

4-20-2011

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Abstract

This paper investigates the conditions for assimilation of information systems and IT in organizations and the influence of various actors in the organization context. To do so it draws on the literatures on assimilation gap, sociomateriality and infrastructure together with a longitudinal study of implementation and use of information and communication technology in and among organizations in a Swedish region. There were substantial investments made on a regional level and the focus of this study is how the investments were transformed and assimilated in practices, relations and communication. Based on the empirical data from the case study, reflected in the literatures the paper extends the assimilation process into interplay among actors in organizations contexts. It describes organizations strategies for coping with needs for information and the actors in these processes. Two categories of actors are identified, sensemaking and sensegiving actors, as most important in assimilation of IS/IT in organizations. A sociomaterial perspective gives guidance and a better understanding of the assimilation process in terms of knowledge and interpretative frames, and how assimilation involves identity construction and negotiations among sensemaking and sensegiving actors. The contribution of this paper is a better understanding of the context of assimilation and adaptation of IT in organizations' business processes.

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Permanent URL: <http://sprouts.aisnet.org/11-134>

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Reference: Gare, K., Melin, U. (2011). "Sociomaterial Actors in the Assimilation Gap," . *Sprouts: Working Papers on Information Systems*, 11(134). <http://sprouts.aisnet.org/11-134>

SOCIOMATERIAL ACTORS IN THE ASSIMILATION GAP

ACTORS IN FORMATIVE CONTEXTS AND ASSIMILATION GAPS: A LONGITUDINAL CASE STUDY OF IT-ASSIMILATION

Abstract

This paper investigates the conditions for assimilation of information systems and IT in organizations and the influence of various actors in the organization context. To do so it draws on the literatures on assimilation gap, sociomateriality and infrastructure together with a longitudinal study of implementation and use of information and communication technology in and among organizations in a Swedish region. There were substantial investments made on a regional level and the focus of this study is how the investments were transformed and assimilated in practices, relations and communication.

Based on the empirical data from the case study, reflected in the literatures the paper extends the assimilation process into interplay among actors in organizations contexts. It describes organizations strategies for coping with needs for information and the actors in these processes. Two categories of actors are identified, sensemaking and sensegiving actors, as most important in assimilation of IS/IT in organizations. A sociomaterial perspective gives guidance and a better understanding of the assimilation process in terms of knowledge and interpretative frames, and how assimilation involves identity construction and negotiations among sensemaking and sensegiving actors.

The contribution of this paper is a better understanding of the context of assimilation and adaptation of IT in organizations' business processes.

Keywords

Assimilation gap, sociomateriality, adaptation, formative infrastructure, IT use.

1 Introduction

In the digital economy, information technology (IT) and information systems (IS) are sources for competitiveness and innovation in business processes (e.g. Hagén and Zeed 2005, Brynjolfsson and Hitt 2003). Contemporary organizations need of information and information provision is essential for development and growth, to collaborate, interact, and compete. IT and IS provide new ways of providing organizations with information for business process innovation.

Although there is a lot of IT available, both on the market as well as inside organizations, still there are gaps between the availability and the actual use. So how can we better understand these gaps? The mechanisms of assimilation and adaptation of IT in organizations are rather well known. Less well known are the relations and influences from other actors in the organization context (Vaast and Walsham 2009, Weill and Broadbent 1998) on adaptation and use of IT in organizations. The area of concern in this paper is assimilation of IT in organizations with a special focus on the assimilation gap (Fichman & Kemerer 1999). Orlikowski & Scott (2008) states that further work is needed to theorize the fusion of technology and work in organizations and challenge the deeply taken-for-granted assumption that technology, work, and organizations should be conceptualized separately. In terms of sociomateriality, humans, organizations and technology are assumed to exist only through their temporally emergent constitutive entanglement, and this is the approach in this paper. Assimilating IT into organizations' work practices takes a lot of learning (Vaast & Walsham 2009, Robey et al 2000) in several senses. One way of overcoming learning barriers is by learning from others, as e.g. in benchmarking or engaging consultants as intermediaries in the learning process.

The approach in this study is to examine organizations' needs of information and the context for providing these needs. The question in focus is:

How can we better understand the role of context in IT assimilation and use in the digital economy?

Business process innovation in the digital economy is inherently sociomaterial (Orlikowski & Scott 2008); there is an inherent inseparability between the technical and the social. The social and the material are entangled in everyday life in relationships among human and material actors (Latour 1998). Drawing on writings by Orlikowski & Scott (2008) and Orlikowski (2010) on sociomaterial practices, work practices, and actor-network-theory, the suggestion in this paper is that the context of IT use rests on networks defined by social actors, material and technical ones.

The empirical part of the paper is based on a case study of a Swedish municipality facing difficulties with growth and the actors working to make the municipality prosper. The case cov-

ers more than ten years of action for growth and prosperity, and many actors have contributed. In the core is the early acceptance and implementation of broadband for support of IT in use in both organizations and private homes. However the use of IT requires a lot of resources as well as social interaction (Gal, Yoo and Boland 2005, Star 2002, Hanseth and Monteiro 1998) in order to achieve development. The contribution of this paper is a better understanding of the context of assimilation and adaptation of IT in organizations' business processes.

The present paper can be used for reading and reflection among researchers but also among investigators in municipal service as design conditions in planning. The paper is organized with the next section introducing previous studies and theory. The following section is a description of the research approach, which is followed by a description of empirical findings. In the following section, we analyze needs and strategies and a discussion are performed and lastly, a concluding discussion.

2 Literature

Organizations have needs of access to knowledge of use of technological innovations for their development. What is little known is what these needs really are about? And how do the needs correspond to their strategies and support in the context? The effective assimilation of new systems can only occur through processes of learning where organizations become competent in smoothly turning anomalies and novelties into innovative patterns of behavior. We argue that the Internet has changed conditions and work routines for collaboration, communication and coordination among and within organizations (Tapscott and Williams 2006). I.e. it has had an impact on work routines in organizations or at least created an option for impact on work routines concerning e.g. relations with customers and suppliers. The difference between this option and what is really assimilated in organizations is in focus here.

Previous studies show that the use of IT is of importance to productivity and growth of a organization as well as at a national level (Hagén and Zeed 2005, Brynjolfsson and Hitt 2003). However IT use requires a lot of resources as well as social interaction (Gal, Yoo and Boland 2005, Star 2002, Hanseth and Monteiro 1998). IT use varies among organizations to a large extent depending on size and IT competence, where smaller organizations have smaller resources in this respect (Persson 2000, Nutek 2004).

