Dynamic Trust in Implementation of Large Information Systems: Conceptualized by Features from Giddens' Theory of Modernity

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Abstract

Trust is an important concept in the implementation of large information systems. Earlier research in this area has focused primarily on trust as either a static concept ('what is trust'), on the consequences of a lack of trust ('what happens if trust does not exist'), or on the different ways in which trust is created. This paper suggests a dynamic model, based on features of Anthony Giddens' theory of modernity, to provide insight into how trust is created dynamically and how trust influences the implementation of Integrated Healthcare Information Systems in a Faroese healthcare case. The dynamic model is used to analyse a critical incident in the project to further illustrate the case. Suggestions for further research in the form of an interpretative case study are given..

Keywords: Trust, Implementation, Abstract Systems, Modernity, Anthony Giddens, Critical Incident Analysis

1 Introduction

The implementation of large-scale standardized information systems, e.g. Integrated Hospital Information Systems (IHIS) and Enterprise Resource Planning (ERP) systems, is often reported to be problematic, leading to overruns in time and cost and misfit of functionality (Scott 2000; Nah et al. 2001; Heeks 2006). The term 'implementation' is used broadly, ranging from the pure technical aspects of system development to more human and social aspects, e.g. the process that leads to a state where the IT-system is fully adopted by the users and the goals are reached (Walsham 1993). This paper focuses on implementation as a project.

Many reasons for these difficulties have been reported, but one issue discussed in the context of critical success factors for implementation projects is trust (Somers and Nelson 2001; Akkermans and Helden 2002; Sun, Yazdani et al. 2005). In the context of the implementation of information systems, trust has earlier been defined as 'the belief that others on whom one depends will fulfil their expected commitments' (Scott and Kaindl 2000; Salam et al. 2001; Gefen 2004; Lander et al. 2004). Trust influences cooperation and commitment among those involved (Rajiv 1999; Salam et al. 2001), and is, therefore, crucial to establishing positive results during implementa-

tion (Scott and Kaindl 2000; Somers and Nelson 2001; Lander et al. 2004; Wang and Chen 2006). The presence of trust is shown to reduce project failure rates. Trust is 'important for ERP customization clients in determining their assessment of the relationship with the vendor, because the customization of such complex software typically entails vulnerability and dependence on the vendor' (Gefen 2004:p266) and 'the successful implementation of ERP systems requires a corporate culture that emphasizes the value of sharing common goals over individual pursuits and the value of trust between partners, employees, managers and corporations' (Stefanou 1999:p 801). The absence of trust, or mistrust, in an implementation project typically necessitates extra effort in relationship building and increased project control through a variety of formalisms, including contracts and legal remedies. As problems and delays mount, trust relations become strained, leading to a circle of suspicion and disbelief that is both destructive and hard to escape from.

Earlier studies have mainly explored variance and process theories related to trust, ignoring more dynamic oriented theories. The three different theory types are briefly introduced below:

<u>Variance theories</u> show the one-directional invariant relationship between cause and effect, between independent and dependent variables (Markus and Robey 1988). An example of a variance theory is the claim that (the level of) trust is dependent on a set of conditions (Zucker 1986):

1. Condition 1:
   - The process itself, e.g. the degree to which a supplier delivers as expected ('delivery based').
2. Condition 2:
   - Those involved share understanding based on gender, culture, race etc. and shared reference frames (Orlikowski and Gash 1994) ('characteristic based').
3. Condition 3:
   - Professional Standards certifications based on formal structures such as certification, regulation or independent intermediaries ('institution based').
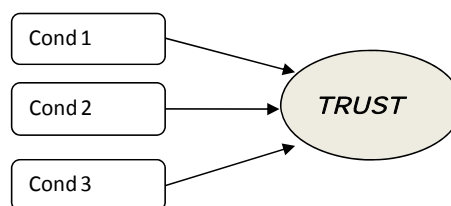

Figure 1: Variance relations

Another example of variance theory is the taxonomic model by McKnight setting up 29 factors influencing trust (McKnight 2002). This type of theory is quite common (Lowry, Zhang et al. forthcoming) (Dinev, Bellotto et al. 2006).

<u>Process relations</u> show how trust is developed through a chain of incidents, thus undergoing a change of state; named process theories (Markus and Robey 1988; Mohr, 1982). An example of this is the statement that trust is developed in a three-stage process (Lewicki and Bunker 1996):

A. People-based trust ('to keep one's word') where there is no developed connection, history or ties between the truster and the trusted. As time goes a common history with good experiences is developed, leading to =>

B. Knowledge-based trust ('based on predictability — relies on information'), where there is a common history but no obvious sharing of values, e.g. when a buyer enters into an implementation project with a supplier with a good reputation, the buyer is 'told' that he can trust the supplier, or the buyer himself locates information that leads to trust. At time goes the actors begin to share e.g. technological frames, leading to =>

C. Identification-based trust ('the parties effectively understand and appreciate other people's wants — act for each other'), where there is a shared history and the parties are interlinked, e.g. sharing a set of technological frames (Orlikowski and Gash 1994).
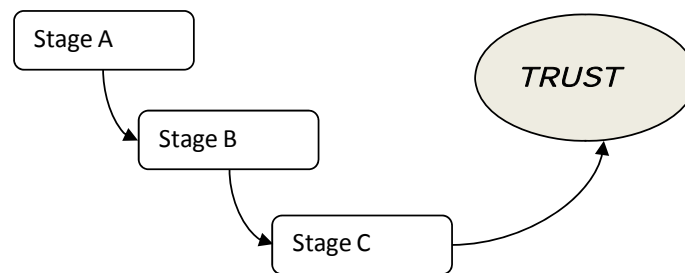

