the present customers is considered much more important than finding new ones. The advertisements make people suspicious but messages from people they know, could make them try a new vendor. This is called the new economy and is much more based on sustainability than the old one. We think this is much more praiseworthy than the capitalistic version. However, the technical development might seemingly point at a different direction.

Credo

Economy and industry as a whole

Since IT is dependent on many things we start in macro scale. We believe there is a growing tendency to outsource, not only IT but as much other functions as possible. What is left is the brand and the industry of today is basically brand-driven. For the manufacturing industry we see a system of suppliers in several tiers. The automotive industry is a good example. Instead of yesterdays gigantic car factories we see today a set of suppliers which are supposed to design and deliver a specific module of the car according to certain specifications. What counts is the ability to deliver, both in time and in the desired quality. This is a step towards the network economy described by (Castells, 1996, Castells, 1997, Castells, 1998).

The focus is on the business process, not on the single company. This requires a genuine new way of doing business, we see a need for trust, loyalty and sharing of value (Habermas, 1984, Habermas, 1988, Keen, 2001) instead of the usual benefit maximation.

There is still competition between different companies and products. Being informed plays a crucial role in this competition. Therefore issues like business intelligence, data mining and information fusion will play a great role.

In Sweden we see a good economical growth, but there are no more employees due to efficient production. We think this is a world wide trend, which will have severe effects on the labour market, create political instability and conflicts between countries. An example is the upcoming budget negotiation in EU where the new members expects huge contributions but the old members (such as France and Great Britain) are not willing to give up their privileges.

We also believe the current economical focus on short time benefits must be replaced with more sustainable reasoning. Within the manufacturing industry we se a growing focus on sustainability and this must sooner or later, unfortunately probably later, put the focus on more long-term issues.

Other important issues in the manufacturing industry are the quality of both the products and the work processes as well as reliable deliverables in the correct time. The quality must remain the same, the delivery time be shortened and the price lower. This is a huge challenge and requires a total and holistic view on the whole production process and all the costs associated with it.

Implications for information systems

So far we have sketched roughly on a possible future development of the industry and business in the world. Now we will describe the implication we believe this development might have for information systems, their use, design and development, thus forming our beliefs on future information systems.

First we notice that about 95% of the time used in industry is used for information processing. We have talked to industrial workers about this, such as (Kallin, 2000), but we have to admit, we have no hard scientific evidence. However, further rationalisation is more likely to be due to better information processing, than better production. It is true that certain areas of production, such as maintenance, requires more attention and will decrease production costs, but it is our firm believe that information processing, i.e. providing the right information to the right person at the right time at the right place in the right format with the right content and to the right cost (Karlsson et al., 2004), is the key to survival of the western industry!

The industry of today must be extremely flexible and able to produce small series with high quality and short lead-time. The business process is almost tailor-made for every transaction and covers many organisations. Having information systems based upon the MIS model with its roots in the 60's is no longer possible. Neither is it possible to develop new systems in the way prescribed in systems development models, such as for instance RUP (Bergström and Råberg, 2004, Pollice, 2004, Kroll and Kruchten, 2003). Changes occurs very fast leading to very diverse and varying information requirement. The new service oriented architecture (Krafzig et al., 2005, Newcomer and Lomow, 2005, MacKenzie C M et al., 2005) is one model for doing this that draws considerable attendance. However, in our mind the ontological aspects are not covered sufficiently (Flensburg and Milrad, 2003). One issue we point at is information requirements and information needs are not always possible to foresee and the only way to be sure to get it right is letting the users do it themselves (Flensburg, 1986). Hence education of users at the workplace will be a major concern as well as development of suitable and comprehensible tools. In both cases a common

language and a mutual and deep understanding of the concepts used is a prerequisite.

The meaning of a certain concept and the knowledge thus achieved is based upon the context at hand. The context definitions so far have been related mainly to environment and task/activity attribute (Park H and Lee J, 2005, Zhang D et al., 2005, Raverdy P and Issarny V, 2005) but that is not enough. Context should be related also to personal and cultural attributes as well.