IT assimilation and use is where the individual makes sense of IT in relation to the work process, as in sensemaking (Weick 1995, 1979, Weick, Sutcliffe and Obstfeld 2005). A major premise of social research is that people act on the basis of their interpretations of the world, and in doing so enact particular social realities and endow them with meaning (Berger and Luckmann 1967, Weick 1995, 1979). This interpretation also goes for IT when brought into working life, and the notion of technological frames refer to interpretative flexibility, that arti-

facts (e.g. IT) may be interpreted in different ways among different social groups, whether they “work” or “don’t work”, depending on who uses them and for what (Bijker 1995). Relevant social groups interpret and understand the artifact according to their purposes and apply their understandings (Orlikowski & Scott 2008, Orlikowski 2010, 2000, Hanseth and Lyytinen 2004, Bijker 1995, Orlikowski and Gash 1994).

2.1 Assimilation and assimilation gap

In the assimilation processes of IS in organizations, the larger context is the business rules, norms and culture, but also its activities, processes and actors. Rules, norms and culture are indicative of what activities and processes carried out and how; but are also subject to change. If the rules, norms and culture in a business changes and changes in the IS adoption, they have an indirect impact on the performance of business activities and processes and thereby also on the business products, be they tangible or intangible.

The assimilation gap is the gap between acquisition and deployment of IS/IT, Fichman and Kemerer (1999) pointed out that an assimilation gap might appear in case the management makes the primary adoption decision, but the software remains unused for various reasons. The assimilation gap is mainly depending on two characteristics—increasing returns to adoption and knowledge barriers impeding adoption—separately and in combination may serve to predispose a technology to exhibit a pronounced gap Fichman & Kemerer 1999).

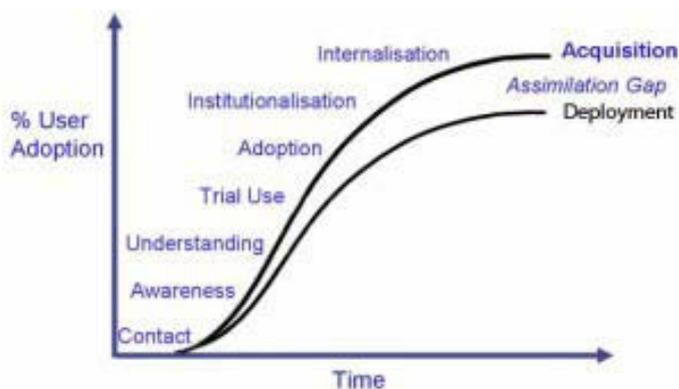


Figure 1 Assimilation gap, Trigg J 2009 (based on Fichman and Kemerer, 1999, p. 3)

Viewing technology as assimilated with the people that uses it, and focus on the interaction of technology and people, and by focusing on one or the other we lose sight of their mutual constitution (Orlikowski & Scott 2008, Orlikowski 2007

<http://www.lse.ac.uk/collections/informationSystems/newsAndEvents/2007events/orlikowski.pdf>). Sociomateriality entails entanglements of individual skills and identities, institutional norms and expectations, local and global contexts.

2.2 Context of IS/ IT assimilation and use

From the perspective of the individual, IT-use is about figuring out how new IT can be integrated in the actors' specific organizational processes getting the new IT into the actors' mental models. So what is not well known are questions of how social environments influence sensemaking, and what environmental conditions constrain or support IT adoption (Seligman 2006).

From the perspective of organization, IT-use is about the social context for IT-use, the cultural and social context for mental models to develop, instantiated by business processes. Communication and socializing relate to the social impact of and on IT-use. What is not yet well known are the conditions for this communication and how it affects IT adoption, conditions as forms for communication and interaction (Seligman 2006). One part of sensemaking is about how persons over time influence their work environment, and then are influenced by it, as the environment is a source of stimuli. The environment has an impact on the users' attitudes towards IT-use where the knowledge of the experience of others is one part, and sensemaking is to incorporate them with existing mental models in one direction or another (adoption or rejection). A formative context (Ciborra 2000) refers to the cognitive frames and institutional and technological arrangements in e.g. an organization. Context, as used by Ciborra & Lanza-ra (1994), is not a precise concept and does not refer to if it is a context of a small workgroup or a large organization. We find a need for a more distinct concept of context in using three kinds of context – local, corporate and public (Weill and Broadbent 1998), to cover organizations' need of a basic level of IT capability to implement new ideas and systems (Edwards 2007, Broadbent and Weill 1997).

In contexts where limited learning and invention occur, the organization is incapable of enquiring into the existing formative context (Henfridsson 2000). So one important condition in the formative context and for IT to be meaningful and sensible in business processes, is the extent of learning and invention which occur in alignment of IT adoption, norms and experiences of the organization.

2.3 Networking actors

Assimilation takes time and negotiation, and adjustment with other aspects of the systems involved. This could be said to express a micro perspective on infrastructure, in the hands and heads of the actors in processes. Sociomateriality provides the analytical tools for describing and a better understanding of the Tranås case. One of the key concepts of socio-materiality are (Orlikowski & Scott 2008 table 10.6) is Actor Network Theory (ANT). IT and its operating properties as an actor in interaction with other actors is highlighted in ANT. Such actors may be colleagues, supervisors but also “non-human” actors such as infrastructure, opera-

tional procedures, etc. (Walsham 2001, Latour 1996, Monteiro & Hanseth 1995, Hanseth & Braa 1998).

The image of the network is central to actor-network theory and the means to society, organizations, operators and machines are all effects generated in the networks and patterns of various, not always human, material (Law, 1992). Actors in networks are not merely the sum of several relationships, but more that every relationship takes place in the context of other relationships. It is not the result of a relationship depends only on the content of this particular relationship but also of other relationships in the network. Relationships are not static but evolve over time in repeated interactions. Any technological artifact is dependent on a network that supports its use. The study of actor networks is about how social consequences built into the technology and how truths about the impact of technology on negotiated and socially constructed (Latour 1992). Social impact of technology arises as a result of negotiation and interpretation. Essential for the description and analysis are interpretation and translation, *intressement*, alliances, interests, power, and stabilization.