Figure 2: Process relations

<u>Dynamic theories</u>, often based on social theories, e.g. structuration theory (Giddens 1984), have played an important role in the development of the Information Systems IS (Information System) field (Rose et al. 2005; Jones and Karsten 2008), particularly
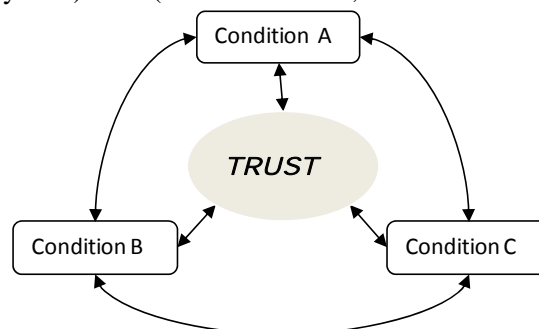

Figure 3: Dynamic relations

through the duality of technology model (Orlikowski 1992) and adaptive structuration theory (DeSanctis and Poole 1994), but are not often seen in relation to trust, which has motivated the present studies. There seems to be a lack of models theorizing on dynamic relations of trust where conditions influence each other and trust itself influences the conditions as illustrated in Figure 3. The arrows show how the conditions influence each other and how trust influences the conditions. An example of the latter is when the quality of a contract influences the level of trust in a project, but at the same time the qualities and content of the contract are a result of the overall trust in the project.

Structuration theory provides a 'dynamic conceptualization of structure as being continuously produced and reproduced through situated practice which facilitates the study of change' (Orlikowski 2000; Jones and Karsten 2008: p. 128).

The research objective of this paper is twofold:

1. Theoretical: To develop a framework for understanding dynamic aspects of trust during implementation of information systems based on concepts from Giddens Theory of Modernity.

2. Empirical and analytical: To gain insight into how trust in the implementation project is developed dynamically during the implementation of Integrated Hospital Information Systems on the Faroe Islands and hence to provide a proof of concept for the framework developed.

The paper is organized as follows. After the introduction the methodological approach used in the paper is discussed, as well as the data collection process. Section 2 presents the conceptual foundations of trust through the theory of modernity. Chapter four presents and analyses the critical incident in an illustrative case with offset in the conceptual foundations. The final chapter concludes with an evaluation of the approach and suggests further research.

2   Methodological Approach

Trust perceptions are subjective phenomena, dependent on historical and social contexts, for which qualitative and interpretive studies are well suited (Walsham 1993). This longitudinal single-case study is conducted within the principles for interpretive research established by Klein and Myers (1999). Longitudinal data collection in the field, at multiple interview points, facilitates the study of process and change, evolving patterns of action and consequence (Pettigrew 1990). The research method chosen (longitudinal interpretive case study) is thus consistent with the research objective.

From 1998 to 2003, the author was the consultant to the Faroese Healthcare Minister on IS strategy, thus gaining a high degree of access to, and insight into the context. From 2004 until 2009, the author spent three to four weeks each year in the ministry observing (but not participating in) project meetings, as well as daily work within the full organization. Observations and semi-structured interviews were supplemented by informal social contact with the participants and a review of written materials. Semi-structured interviews, lasting 30 to 60 minutes and based on an interview guide (see Appendix 1) were conducted at all levels of the organization: with senior managers, such as the deputy minister and hospital directors, the IHIS imple-

mentation project manager, members of the implementation group, the internal consultant, super-users and regular users. In all, 17 individuals, selected to represent the principle IHIS project stakeholders, were interviewed twice a year from spring 2004 until autumn 2008. A subset of 9 interviews has been identified to illustrate the theoretical constructs elaborated on during the paper. Each interview is identified by the role of the interviewed person followed by an interview number: ('role'+'number') e.g.' (PM26) refers to 'Project Manager, interview number 26'.

Table 1: References to interviews reference in the text:

Reference	Interview	Date
(PM26)	Interview with the project manager	29th November, 2006
(PM31)	Interview with the project manager	22nd June, 2006
(DM28)	Interview with the deputy minister/head of steering committee.	29th November, 2006
(CIO29)	Interview with the chief information officer in the Ministry	29th November, 2006
(CIO33)	Interview with the chief information officer in the Ministry	27th June, 2007
(CD22)	Interview with consultant	28th November, 2006
(HD02)	Interview with the hospital director	1st March, 2005
(SC06)	Interview with the suppliers' consultant.	18th April 2005
(PL51)	Plenum, presentation and discussion of findings with respondents and other staff members.	16th March, 2010

In March 2010, the findings and the process were presented at an all-day seminar in the Faroese Ministry of Healthcare, where respondents and other staff took part in a discussion and gave feedback (PL51). A detailed description of the Faroese case is given in Schlichter 2010.

The data analysis approach is critical incident analysis (Flanagan 1954). This method consists of a set of procedures for collecting observations of human behaviour which have critical impact, positive as well as negative, on a given set of situations. The procedures used are:

1. A purposeful description of the context in which the critical incident takes place;

2. The cause, description and outcome of a critical incident;

3. The individuals' understanding of the situation;

4. Means taken to overcome or solve any observed problems;

Critical Incident Analysis is well suited for analysis of processes since it generates detailed process descriptions of critical incidents as they are perceived by interviewees and hence support the analysis of dynamics. To assure a high degree of

'depth' and 'richness' in the collected data, personal interviews are preferred (Edvardsson 1992:p.19).

3 Trust Conceptualised Through the Theory of Modernity

When researchers in information systems have faced a need to analyse or understand dynamic aspects of complex social systems, they have traditionally taken advantage of concepts from the social sciences. One familiar approach is Giddens' structuration theory, which has been used to address the unintended consequences of actions, and the relationship between agency and structure (Orlikowski and Robey 1991; Ngwenyama and Lee 1997; Rose and Scheepers 2001; Pozzebon and Pinsonneault 2005).