As an example we will briefly describe a research project of introducing the mobile contextual service in the library settings. There were 10 library workers that participated in this project. The idea was to "translate" the social context into the content of the mobile service. The social context was divided into three contextual attributes (environmental, activity/task and personal/cultural). We regarded those three contextual attributes as almost independent (Figure 1), the so called Apple model. We realised that it would not be possible to translate the social context into the content of a new service without using participatory approach, since it is not possible to identify personal/cultural attributes without direct user involvement. The other two attributes can to some extend be identified (using sensor technology, cameras, work descriptions etc.) without direct user involvement. In our library settings the environmental attributes were known since the location and its attributes were not changing while our efforts were mainly focused in identifying the activity/task and personal/cultural context. Based on a survey we were able to identify that most of the time library workers were dealing with readers they spent in providing the information about the content of the book. This information was confirmed during individual structured interviews as well. This was core information about their activity/task.
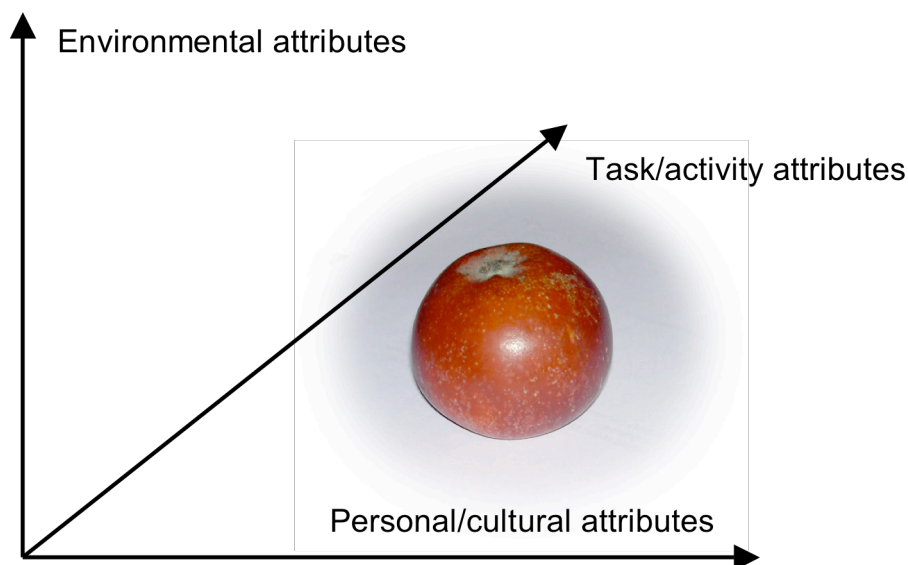

Figure 1 Social context as a layered structure (the Apple model)

Based on this and the personal/cultural context (users mobility perception and use) we basically were able to shape the content of new service. The new service was audio book reviews provided through mobile wireless channels. In our evaluation survey, seven subjects answered that the service would be useful but they would need more time to explore it. One subject answered that yes, it is completely useful and this service should be introduced already next year. Another subject answered that maybe the service might be useful, but it will be difficult to find time and resources to produce the content. The important thing to mention is that none of the subjects answered that the service can't be useful at all for them even if they had that answer as a possible choice. The explanation was that the users understood the service and identified it as a proposal from them.

Based on this experience we realised that for defining the social context a user centred approach must be used. This is mainly because social context is both complex and unique in the same time since it contains personal/cultural attributes. These are genuinely human attributes and can be identified only with direct user involvement. Based on this we think the result of our research might be different if we would be dealing with library settings in some other place with other people, due to different personal/cultural context attributes. The service that has content that correspond to the user social context has higher usability and acceptance. This is mainly due to the fact that service is more related and familiar to user social context and due to the user perception of new service as their own contribution as well. This was proved right with the users in our trail project since they have very well accepted the new service.

Therefore the role of social informatics can be in grasping and mapping the user social context to service content. This process is bidirectional way of learning. Learning from users in order to understand their social context, and users learning from the service that has content based on their social context.

New informatics domain

Today in-house systems development as it was done in the 70's and 80's are no longer done. The reason is simple. It costs too much (Figure 2). When the first generation of computer-based information systems was introduced the rationalisation potential was very high, since the starting point was based upon manual routines. The tasks that were rationalised were also rather easy, it was the 80% of the transactions that required the 20% of effort. But when the next generation was introduced, the situation was very different. Now the starting point was a high degree of rationalisation so the possible benefit was considerably less. Also the tasks were more tricky and thus the systems development costs was higher. Seen from an economic point of view, it is easy to understand why systems from the 80's still are working.
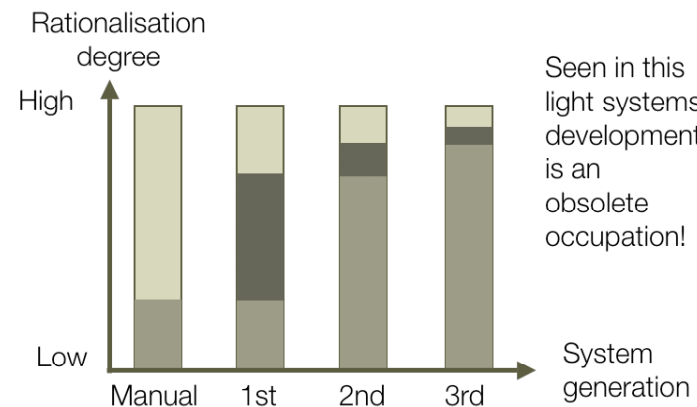
Figure 2 Increase of rationalisation potential for different systems generations (Flensburg and Friis, 1999)

Today standard systems are used, but they are configured to suite the specific company. The configuration is often cumbersome, tricky, hard to do and takes a long time. SAP/R3 is well known for the complexity of the configuration. The drawback is, however, that when a new release of the standard system is released the configuration must be done again. The result is the same: The IT-systems becomes great hinders for changes and they conserve the current work praxis and prohibit changes.