Sociomateriality offers a wide frame for understanding assimilation of IT in organizations in terms of mutually dependent ensembles. The notion of assimilation gap expresses gaps in ensembles, that can be wider or narrower, i.e. expressions for better or worse working ensembles of networking actors in analysis of the gap.

2.4 Sensemaking and sensegiving actors

IT-use does not take place as a single decision, but rather as series of sensemaking cycles (Seligman 2006). In these cycles perceptions of the technology change, until apparent adoption or rejection actions are performed. To cope with new information and uncertainties, humans develop a “vision” or mental model of how the environment works (sensemaking). And as we see that IT has a significant positive influence on processes for creating knowledge (Lopez-Nicolas 2010), we also see that humans communicate these models with others (e.g. partners, employees, investors, potential customers, and suppliers) and gain their support (Weick et al. 2005, Gioia and Chittipeddi 1991). This process: “[...] involves calling into question an obsolete interpretive scheme, framing a new interpretive scheme in understandable and evocative terms, providing guidance for action toward the incipient change and exerting influence to accomplish it” (Gioia et al. 1991 p. 446). When organizations are in need of new interpretation patterns, influential actors may attempt to articulate or advocate their vision or preferred interpretive scheme, thus engaging in sensegiving processes and influencing the sensemaking processes of internal and external stakeholders. Sensegiving processes can take place between top and middle managers and between managers and employees. Sensegiving is different from sensemaking, in that the person trying to give sense is attempting to influence other

people to perceive and interpret certain actions and events in particular ways. Sensemaking has to do with meaning construction and reconstruction by the involved parties as they attempt to develop a meaningful framework for understanding the nature of e.g. an intended strategic change. Sensegiving is concerned with the process of attempting to influence the sensemaking and meaning construction of others toward a preferred definition of organizational reality (Gioia et al. 1991, Söderberg 2003). Although you cannot force adoption onto reluctant users, there is a force in changing e.g. administrative architecture and slowly the culture changes to adapt to that architecture (Wagner et al. 2006).

There is therefore a need to investigate how IS/IT is assimilated into organizations processes and routines and contribute to a better understanding of the conditions for infrastructure of assimilation processes. .

3 Research Approach

This research has been conducted as an interpretive field study (Klein and Myers 1999, Walsham 1995) involving embedded cases (cf. Yin 1994). While the mid-sized Swedish region is our unit of analysis, our embedded cases are organizations and municipal actors. The empirical data is primarily based on qualitative semi-structured interviews (cf. Patton 1980). In addition to interviews, data were collected from documents such as marketing documents, policy documents, project reports, data stored in databases, and web pages – to get a more varied and truthful view of actors perspectives as a kind of triangulation (Denzin and Lincoln 1994).

The first series of interviews, including nine organizations, were conducted between 2000 and 2001. In addition, and as a follow-up of the previous collected data, 24 interviews were carried out during late autumn of 2003 and winter of 2004, with municipal politicians (2), municipal managers (2), municipal officials and project leaders (4), managers in large and small organizations in both industry and trade (10), and also representatives from professional and industrial organizations (3). During the interviews the respondents were asked to tell their story; how they perceived the process in hindsight; what events they regarded as critical; the general IT situation in Tranås; implications of the TRAMAN implementation and future intentions in relation to TRAMAN and in general. During 2005 interviews were carried out with municipality IT-officials (4), general meetings with organizations in Tranås for presentation and discussion of results (2). Also during 2005 group interviews were carried out with persons from different lines of business as trade, industry, and service, in all 21 persons from 21 companies with less than 50 employees. These interviews were performed in order to gather data from smaller companies. During 2006 interviews were made with five managers in three organizations. The interviews covered manager's focus on e.g. IT, marketing and sales and production in order to capture also managers' opinions and thus get a more complete pic-

ture of the visions, needs and pre-requisites that different representatives have. Between 2007 and 2009 there were interviews (13) and observations (9) carried out with the board of the organization working with development of and for organizations and the municipality of Tranås (Tranås United).

The interviews concern questions on use and understanding of IT in business processes, roles of various actors for successful implementation and use of information systems, the importance of communication and interaction for growth, facilitators and barriers. There were checklists of areas of concern to be covered in all meetings, but not structured questions. This means there were options for conversations in the meetings to take various directions depending on the participants. All interviews were recorded and some also videoed. The length of the interviews was between 1,5 to 2,5 hours. All interviews were transcribed into text.

The content of all the interview transcripts was read in order to identify issues and topics as they were framed by organizational members. Questions and answers were put into large matrices for finding topics and themes in both a textual and a more graphic way.

Out of this inductive reading of the material came themes and topics that then were analyzed and aggregated in order to arrive at a set of themes that were common or recurring. Then data were reviewed in an iterative process of interpretations and reflections in line with a reflexive research tradition (cf. Alvesson and Sköldbberg 2009; Van de Ven 2007). Documents and other secondary data were mostly used for check-ups of the results from the analysis of the interviews.

In the present study we have no ambition to generalize results in a statistical sense. Analytical generalizability is more in line with the epistemological stance taken in this paper (cf. Patton 1980; Walsham 1993; Yin 1994) when we try to make theoretical contributions to the area of context and infrastructure for IT adaptation and use.

4 Empirical findings – actors bridging assimilation gaps

Tranås is ranked as a sparsely-populated rural district. For different reasons the fur industry collapsed in this era causing many problems at the municipality level such as unemployment, diminishing population, less taxes paid etc. Large-scale concentrations were made in order to attract new industries and increase employment, whereof the IT platform, the TRAMAN project (Tranås Metropolitan Area Network) was a major concentration. In a governmental proposition from 1999/2000: “An IT community for everyone” a call for a national build up of broad band was established where a fiber optical infrastructure should be implemented not later than 2005. However, in the Swedish municipality of Tranås, this was done some years earlier. In the middle of the 1990’s the municipality made investments in regional development including an all-fiber network (“broad-band”) in order to connect organization, persons,

associations and public sector in the TRAMAN project (Tranås Metropolitan Area Network). In the middle 1990's the municipality made investments in regional development including an all-fiber network ("broad-band") in order to connect organization, persons, associations and public sector in the TRAMAN project. The TRAMAN project is an investment in infrastructure where the municipality builds a network with a global action range. It contains a fiber network and services provided by suppliers in the open market. Examples of services offered are back-up service, web design, web hotel, access to software (ASP), GIS and others. The network connects organizations, many of the citizens, the municipality administration.