Trust is a central element in Giddens' thinking about modernity, which builds upon and shares much communality with structuration theory. He defines trust as 'confidence in the reliability of a person or system, regarding a given set of outcomes or events, where that confidence expresses a faith in the probity or love of another, or in the correctness of abstract principles "technical knowledge"' (Giddens 1990:p. 34). Trust exists in an environment of socially created transformative human activity. Human activity creates intended and unintended consequences (contingencies) and thus involves risk and danger, to which trust is a response mechanism. Trust is related to absence in time and space (Giddens 1990:p. 33); the ability to have confidence even though the trusted person or social system is out of direct contact, which is also a fundamental precondition for the existence of social systems. Giddens refers to this throughout his work as time-space distanciation. Trust involves the attribution of probity to a person or system to act in a reliable way in relation to contingent outcomes and situations with incomplete knowledge. Therefore, the breakdown of trust is also a personal failure of attribution. Trust is thus implicated in an individual's ontological security — the concept that Giddens uses to represent an individual's confidence in their social identity, and in their situation and how to proceed with it. Giddens distinguishes between trust in people and trust in abstract systems. Abstract systems, such as legal and banking systems, are combinations of technical means, procedures, professional expertise and other structures. Trust in abstract systems enables dynamism in modern societies, by allowing social individuals to act with confidence in the absence of personal knowledge of, or contact with, the structures, people and actions embodied in the system. Trust in abstract systems allows the use of a bank without detailed knowledge of its procedures or established relationships with its employees. Abstract systems are thus disembedding mechanisms, enabling time-space distanciation and providing security and guarantees to their users. An abstract system is a means to stabilize relations across time and space — 'something to trust in' (Walsham 1998). Trust in abstract systems produces dynamism in society by allowing individuals to proceed in situations of uncertainty, freeing (mental) resources and enabling social interactions across time and space. The absence of such trust forces social actors to take many actions to reduce risk and uncertainty, to control situations by face-to-face interactions and confidence-building measures, and to set in place procedures and regulations to govern social interactions.

Below a conceptualization of aspects of trust, related to the implementation of information systems, is presented by using the seven features from Giddens' modernity (Giddens 1990:pp. 87–88) . Each feature is illustrated using a small illustration indi-

cating how trust is related dynamically to the feature in question, and references are given to where the concept has been used in the IS literature.

The concept of abstract systems was introduced by Anthony Giddens, to be able to analyse the encounter between individuals and the complex systems of modernity among other things (Giddens, 1990). The embedding mechanisms led to the construction of abstract systems, which are characterized by the fact that, even without concrete and detailed knowledge about them, we, as individuals, are able to apply them anyway. The intrinsic consequences of abstract systems are that they increase dynamism in society, and thus the ring is closed.
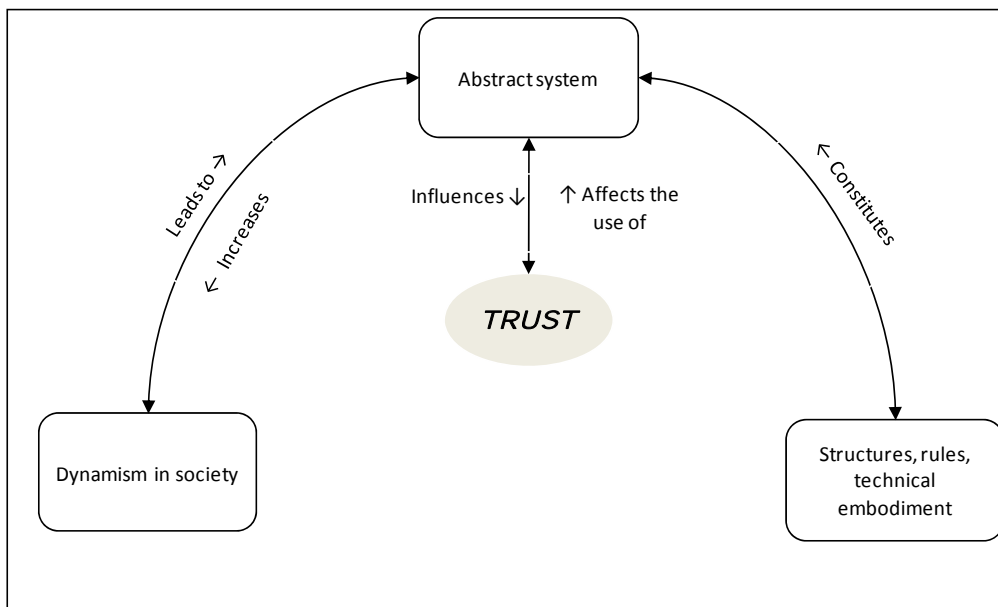

Figure 4: An abstract system

Giddens provides two examples of abstract systems: the symbolic tokens of media of exchange, e.g. money; and expert systems enabling complex systems to work, e.g. transport systems. The first type, symbolic tokens, is a medium that can be passed around among people and groups of people, where these groups can act on the basis of these media; in principle, without taking into consideration the specific characteristics of that group. A good example of this — and the only one provided by Giddens — is money. The other type of abstract system is the so-called expert system, which is a system based on, or formed from, a combination of technical means, procedures, professional expertise and other structures. Giddens gives the following definition: 'systems of technical accomplishment or professional expertise that organize large areas of the material and social environments in which we live today'. Abstract systems themselves are disembedding mechanisms in the sense that they (the Abstract System [AS]) provide security and guarantees to the users of the system that it will work across the time-space distanciation. Based on this, the users will have 'faith' in abstract systems, which further leads to a situation where users (or individuals) use the system without fully understanding either how it is constructed or how it works. A necessary condition for this to work and for the expert systems to be used is that indi-

viduals can place trust in them. As such, an abstract system is a means of stabilizing relations across time and space.

Abstract systems, are 'something to trust' (Walsham 1998) and are used to conceptualize organizational artefacts, e.g. ICT-based marketplaces (Hine and Eve 1998) or the loans advisor's IT system (since it replaces a previous trust-based system) in a bank (Walsham 1998).