The solution to this problem is dividing the BIG systems in smaller, easier to use, understand and maintain. The needed exchange of information in the network society is done with help of Web Services and the whole system is build in a service oriented architecture (SOA), (MacKenzie C M et al., 2005). This architecture can be used for local and even individual systems, if the users are well enough educated.

However, the network society requires totally new applications and a new way of seeing things (Flensburg, 2002). This is not yet identified by the IT community in general, but when it is the case, it will be a dramatic change for all IT-processing.

Education

We have already indicated the need for workplace related education, but we think there will much more need for education in many aspects and in many jobs. After all, it is the education of our workers that is the primary competition weapon! But education is also needed to cope with our complex everyday and to maintain the job carrier. Thus we will see use of IT, in all forms, for education of people, we will see a society full of communities, games, chats, virtual reality etc. Since we see a growing specialisation of companies, this will also be the case for the business systems. Today we talk about e-health, e-care, e-government and e-

learning. Tomorrow there will be many more and many specialised, but unfortunately, there are no education of them.

Finally, we believe that all this phenomenon and a lot of other, yet unknown circumstances, will lead to an increased discussion of IT and its use and its impact on society. The area of IT in society will be highly actual!

Sanctus

Industry

Our chance to survive in the current western culture is to lower the production cost, increase the quality and shorten the delivery time with increased reliability. Besides the production must be more environmental friendly. This seemingly impossible equation is possible due to more efficient and reliable production processes, especially the information processing part. Thus flexible production in short series can be done, provided the machinery does not break down. Good maintenance is also a part of the total quality and it is often overlooked.

Economy

We need genuinely new informatics paradigms adopted to the network economy. This requires a massive re-education of all workers, both white and blue collar in order to be able to take advantage of the IT-technologies advantages. It requires also a de-learning with subsequent re-learning of the IT-experts in order to make them think more according to business needs and less according to technical possibilities. One economical advantage, which the manufacturing industry already is aware of is the fact that sustainable production pays off, not only in reduced environmental load but also in tax reduction and selling advantages. The new economy is based upon reliability and trust, manifested in the relation management (Keen, 2001). It is also said that the most valuable asset of the company is its knowledge. An interesting thing is that sharing of knowledge increase it, thus the company should be as open as possible. For conventional economic thinking this is ridiculous, but seen in the light of trust and reliability it makes perfect sense.

Critical resources

To sum it all up: Reliable and sustainable production, availability of reliable information, trust and flexibility are the means for us to survive in this new economy. How shall it then be implemented?

Benedictus

We suggest three different activities which are under implementation in our network. It is all networked activities, thus it is meaningless to allocate them to a specific university. This is the very first step in implementation: Think in networks, not in single universities or even worse: Parts of universities!

In order to improve industrial production: *Create a research centre dealing with sustainable production and information availability and reliability.* Issues addressed by the institute:

- Decrease information processing time in a supply chain
- Develop IT-systems for total quality maintenance
- Develop sustainable economy models for the network society
- Identify areas where the region industry can compete
- Develop a holistic and sustainable model of production in a local region

The centre is supposed to operate at regional basis and in cooperation with the industries in that region. The specific region we have in mind is southern part of Sweden. This network provide us with companies willing to join research activities. This is necessary in order to achieve research foundlings from EU or government. With a set of well-known and trusted collaboration partners the base for writing research applications is achieved.

Since the companies requires very broad competence due to the diversity of their problems the centre must have access to very broad competence. This is secured by the second activity: *Establishment of a nation wide competence network for research and research education.* Here we establish common learning activities in higher education and in research education with shared teachers and partly shared students. Thus the researchers know what is going on in the different universities and can draw upon that competence when needed. We also have a greater body of researchers and smart students who can do specific parts of the work. This is supposed to be carried out on mutual base, why no extra payment and no extra administration is needed.

Now we have companies and we have competence; only projects are lacking. The process of reformulate the companies problems to researchable questions within available competence is done in the project formulation phase. This is carried out in another *centre for project management and innovations*, which in fact is organised as a course in project formulation and development. During the course the participants (which can be students or researchers) formulates projects and tries to get them founded. In some cases it will succeed. There is an example from Copenhagen business school, which resulted in 9 mill DKK!

In doing all three activities we do hope for beneficiation through a lot of interesting and challenging research projects!

Exodus

As well as an introitus, there are an exodus, a departure when the community leaves the church. Here it will be close to a combined conclusion and summary. We have drawn a scenario where the future for the western industry is not so very bright, but we have indicated some areas and some ways of doing things where the there might be a brighter future. As far as we can see, taking the use situation into account, focus on the content and the specific, customise instead of standardise is the key success factors. Or in other word: Replace traditional informatics with social informatics!

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