From then on several new companies have established their businesses in Tranås and others have developed partly new lines of businesses, all adding up to a diversified commercial sector, less unemployment and a stabilized population. Businesses have developed and grown during this period. In sum there has been quite a positive change in many aspects in the situation in Tranås despite (or thanks to) the big problems some 15 – 20 years ago. A question in some of the interviews concern in what way the investments and activities correspond to needs in the organizations. Summary of some of the case (-s) as examples of investments made in this period to support a positive development, is presented in the table:

Table 1 Overview of projects in Tranås

Events	Main issues and aims	Time started	Activities and actors	Outcome
Tranås turn-around project	Stopping decline in municipality	1996	E.g. TUC, TRAMAN, and TU Infrastructure for sensemaking Support of agents	Tranås is later on ranked as one among the most organization friendly municipalities, with a positive balance in the budget
TRAMAN project	Providing net- access – private or/and the Internet	1997	Activities of information, meetings, projects with actors in organizations and society Drivers of the TRAMAN project Physical net access	Most large organizations connected
Tranås Education Center project (TUC)	Provide Tranås and organizations with relevant and needed competence	2000	Education and competence development for students - support of sensemaking processes among students Programs and courses corresponding to exclaimed needs among organizations	A comprehensive development into many competence areas through courses and projects
KÖBYT project	Collaboration among small municipalities in the region for developing infra-	2001	Collaboration and negotiation among parties	Projects pursued, the initiative replaced in 2006

Events	Main issues and aims	Time started	Activities and actors	Outcome
	structure for services		Arena for collaboration in connection to investments in IT infrastructure	
Thesis project	Reach conclusions on how to pursue efforts to develop organizations in connection to IT in 10 cases, reported in 10 student theses	2001	Focus on conditions for organization development in connection to IT	Little direct, but the project contributed to the image of the modern, evolutionary e-municipality
Smart Community project	Politicians, organizations, education, healthcare, culture and others join in a common way supported by IT to create a human, well functioning environment for growth	2002	IT in municipality development Social and formal processes in project activities in combination with IT Politicians and municipality officers	Some projects pursued, now revitalizing the idea into new projects
Tranås Open Portal project (TOP)	Web-based solution for safe and secure communication	2002	Collaboration in design of solution Implementation and operation of the service – information and marketing The application for safe communication Municipality officers and IT people in organizations	Some organizations and municipal departments connected
Tranås United project (TU)	Stimulate and support growth in and of organizations in Tranås.	2006	Is known among organizations, but not with a large impact, expectant attitude Extensive activities about information, seminars, meetings, projects, - high level of activity. Arena for collaboration and support in and of organization development Politicians, municipality officers, organization organizations people	Reported impact and goodwill from first year of activity, and pursued extensive activities.
Organization and education in collaboration	Bridging the gap of educational content and need for competence in the labor market	2004	Educational boards founded, some key activities are Science and technology for all, Practice in real life, Technical College	Substantial change in attitude towards work in industry among students. Change in educational programs for better in-

Events	Main issues and aims	Time started	Activities and actors	Outcome
			Project, Apprentice Project. TUC and organization people	tegration with organizations needs. Happy employers.
At your service	Assimilation of services with products – development program for smaller organizations	2008	Focus on female entrepreneurs and on the combination of products and services offerings for competitive edge.TUC and organization people.	Great enthusiasm among those taking part of the program.

In short there are some 1600 organizations in Tranås, of which 390 have more than one person employed, only 10 companies have more than 100 persons employed. Around 300 companies are connected to TRAMAN (fall 2009), see below. Of the 184 companies in Tranås Organization Society (Tranås Näringslivsförening) there are some 30 without e-mail addresses or PC's. Other significant actors in Tranås are “Tranås Organization Society” (Tranås Näringslivsförening), “The Swedish Federation of Trade” (Svensk Handel), Sommenforum, the Confederation of Swedish Enterprise (Svenskt Näringsliv). In order to take a closer look at the needs of the organizations and how the activities correspond to them, we start with the needs.

4.1 Need for information and IT

The area to understand more about is what need of IT infrastructure organizations have for enhancing growth, with special focus on communication and interaction. In the interviews, the Internet is regarded as more of an option than a threat. It serves as a complement for active customers who are using the Internet to inform themselves about the product, e.g. characteristics, price level etc, but do still need the physical visit for guidance. Quite a lot of the products are complex and the need of information is great both among sales persons and customers. When the net shops compete with the price however, the net can turn to become a threat. The organizations in Tranås must meet this with knowledge, competence, and service around the products they offer for sale. It is important for their customers, which often are organizations to have a reliable service organization to turn to in the event of problems in order to avoid standstill. Especially among smaller organizations there is a need for local suppliers for service and support which is an important role for smaller suppliers. Service and support concerns technical matters as well as use of applications and its integration with work processes in order to develop the organization. This need is not covered by net operating suppliers and these services play an important role in the customers' investments in IT and that they will work and be used in the further development of the organization. In cases of service and support, suppliers often make problem analyses and measurements via the Internet or by tele-

phone calls and also most software problems are adjusted via the Internet together with support via telephone. Hardware problems have to be attended to on site. In turn suppliers (e.g. HP, MS) have support service for the local support suppliers who have the direct contact with the customer/end user. This is done almost exclusively via the Internet. In order to be able to perform a service efficiently, access to the Internet is demanded independent of if you operate from home/office or on the customer site. In order to perform these services there is a need of infrastructure that is not within a formative context.

A new pattern of roles for distribution of information, services, and competence was observed by the interviewees. The web and the Internet have become increasingly important and the customer has to attend to the suppliers' site, has to be active in contacting and looking for data, not the opposite as it used to be. The active part is nowadays the information seeking sub-supplier. There is re-allocation of responsibility both regarding search for information and also costs for travels to visit the supplier. This re-allocation is made possible by web services and the earlier visits from sales representatives are now substituted by web services. Regarding the fact that these services are open for every sub-supplier, disregarding size and volume of accesses – it is possible for a sub-supplier in a small market to have access to the same information as a large sub-supplier in a large market. In other words, this development is in favor of small sub-suppliers and small markets if they only have the option to access the services.