Access points are where people actually meet and interact with the abstract system (also called the 'expert system'). They are incidents or places where individuals in the form of laypersons (people not expert in some or more parts of the abstract system) connect with representatives of the abstract system in question; it is the place (or the situation) where trust is established and maintained, but also — and maybe therefore — places where the abstract system is vulnerable.
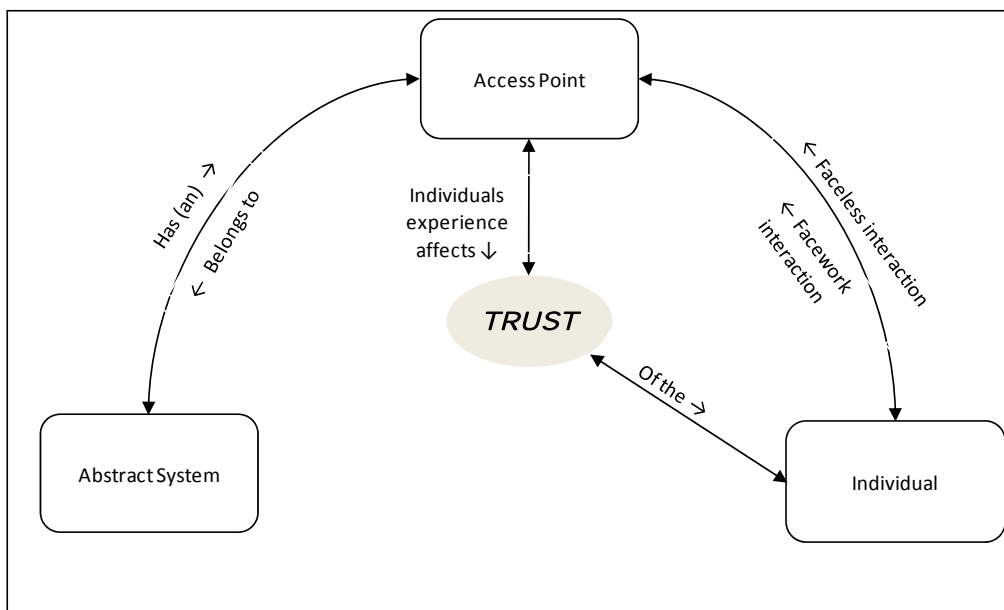

Figure 5: Access point

Trust in abstract systems is highly dependent on the individual's experiences at the access points. By means of the access points, a person can meet the system in two ways:

- Faceless interaction: The individual does not meet a real living person representing the system. Using the bank metaphor this can be exemplified by a client withdrawing money from a cash machine.

- Facework interaction: The individual meets a real, living person; an expert. Using the bank metaphor this can be exemplified by a client withdrawing money from a clerk inside the bank.

An access point (see Figure 5) has two 'parts/faces': one towards the individual ('front stage') and one towards the system ('backstage'), and the expert behaves differently in the two roles/situations.

Hine and Eve (1998) address the concepts of trust and risk and use Giddens to discuss the role of representatives in relation to consumers' privacy concerns when using Information and Communication Technology (ICT)-based marketplaces, where 'retailing organizations' are given as an example of 'abstract systems', and 'particularly representatives of the institution' are seen as access points. The issue of face-to-face interactions versus ICT-enabled distance interactions is discussed by Molony 2007.

The concept of time-space distanciation refers to a situation — or a quality of a social system — where the individuals can act without being physically present in the situation. It is a condition in which time and space are organized in such a way that presence and absence are connected. Traditionally, societies — or organizations — were organized and linked through place and time. In order to interact, individuals had to be at exactly the same spot at the same time. In modernity, these links are untied and the social system can work independently of time and space constraints (Giddens 1990) and, as a consequence, upholding of social relations over time and space happens; AS only exists as a result of confidence in it. The process in which the links are broken is called disembedding. According to Giddens, the time-space distanciation as such is dependent on trust, and is also, in itself, a result of trust.
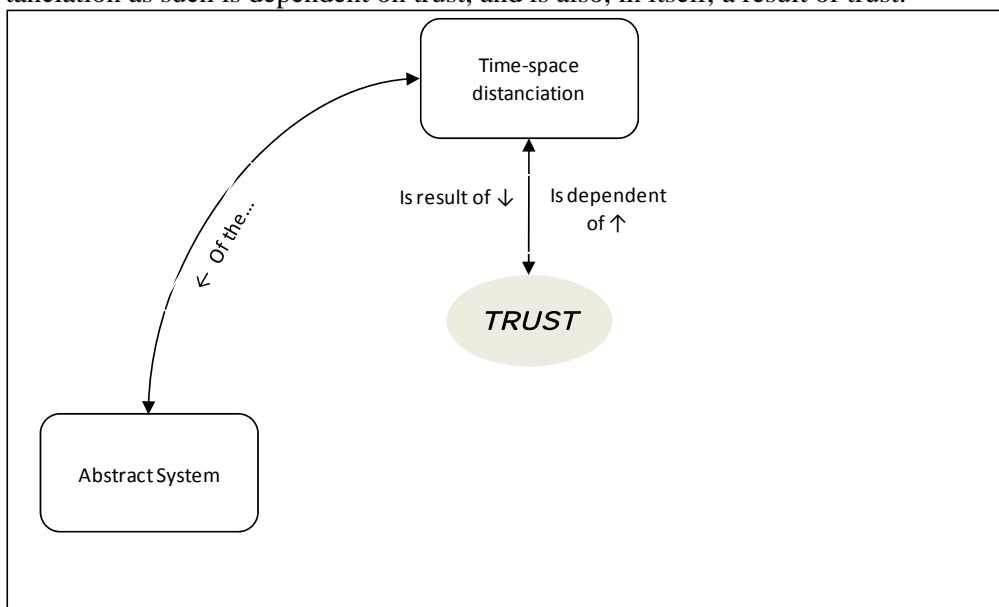

Figure 6: Time-space distanciation

The issue of time-space distanciation has been addressed in the information systems literature, e.g. when considering how trust can be maintained at a distance, enabled by information and communication technology (Bødker 2004; Molony 2007), to exemplify space-time separation with functions in hospital systems, such as the long-distance writing of journals based on dictation (Mark Annabelle 2007) and further by Walsham (1998), who sees the breaking of time-space links of broker-underwriter interaction, when using a new information system, as an example of time-space distanciation.