4.2 Strategies for coping with needs for information and IT

In coping with the need for information and IT we have – based on the case study – identified three strategies – competence, cooperation, and service. We find it interesting to see what needs that correspond to what strategy to get a rough indication the same way as above. In order to satisfy these needs organizations develop strategies for cooperation and communication, in order to create business benefits. The strategies concern areas like communication, monitoring, learning, support, and business intelligence and where there are IT tools to support. The leading star for organizations to develop strategies is business value, together with organizational readiness and external pressure. Need for infrastructure touch on different contexts such as local, organization wide, and public infrastructure. In the daily operation the two first mentioned contexts are important as facilitators. Actors in these two contexts are important as they are more easily communicated with, in comparison to actors in public infrastructure. You can communicate and express wishes for change and have an expectation on having an impact, with the constructor of a local or organization wide function more easily than the same situation concerning a function in e.g. MS Excel.

4.2.1 *Competence strategies*

Access to competence can occur in several ways – e.g. ALMI Företagspartner can support with consultants for strategic/tactical planning. Other ways to access competence are via partners and suppliers. An important source for competence is investing in education of employees in the organization with rather big sums, e.g. 10 to 15 days a year per technician which equals to about one month working time and impeded billing. All the interviewees point out critical conditions for growth as access to competence, developing own competence; information about important news, to be in the news current, to keep track of what is going on. Earlier findings show that all organizations need a basic level of IT infrastructure capability to implement new ideas and systems (Broadbent and Weill 1997).

Coming to IT, the interviews point in the direction of more focus on net learning instead of courses, video conference system instead of telephone meetings and traveling. The need for system support is growing very fast at a certain size of a organization. One system after another will be added. All interviewed companies mentioned their need for support in business intelligence. Firstly to have access to important information in the IT systems, and secondly to have the ability to interpret the data and perform analyses which can be followed over time. Competence strategies are about means for interpretation and sensemaking of news as options for business development with IT. The importance of and need for competence illustrates both the intra organizational perspective of a formative context but also the inter organizational perspective as a need for competence supplied from sources outside of the organization.

4.2.2 *Cooperation strategies*

To cope with growth and development most organizations develop different kinds of cooperative strategies. One example is to cooperate with colleagues or similar suppliers within a geographical area. Another is to merge with a larger cooperation, and still another is to cooperate with suppliers and customers in a “symbiotic” way, more like a social network where organizations help each other in many ways – e.g. ideas, technology, competence, employees, and capital. Cooperation with resellers is important and will increase in importance. In this situation the web is both a threat and an option. Almost all communication with suppliers is via the Internet and communication with customers is via the Internet as well as direct personal contact (but there are differences among the interviewed organizations).

A transfer of responsibilities is observed by the interviewees (resellers) in contacts with suppliers. The customer is the active and responsible part, for making contacts and inquiries. The main supplier rarely visits the customer any more (sub supplier or reseller). Personal contacts occur at fairs and exhibitions. The new communication patterns concerning information, ser-

vices, and competence – via the web are completed with local meetings where those interested take part. The active part is the information seeking sub-supplier with a re-allocation of responsibilities concerning to seek information and the costs for this (e.g. travel costs). This re-allocation is enhanced by web-services, where earlier visits from sales representatives are substituted by web-services. Having in mind that these services can be open to anyone, as there is no extra cost to offer them to a small sub-supplier in a small market in comparison with a large market, one can say that this development favors small suppliers and small markets, if they only have resources to take part of the service. Communication can occur over large distances without problems. To have access to the services and support of a chain or a franchise is of vital importance, as a kind of infrastructure to exist at all, to expand, grow and develop, to be able to grow and consolidate in cooperation. Another way of putting it is that the option to rely on “a big sister” is crucial. Cooperation strategies are about giving and obtaining ideas and experience from the context for use and business development of IT. An example is when the way suppliers maintain their business relation on the Internet is influencing the organization is developing their business relations with their customers in turn.

The cooperation strategies are pursued in networking relations – as in an outsourced situation, but often with less formal relations (than legal contracts) – making informal relations important, whether it is inside or outside of a formal context. E.g. once the formal relation is set, there are options for informal information exchange, as in all kinds of legal contracts among business partners.

4.2.3 *Service and information strategies*

Services and support are central in the growth of the interviewed organizations – to grow and as a product. “Our chance is to have a working service- and support organization to the products we sell”. Service is identified as an important tool in the competition, and in this our ‘cause for life’ lies. Compared with the change in shopping patterns where the customer gets informed via the Internet (web services) before making the final decision in the shop. The Internet together with the competence of the sales person is the service in shopping, so to speak. This goes for all interviewed organizations, in more or less direct ways. In this regard the service and information part of sales work or the products value increases. E.g. you cannot sell a heating pump without a rather substantial chain of information. All interviewed organizations invest in this, in different ways. Services are about support in use and business development with IT.

Table 2 Summarizing empirical data and showing actors in relation to information needs and strategies

Strategies for coping with needs for information and IT	Need for information and IT	Actors
Competence strategies	Communication with customers and suppliers Service and support Hands-on-problems, physical action Learning	Local suppliers Net operating suppliers Consultants Business partners TRAMAN The Internet
Cooperation strategies	Collaboration Learning	Suppliers Information-seeking sub-suppliers TRAMAN The Internet
Service and information strategies	Physical information about product (touch, smell, etc) General information (measures, qualities, characteristics, comparisons)	Information-seeking customers and suppliers TRAMAN The Internet

5 Discussion of empirical findings

IT is important in coping with needs for information. However investments in IT is first of all viewed as a question of comparing benefits with costs, i.e. its business value, in all interviews. This means that all interviewees take a business view of investments in IT. This could also imply that there is little interest in IT (“why do we find so little about IT in the interviews?”) but more in the business or economic benefits of technology, i.e. the beneficial consequences of IT investments. To continue this line of thought, there is an implication that competence is not about IT itself, but its business impacts – experience from failure and success. The interviewees perceived a demand for competence to achieve shorter lead times, slim lined stock, and increased rate of turnover. So competence has an important ingredient of means for interpretation and sensemaking, where cooperation contains ingredients of idea generation and sensegiving, and access to service is important as a product both to deliver and buy.

The users of IT act and use IT based on their interpretation and understanding. In order for change to occur there is a need for influencing these interpretations and there is a need for actors to interact in sensemaking and sensegiving. Our findings conorganization earlier research in technology use (Hanseth and Lyytinen 2004, Orlikowski 2000) and reveals that technology use is a complex process and also a sensemaking process (Weick 1995). Technology use is a process where users make objects around them rationally accountable to themselves and to reach some order in their everyday working life. In the processes there are several actors influencing both in sensemaking and sensegiving directions. We argue that there are needs among organizations in these processes and that actors come into the processes in different ways, as business actors, internal actors, or general actors as IT and the Internet. The organizations in our study have needs for better working sensegiving-sensemaking cycles; they have needs for images and experience of working IT in different business processes. These cycles are important in IT adaptation, and they occur in all kinds of organizations, but there is a difference in resources for accomplishing these cycles. From this it comes that one important property, when describing organizations, is size, but also three other properties are important – independence, limited resources and lack of competence. The studied organizations show examples of these sensemaking-sensegiving cycles, double interacts (Weick 1979), in that they consider it very important to be members and parts of all kinds of networks, e.g. Rotary, industry networks, friends, sporting friends and more.

So returning to the question of context for assimilation, we draw on the notion of local, corporate, and public (Weil & Broadbent 1998). From the local view as compared to the corporate view, there is less of infrastructure and less of overhead services and these are to be found outside the organization. There are more or less only two kinds of infrastructure for the smaller organizations – local and public, and that these organizations to a larger extent are referred to and depend on, public infrastructure. This is shown in the need for cooperation and collaboration with external actors, as in competence, cooperation, and service strategies.

In the empirical data we see illustrations of the three types: public (1) networking – to cooperate with the municipality, (2) to arrange education of interest, and (3) to cooperate with universities for research, assessment and education. Other examples are cooperation with organizations like Telecities, Smart Community. It is also about to cooperate with colleagues in the same or mostly the same business sector in a larger geographical area, or to cooperate with suppliers – all in order to get access to competence and thereby the possibility to offer better service and support to customers. Corporate context – is e.g. what occurs when an organization merges with a larger organization that contains elements of interest, to become a part of e.g. a chain for access to interesting contextual elements (mostly in shopping but also as production organizations give different levels of status to resellers) is to be regarded as a kind of franchise as different conditions are to be met by the resellers.

The assimilation processes in smaller organizations differ from the ones in larger organizations. The IT artifacts are elements in the formative context that shapes the routine behavior of actors in organizations. The important thing here is that this is a process, a formative context is constantly moving, and is to be viewed as sensemaking-sensegiving cycles, as double interacts. This implies that smaller organizations are different from larger organizations – the smaller organizations rely more on external relations in a public infrastructure. Larger organizations have these needs covered by its organization wide infrastructure (Edwards 2007, Weill and Broadbent 1998).

We have identified a number of implications for assimilation of IT with business processes. Conditions would to a large extent be described in terms of knowledge, competence and interpretative frames. Assimilation involves identity construction, and negotiations around sorting relevant meanings from irrelevant to reach a shared understanding. Into this process comes what is mentioned earlier as knowledge for use of IT, triggers for sensemaking, and double interacts. For the smaller organizations it is in these respects that there is a difference compared to larger organizations. The smaller organizations are more dependent on a formative context outside of the organization.

5.1 Actors in assimilating IT

What actors take part in assimilation of IT? Where are the actors located? Inside the organization? In the local municipality? This study identifies actors and networks that do not easily fit into the three categories of local, organization wide and public context, and the empirical data indicates a need for extension and adjustment. We have identified some important actors that can be sorted into three more general groups, in line with the notion of local, corporate and public: (1) local actors, (local management, employees), (2) corporate actors (corporate management, franchise givers) and (3) public actors (suppliers, customers, resellers, partners, municipality). It is not evident that interaction among customers and suppliers occur in one business sector, but possibly across several business sectors with e.g. suppliers in one business sector and customers in another. Also in the case of competence and learning, organizations from different business sectors interact. From the perspective of a organization, as in organization wide context, there are important relations with customers and suppliers (cf. in a network), but with a cooperative strategy, as in many of the organizations in this study, also relations with e.g. suppliers or with customers play a role for interpreting and making sense of IT. The analysis of the empirical data shows a need for arenas where relations and activities are other than the traditional customer-supplier relation, within infrastructure of arenas for interaction and collaboration among actors from several business sectors and corporations - a network and collaboration.

In all three categories of context (1, 2, and 3 above), actors are implicit, which also goes for the interaction. The empirical data indicates a need for developing a concept of networking

where actors and interaction are more visible (explicit), and thus making it a verb, networking, more than a noun, network. As stated by Hanseth and Lyytinen (2004), information infrastructures do not develop due to planned and controlled actions by some developers, but rather in a process imbued with surprises, blockages, diversions, side effects and vicious circles, as well as inherent tensions between the need for universal standards and locally situated practices. The same conditions are relevant to networking.

The key actors, important for development and growth, identified and studied in the empirical data are suppliers, customers, resellers, partners, corporate management, employees, IT, and the municipality organization. All of the actors are public actors and within the formative infrastructure. All interviewees mentioned cooperation with other companies in Tranås, as significant. If they can choose a local partner, they do. This can be understood as they are interested in developing both their organization and their municipality. At the same time they say, that it is of crucial importance for surviving and development to be a part of a larger company or chain. "Without it we would not exist". It is also interesting that no one mentions the TRAMAN initiative as an important actor for growth, but rather as a facilitator, a carrier, for the access to global net services.

When summing up what actors occur in what combinations of need and strategy there emerges one group of actors who are business partners, e.g. suppliers, resellers, customers, and partners in e.g. product development or implementation projects. In another group with internal and public actors, there are both internal e.g. employees and corporate management, and external e.g. the municipality and the society in general (regions and state), where also IT is an important actor in both groups. IT in this sense is not to be viewed as one single actor, but rather many. TRAMAN is one IT-actor, the Internet is another, and communication software is still another. So in this study the notion of IT as actor rather refers to a group of actors, in line with the notion of technological frames and interpretative flexibility (Bijker 1995, Orlikowski 2000, Weick et al. 2005).

5.2 Networking in IT assimilation and use

Networking is constituted by the identified needs and corresponding strategies of competence, cooperation and service (as in 5.2) among organizations in our study. It contains three parts; (1) competence and learning, (2) cooperation, and (3) service. Competence and learning (1) is about conditions for making sense of IT, to give the ability to realize what IT can be used for in business development, to make sense of IT in a business development perspective. Collaboration (2) is about imposing meaning to others about what IT can be used for in business development. Collaboration is about realizing the business value of new IS-functions or existing IS-functions used in new ways or for that matter the lack of business value in some

IS-functions. Service (3) is about having the installed base work as intended and the importance of services and functions in a corporate context, and also that the lack of it has to be handled by those organizations that do not have access to that kind of services within their own business (as described earlier in 5.2.3 and 5.2.5). So what we see is that networking refers to the situation where organizations deal with IT when developing their organizations and also to what actors, strategies, and IT-areas to invest in. It is still an open question what roles actors have within public and local infrastructures in this respect.