The concept of disembedding is the second of the three basic features of Giddens' modernity, and is a process that leads to a situation where social relations are

'lifted' away from a local interaction context and are reconstructed across unlimited intervals of time and distance. According to Giddens, two types of disembedding mechanisms exist: the creation of symbolic tokens and the establishment of expert systems. A disembedded system is a social system, where one or more conditions of time-space distanciation exist; this is a system that functions even though the individuals are not present and where traditional face-to-face interactions are made automatically, or by experts with no direct interaction with the clients. During the disembedding process, social interactions and 'relations would become impersonal, at a distance' (Walsham 1998), and 'something' will come between the individuals concerned. The process of disembedding will only happen if trust exists. The indiciduals must believe that the time-space distanciation works and provides the necessary conditions for those involved and that all disembedding depends upon this existence of trust — either trust in the people who are part of the system or trust in the system, which is established to make the time-space distanciation possible. Re-embedding is a process where, or a situation in which, trust in abstract systems is connected to the reflexive nature of such systems, and at the same time it is a process that provides meetings and actions that sustain trustworthiness among individuals. In other words, disembedding is based on trust and supports the establishment of procedures with less personal contact, whereas re-embedding is a process in which trust is re-established during personal interaction.
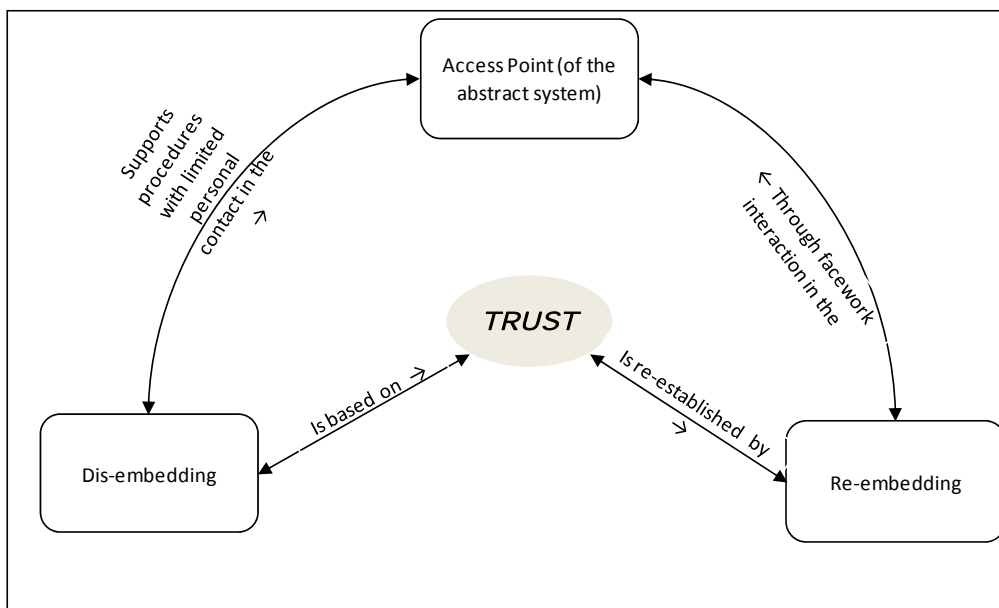

Figure 7: Dis- and re-embedding

Disembedding is dependent upon trust — those involved must believe that the social relationship will endure at a later time and different place. The bank customers must believe that they can reclaim their money at a different branch at a later date or they will not deposit it. Giddens specifies two types of disembedding mechanisms: symbolic tokens (such as money) and expert systems (collections of practices, procedures, expertise and technologies). Abstract systems employ both mechanisms. A disembedded social relationship can be re-embedded — that is, it can again become

localized, personal and immediate, however temporarily. A bank customer may request a meeting with their adviser to discuss a difficult transaction. The adviser represents the expert abstract system, and such re-embedding is important for the maintenance and re-establishment of the trust relationship between the layperson and the expert system.

The concept of disembedding has scarcely been used in information systems-related areas, but a few examples exist. Walsham (1998) describes the situation where the introduction of information systems enables loans to be provided centrally, and not in the local branches face-to-face with customers, and Bødker (2004), who has his focus on risk, shows how trust can be established during re-embedding when discussing a user's work with digital technologies and 'becoming the partner or co-actor and pure functionality (speed, reliability, efficiency) is replaced by the quality (pleasure, satisfaction) of interaction'. Also the introduction of Geographic Information Systems for forestry management has been seen as a disembedding mechanism (Barrett et al. 2001) and, as such, has been part of a discussion on the use of Modernity and trust features in the IS field.

In modern times, human beings always relate their actions to thoughts on who they are and why they are doing what they are doing. This feature is called 'chronic reflection' by Giddens, and is not a separate activity, but integrated into our daily practices. Giddens explains that chronic reflection has the consequence that all work practices are constantly adjusted, based on the information we receive or have about the practices. We no longer (only) do things based on tradition, but based on knowledge. Since we cannot be sure that this 'knowledge' cannot be revised (often 'science' and investigations will show changes to the 'truth'), doubt will be created, which further on may lead to a lesser degree of trust. Modern human beings are affected heavily by chronic reflection and this has consequences for their identity. Re-embedding and face work and faceless commitments are made necessary by the modern habit of chronic reflection, where reflective evaluation of the situation, our actions and their consequences is a constant feature of human social practice. This implies that trust in people or abstract systems can never be absolute or constant over time, but must be reconfirmed periodically.
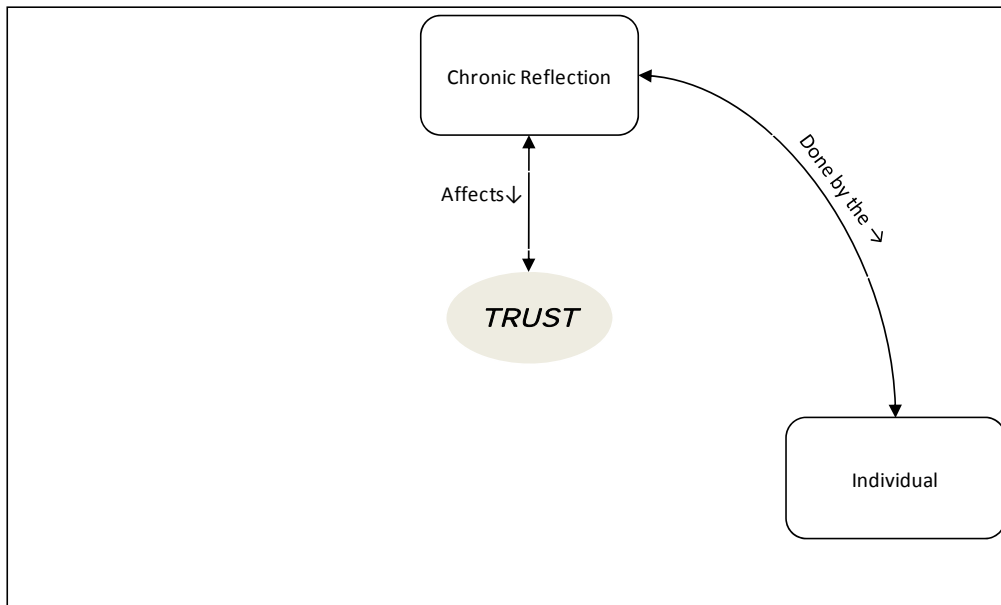
Figure 8: Chronic reflection