In the case of networking there is a special focus on the knowledgeable use of IS, and there is an element of know-how/competence which plays a role for setting relevant expectations on IS-use or IS-investments. The analysis of empirical data of this study indicates that the perceived business value was the most important explanation to decisions, when it comes to investments in IT. The weak interest for the technology of IT in smaller organizations has two reasons. One is too little knowledge of the business benefits of IT. Another one is that there is knowledge and that knowledge point at investments in IT to have limited or weak influence on business benefits, and therefore is less interesting (as described in 5.1 and 5.2.5). More in general, networking takes into account the conditions for using the technology part of IT, the means for knowledgeable use of IT, e.g. resources for communication, analyzing and acting on market signals, learning, offering or ordering service.

5.2.1 *Context and assimilation*

Networking gives some guidance to what conditions are important for assimilation to occur, and further develops the concept of context. The information systems are elements in the networking that shapes the routine behavior of actors (cf. Orlikowski 2000). Assimilation is the process where networking is maintained as well as changed by actors enacting this context. So what makes things change in a organization? In this paper the argument is that it is the process of establishing or re-establishing local theories and norms in the organization. The important aspect here is that this is a process, networking is constantly moving, and is to be viewed as double interacts (Weick 1995, 1979). This implies that there is a difference between organizations – there are those with supportive networking and those with less supportive networking. In separating different outcome areas as individual, organization and customer, a more comprehensive background and understanding of the process of education and its impact is provided.

We have identified a set of implications for networking in assimilation and of IT with organizational processes. Conditions for the assimilation are to be found in the networking, to a large extent in terms of knowledge, competence and interpretative frames. Assimilation involves identity construction, and negotiations around sorting relevant meanings from irrelevant to reach a shared understanding. Into this process comes knowledge for use of IT, trig-

gers for sensemaking, and double interacts. It is in these respects that there is a difference regarding the networking among organizations. The concept of networking adds a more comprehensive understanding of the impact of education and learning, or the conditions for education and learning to have an impact.

A deeper look at the networking is by grouping relations among actors in the case into on the one hand formal and informal relations and on the other hand in local and virtual relations, gives an interesting perspective on the strategies. These two perspectives are not explicitly mentioned in the empirical material, but are obvious when looking back on all the encounters with various Tranås actors.

Local relations and interaction are both formal and informal. Formal relations are customer – supplier formal relation, deliveries, contracts, support etc. Informal relations are social interaction among persons in business related organizations, or business partners in long-term friendship-like relations. They relate to a cooperation strategy.

Virtual relations are also both formal and informal. Formally it also contains customer – supplier relations, but in e-mediated interaction relating to both a competence and a cooperation strategy. Informally it is e-mediated and refers to interaction among persons in business related organizations, once you have got to know one another and feel freer to communicate various subjects in various ways. E.g. asking or telling about vacation issues, in a more personal way but rarely private. These relations refer both to a competence and a cooperation strategy.

Table 3 A Local – Virtual perspective on formal and informal relations

Formal			
Local	Customer – supplier formal relation, deliveries, contracts, support etc Service and information strategies	Same as customer – supplier formal relations, but e-mediated interaction Competence strategy Cooperation strategy	Virtual
	Social interaction among persons in business related organizations Business partners in long-term friendship-like relations Cooperation strategy	“Surf is free” Virtual interaction among persons in business related organizations Competence strategy	
Informal			

The formal perspective on the case shows that the basic activity is quite similar but they correspond to different strategies, making for a new kind of customer relation in the virtual perspective.

The informal perspective also shows a difference in correspondence to strategies, where the local to a larger extent corresponds to a cooperation strategy, where a virtual perspective is more attached to a competence strategy.

In the smaller organizations, there is a strong connection between IT-use and how much cooperation there is with other organizations. Users that are accustomed to new technology quickly see a lot of applications and management in smaller organizations often develop external relations to deploy different kinds of technology knowledge and competence, but also to legitimize technology change and mobilize motivation to renewal. External relations concern foremost customers and suppliers, where demanding customers are known to have an impact on product and technology development, e.g. in the case of EDI (electronic data interchange), a standard of exchanging messages more or less imposed on suppliers and subcontractors by large and influential (dominating) customers. Also relations with colleagues in the same business, local networks of knowledge and consultants are important. In the conversation with colleagues and experts you come to realize options and possibilities in technology. Common parts of IT are traditionally described in different contexts – public, industry, corporate, local (Weill et al. 1998, Ciborra et al. 2000, Hanseth and Lyytinen 2004). From the small-organization-perspective the elements may differ, where the corporate part may be missing or the same as the local.

5.2.2 *Elements in assimilation*

When analyzing the need for formative IT context, three types, emerge – competence networking, cooperative networking, and service networking, as three cornerstones of networking for assimilation (see Table 4).

Table 4 Three Types of networking for assimilation

Type of assimilation networking	Corresponds to the need for
Competence	<ul style="list-style-type: none"> • Competence in many ways - for use of IT applications, for analyzing the organization (or parts of interest), planning and monitoring, for hiring employees with new ideas, access to expert knowledge from consultants, access to expert knowledge from suppliers. • Analysis - somewhere between communication and planning/monitoring is analysis, as e.g. analysis of communicated interest in groups of products, where input comes from communication and output is given to planning and monitoring. • Mostly within corporate and business sector infrastructure.
Cooperation	<ul style="list-style-type: none"> • Tools for planning and monitoring – ERP systems, new combinations of business processes and IT, ideas for extracting large amount of data to

Type of assimilation network- ing	Corresponds to the need for
	intelligible information. <ul style="list-style-type: none"> • Occurs within all three parts of formative infrastructure. • Triggers for sensemaking.
Service and information	<ul style="list-style-type: none"> • Service and support – both as a need and as a product to compete with. • Tools for communication and supporting systems and tools – the Internet, web services, system integration – both with internal systems as well as external ones. • For larger organizations some or most is found within the organization wide infrastructure. • For smaller organizations these are public actors that are important to have access to.

6 Conclusions

The main argument in this paper is that the assimilation gap is better understood in terms of sensemaking and sensegiving actors in assimilation networking. Organizations' strategies are constituted in assimilation networking, as in bridging the assimilation gap.

6.1 Networking contexts for assimilation

Any technological artifact is dependent on a network that supports its use. The study of actor networks is about how social consequences built into the technology and how truths about the impact of technology on negotiated and socially constructed (Latour 1992). Social impact of technology arises as a result of negotiation and interpretation.

When we have studied how the organizations' cope with needs and plan for how to deal with IT, we identified three strategies; (1) competence strategies, (2) cooperation strategies and (3) service strategies (described above). Examples of generalizations from IS case studies are exemplified in Walsham (1995) in four types as development of concepts, generation of theory, drawing of specific implications, and contribution of rich insight. Here we aim at adding to the development of the concept of the assimilation gap by bringing it into a perspective of sociomateriality with networking actors. Valid abstraction is an aim in this paper together with analytical strengths and making sense of the field, interpretations, artifacts and actors studied.

This study also shows that three different types of networking contexts. We have identified; (1) the public context, (2) the corporate context and (3) the local context (described in section 4.2). However, in this study we have identified actors and arenas that do not easily fit into the three categories of context. The empirical data indicates a need for extension and adjustment (described in section 5.2.2). We have identified a number of important actors that can be sorted into three more general groups: (1) local actors, (local management, employees), (2)

organization wide actors (corporate management, franchise givers) and (3) public actors (suppliers, customers, resellers, partners, municipality).

In the analysis we have also argued that the technology part of IT (the technological media that carries data) is not a sufficient condition in itself for the studied organization to cope with their everyday needs and the aspect of going concern. There are other needs identified that organizations have to deal with (strategies outline above). However, IT is important when coping with the identified needs. We have identified that the organizations in the case study have needs for better competence and learning; they have needs for images and experience of working with IT in different organizational processes (described above).

We have identified elements in networking as a fruitful way to cover more relevant context and conditional aspects (needs) identified above and propose this as a developed perspective to analyze and understand the cognitive and institutional arrangements that form IT assimilation processes. So what we have is that networking refers to the situation where organizations deal with IT when developing their organizations and also to what actors, strategies, and IT-areas to invest in. Table 5, below, illustrates the different elements in networking.

Table 5 Networking – competence, cooperation and service in different perspectives

Dimensions / Perspective	Local context	Organization (corporate) context	Public context
Competence	Adaptation in the close social context	Climate and culture for adaptation, resources and investments	Relevance of services (education, arenas, ...) for organizations needs
Cooperation	Management and planning, informal discourse	Management and planning	Marketing, information, education
Service and information	Local market has a special importance as a complement to the global.	Support and assistance are some of the services in a corporate infrastructure	Conditions for service suppliers

By the three groups of networking these conditions can be understood in more detail and in relation to business needs of organizations.

A major point made in this study has been the view of networking as a special case of a context that is needed for organization operations (cf. Star 2002). This is a description that opens up for thoughts on context from aspects like, technology, social, and communication, understood as networks where a broad range of human and non-human actors influence the devel-

opment in a variety of ways (Hanseth and Lyytinen 2004). We have identified that the networking is about exchange of ideas, experiences, knowledge, and triggers for sensemaking by giving input to evolution and business development.

In much of the referred literature we see that IT is a necessary but not sufficient enabler for strengthening organizations and increase their competitiveness. In this paper we argue that there is a need for competence and learning networking as enabler for successful assimilation of IT. Communication and cooperation in and between organizations is essential for business growth, where one medium is technology as enabler of relation-building, between social actors in establishing and maintaining networks. So there are two perspectives on cooperation – one technological and one social, pointing at the competence and learning networking. In assimilation and use of IT we identify some actors facilitating the process and participation in inter- and intra-organizational networks are reported by the organizations in Tranås to have impact on change and development and in the study we present knowledge about what IT-related action organizations do pursue and what the consequences of this action are. The case of Tranås organizations offers a special opportunity to study how organizations assimilate new technology for business development and growth.

6.2 Sensemaking and sensegiving actors in the assimilation process

The assimilation process is constituted by the actors and by the identified needs and corresponding strategies of competence, cooperation and service among organizations in our study. We see three major roles for actors; (1) sensemaking, (2) sensegiving, and (3) service actors. Sensemaking actors (1) are about conditions for making sense of IT, to give the ability to realize what IT can be used for in business development, to make sense of IT in a business development perspective. Sensegiving actors (2) are about imposing meaning to others about what IT can be used for in business development. Sensegiving is about realizing the business value of new IS-functions or existing IS-functions used in new ways or for that matter the lack of business value in some IS-functions. Service actors (3) are about having the installed base work as intended and the importance of services and functions in a corporate infrastructure, and also that the lack of it has to be handled by those organizations that do not have access to that kind of services within their own business (as described earlier).

So what we see is that the assimilation process refers to the situation where organizations deal with IT when developing their organizations and also to what actors, strategies, and IT-areas to invest in. In the assimilation process we put a special focus on the knowledgeable use of IS, and there is an element of know-how/competence which plays a role for setting relevant expectations on IS-use or IS-investments. The analysis of empirical data in the present study indicates that the perceived business value was the most important explanation to decisions, when it comes to investments in IT. The weak interest for the technology of IT in smaller or-

ganizations has two reasons. One is too little knowledge of the business benefits of IT. Another one is that there is knowledge and that knowledge point at investments in IT to have limited or weak influence on business benefits, and therefore is less interesting (as described earlier). More in general, a sociomaterial perspective takes into account the conditions for using the hard IT infrastructure, the means for knowledgeable use of IT, e.g. resources for communication, analyzing and acting on market signals, learning, offering or ordering service.

A sociomaterial perspective on the assimilation process, gives some guidance to what conditions are important. The information systems are actors in the networking that shapes the routine behavior of actors (Latour 2005, Hanseth & Monteiro 1998, Orlikowski 2010, 2000). The assimilation process is where the practices are maintained as well as changed by actors enacting this context. So what makes things change in a organization? In this paper the argument is that it is the process of establishing or re-establishing local theories and norms in the organization, constantly moving, and is to be viewed as sensemaking-sensegiving cycles, as double interacts (Weick 1995, 1979). We have identified a set of implications for assimilation processes, and conditions for it to a large extent in terms of knowledge, competence and interpretative frames. Assimilation involves identity construction, and negotiations among sensemaking and sensegiving actors around sorting relevant meanings from irrelevant.

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