An example of chronic reflection is the ongoing self-reflection an individual has during the implementation of ERP systems and which may alter the original intentions (Baalen and Fenema 2005). Another example is provided by Walsham, addressing the chronic reflexive ordering when individuals are aware of and reflect upon changing social norms, e.g. their own changing roles as a consequence of a technology-enabled change of work (Walsham 1998).

The chronic reflection mentioned above leads to doubt at both personal and institutional levels. The term itself has reference to the confidence that the majority of people have in the robustness and sustainability of their self-identity and their belief in the continuity of the social practices of which they are a part. When doubt exists, a person's trust or confidence in the abstract system in question is an important factor to be considered, since this will influence the trust in a negative manner. An important statement by Giddens is that trust in abstract systems cannot replace intimacy offered by personal relationships, and the use of abstract systems therefore introduces a new form of psychological vulnerability.
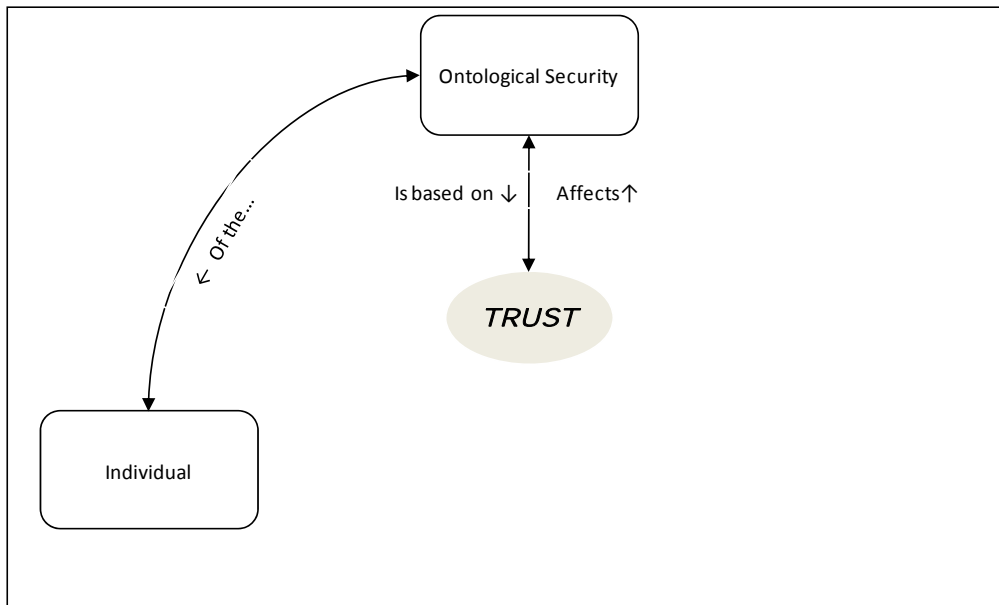
Figure 9: Ontological security

Ontological security is important in the implementation of information systems since trust in experts and in intervention is extremely fragile. Individuals are often confronted with an ontological insecurity in a world that seems to slip from their control; a 'runaway world' (Terpstra and Van der Vijver 2006).

To summarize, the principle analytical concepts used in this paper are:

- Trust: in people and in abstract systems such as a project

- Time-space distanciation: the ability of a social system to function over time and space without the physical co-presence of its social participants, sustained by trust

- Abstract system: expert system trusted despite a lack of detailed understanding or personal trust relationships

- Disembedding, re-embedding: processes whereby an abstract system is removed from immediate close contact, and temporarily made personal again

- Access point: a point where a layperson interacts with the abstract system

- Chronic reflection: constant evaluation of human social situation and actions (including the trustworthiness of people and abstract systems)

- Ontological security: confidence in the robustness and sustainability of self-identity and belief in the continuity of social practice, sustained by trust in people and abstract systems.

When applied together, the concepts presented above constitute a dynamic model of trust different in character from the earlier presented variance and process models. E.g. the individuals' experience in the access point of an abstract system affects their

trust in the abstract system, but their level of trust also affects their behaviour at the access point. Trust is re-established and the system becomes re-embedded by trust-worthy face work experiences in the access point. Disembedding supports procedures with limited personal contacts in the access points thus affecting the individuals' trust in the system as such. Chronic reflection of the individuals affects their level of trust, which affects their use of the abstract system. The statements in the section above is more than just 'new' taxonomic explanation of trust and its generation, since the causality 'flows' in many directions.

4 Analysis of a Critical Incident and Trust During the Implementation

The section will open with a short introduction to the case of implementation of IHIS on the Faroe Islands, to provide a purposeful description of the context in which the critical incident takes place. This is followed by an analysis of the factors causing the critical incident, a description of the critical incident itself and, finally, an analysis of what was done after, and as result of, the critical incident.
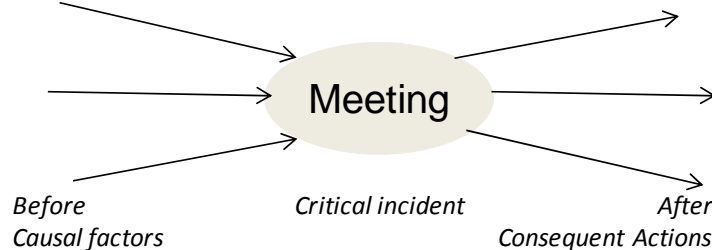

Figure 10: The critical incident: The crisis meeting.

4.1 The Context of the Faroese Healthcare Case

On the Faroe Islands all 3 hospitals and 27 general practitioners (GPs) report to the Ministry of Health. The GPs invoice the private health sickness benefit associations and cooperate with the hospitals. Discussions about establishing an integrated health-care information system (IHIS) began in 2000. After feasibility studies and planning, a contract was signed with a supplier on 3 November, 2004. The implementation project is one of the largest ever IT projects in the Faroese public sector, involving the complete health-care system throughout the community. The ministry contracted an external consultant as project manager and in mid 2005 recruited a chief information officer (CIO). Implementation commenced in January 2005, and was scheduled to finish at the end of 2006.

4.2 Before and the cause of the crisis meeting

The critical incident analysed is the crisis meeting held autumn 2006 and is related to the implementation project abstract system (IPAS), which is one out of at least four principle interacting abstract systems (see Figure 11) identified in the Faroese Health-care project. The principle focus of the system is project management, achievement of goals, configuration and training, and coordination, and many individuals are involved: project manager, project staff, and involved users from the other AS (e.g. nurses and doctors during their involvement in configuration and training). In the

early part of the project, lots of effort was put into a well-defined and sound establishment of the project as such. The IPAS is constituted by rules and structures as agreed in the project charter and supported by technical embodiment, such as communication tools and tools for planning (e.g. MS Project). The IHIS is also the technical embodiment of the IPAS since it can be accessed and configured from different locations, both from the consultants' home base in Denmark and by locally based project team members from the hospital. As a result, the IPAS increased the dynamism in the health-care environment: *'(the purpose is) in general to get a system with a better flow, better overview on which we can react'* (HD,02).

The individuals' experiences of the implementation project influenced their trust in the successful finalization of the project by confirming what was promised during the contract negotiations: *'...at the [initial] meeting the project management showed us a 'handbook' called a 'project directive' to be used for quality management — it looked very good'* (HD,02), thus affecting the hospital director's attitude positively towards the implementation project.

In respect of the IPAS, the IHIS itself was a disembedding device as, *'The IHIS will always provide you with access to the medical journal ... you can always locate your notes ... have access to x-rays and blood tests'* (CD22). The process of implementing the IHIS was a disembedding process where the old paper and personal interaction-based routines are substituted by the IHIS technical system's new possibilities, as described above. The process was carefully designed and grounded in the participants' (laymen as well as IT professionals) belief that it would lead to something useful, as the project manager stated: *'We are doing it ... there is a clear division of responsibilities ... what common task to be completed ... personal interests and benefits for the actors has been discussed'* (PM26). Hence the disembedding was partly a result of the individuals concerned existing trust in the different parts of the implementation project.

One measure introduced to support the implementation was the concept of a 'playground': *'we then suggested the introduction of a clinical 'sandbox' where staff attached to the implementation project could use 'trial and error' without affecting the production system. That seemed very successful'* (SC30), The 'sandbox' is an example of a disembedding device since trust is strengthened and hence work across time and space improved.

Even though the project took off well, signs of declining trust into the successful completion of the project began to emerge during the summer of 2006.

The employees implementing the IHIS constantly reflected on the functionality of the information system, its interaction with the social system of the wards (the health-care abstract system) or their own interaction with the health-care abstract system during the implementation, e.g. the project manager's reflections on their own performance during the troubled time leading to the crisis meeting: *'If I have to be personal ... then it is about me ... I think — about myself. That I am the type of person that runs very fast ... they simply cannot follow me. As a consequence, I must slow down* (PM31). The project manager (PM) has many concerns about the project, their team and the management group, and displays a high degree of reflexive thinking, with many (chronic) reflections about the various issues that concern them.

One issue causing the crisis meeting are the major ontological concerns of the individuals, related to two factors:

- The first is their ability to meet the work demands:

… in reality I'm responsible for the whole system configuration and to a certain extent, also do it myself ... and I want to be involved, but I can see that I can't manage everything ... and many things go wrong. Then there's the supplier problem list ... then there's the system manager role ... and then there's the roll-out manager role ... The many preparatory tasks ... don't get further than being specified, and they're never really completed. That's because of bad management in the project team — it's a problem (PM26).

- The second factor is the self-evaluation of the quality of their work:

'I spent my weekend philosophizing on my three roles ... and I think I perform all three badly because I can't find time for everything' (PM26).

During the implementation of the IHIS, the ontological security of the project participants was not only affected by their own limited understanding and control of the (new) information system, but also by bad experiences when accessing the implementation project abstract system. They do not fully understand the nature and the procedures of the implementation project. Their mental models do not fully grasp the complexity of project, leading to doubts about their ontology standpoint, which may lead to less trust in the abstract system of which the IPAS is a part. The deputy minister directly addressed his lowered ontological security: *'are our basic requirements reasonable*?' (DM28) and began to be unsure of the quality of the preparatory work done in the ministry, based on his lowered trust in the project.

Other issues raised and causing the crisis meeting were:

- That the supplier informed the ministry that a new version was underway, which lead to a discussion on who should account for the related costs, but also for costs related to other corrective actions.

- Serious issues regarding configuration and security that came up, as well as major problems with specific functionality in the IHIS.

4.3   The crisis meeting

The crisis meeting was set up in Denmark in late summer 2006, with the participation of senior management, project managers and external advisers from both parties.

The project crisis meeting can be understood as an access point of the implementation project (abstract system) where laypeople (individuals that are not actually experts in the abstract system in question, e.g. the hospital director or the CIO), interact with the implementation project. The crisis meeting is an example of a face-to-face interaction where the management (laypeople) meets with representatives from the implementation project (project managers from the supplier and the ministry) to gain a common understanding of how the implementation project (the abstract system) should be brought back on track:

'We arranged a meeting with the supplier ...will the contract stand or not? …They had some requirement of us. Were they reasonable? It cleared the air ... it was a good meeting facilitating progress' (DM28). But the implementation project can also be accessed facelessly; an example of this is when the IHIS is configured from a distance and is addressed below.

One of the issues discussed at the crisis meeting was the overall workload of staff taking part in the implementation project. It seems that the experts acted differently at the access points depending on the 'direction' of communication corresponding to front- and back-stage situations. One of these is consultants' requests for additional resources when discussing the implementation project with the deputy minister (in this role seen as a representative of the implementation project), but ignoring this issue during day-to-day work. '*We had only one and a half secretaries. That's not enough. As long as the IHIS does not function better, and as long it is double the amount of work and everything has to be recorded. Workload has not been reduced … they still have lot of work to do*' (CD22).

The crisis meeting was held because the management of the Ministry of Healthcare had almost lost its trust in the implementation project. Every part of the project seemed to be in trouble and almost all felt uncomfortable with the functionality of it. A lot of management effort at all levels had to be enforced to achieve at least some progress — something had to be done. The 2006 crisis meeting was an answer to this demand; a face-to-face event where trust could be re-established and the implementation project abstract system could be re-embedded, thus again achieve a state where the individuals could work on implementation without necessarily being physically placed together. Some incidents similar to the ones resulting in the need for the crisis meeting had been handled in similar ways earlier in the project. Especially after the autumn 2005 breakdown, many incidents of re-embedding occurred; incidents where personal interaction was needed to re-establish the individuals' trust in the implementation process. For example, the deputy minister's statement '*I will have this steering committee meeting each month … it provides me with a feeling of control*' (DM28) or when discussing the issue of encouraging the general practitioners to take part in the implementation project: '*… even though there was much criticism then just the fact that we show up, show our faces and talk about the plans leads to a more positive mood among the GPs*' (CIO9).

4.4   After the crisis meeting

At the meeting an action plan included deploying a consultant to Tórshavn. Updated functionality and principles on payments were agreed and executed.

Under the guidance of the supplier's project manager, the core system was finally configured during the spring. Isolated wards of the national hospital took the system into use during the summer of 2007, and a major roll-out was planned. In the second half of the year, the surgical ward succeeded in configuring parts of the system for their needs. The pilot wards continued their use of the system, but without integration with the remaining wards. However, the system did become more stable. In September 2007, the core system was formally taken over by the Faroese Healthcare Authorises and in December 2008, the ministry extended the project by at least two more years with a focus on implementing the IHIS in all remaining units and wards.

The implementation processes of the IHIS system are themselves clear examples of disembedding. By introducing the information system into the social system of the wards, social relationships are lifted away from the local interaction context, e.g. by letting a nurse order blood tests from the laboratory using the IHIS's 'requisition module', instead of having to go there herself with an order form. This is only possible because the nurse (the user) trusts that the procedures will work. In line with this, trust can be re-established during the process of re-embedding, which is when em-

ployees meet face-to-face and appreciate the quality (the pleasure) of personal interaction. During the implementation of the IHIS system, such personal interaction occurs during project meetings or through normal visits to each other's wards.

5 Conclusions and Further Research

The research objective of this paper was twofold:

1. Theoretical: To develop a framework for understanding dynamic aspects of trust during implementation of information systems based on concepts from Giddens' Theory of Modernity.

2. Empirical and analytical: To gain insight into how trust in the implementation project is developed dynamically during the implementation of Integrated Hospital Information Systems on the Faroe Islands, and hence to provide a proof of concept for the framework developed.

   This paper answers research Objective 1 by demonstrating how concepts from Giddens' theory of modernity can be conceptualized showing dynamic aspects of trust in the context of implementation of information systems. First of all, it is shown that the implementation project has qualities equivalent to those of an abstract system. Then, based on the argument that earlier studies of trust in this domain have been based on a limited analytical framework — e.g. simple classification of trust and on unidirectional influence of 'something' on trust (called variance theories) or the development of trust though stages (called process theories) — a 'new' analytical construct has been introduced, which is feasible for the analysis of dynamic aspects of trust creation. The dynamic elements offer potential for insights that the formerly used process and variance theories cannot supply, by giving more than more than just 'new' taxonomic explanations of trust and their generation since the causality 'flows' in many directions. E.g. the individuals experience at the access point of an abstract system affects their trust in the abstract system, but their level of trust also affects their behaviour at the access point. Trust is re-established and the system becomes re-embedded by trust-worthy facework experiences at the access point. Disembedding supports procedures with limited personal contact at the access points, thus affecting the individuals' trust in the system as such. Chronic reflection of the participants affects their level of trust which affects their use of the abstract system.

   Research Objective 2 is answered by showing how the framework provides insight into dynamic aspects of trust during implementation projects. Specific findings are:

1. The individual's experiences during the actual work to configure the IT system affect their trust into the implementation project abstract systems (IPAS), and the implementation project as such increased the dynamism in the health-care environment. This trust supported the disembedding process of the IPAS, enhancing the individuals' trust.

2. The 'playground' (sandpit) concept was a disembedding device since it supported work across time and space, based on the individuals' trust that they could work safely.

3. The face-to-face crisis meeting has a huge positive influence on the individuals' trust in the implementation project re-embedding the IPAS, just as a major part of other personal interactions did. The high level of trust lowered the need for formal project management structures and tools.

4. The participants constantly reflected on their own role in the IPAS, often leading the ontological concerns and thus lowering their trust in the sound foundation of the project. Their concerns were mainly related to lack of control, high workload and doubt on the quality of their own work.

The framework, in general, provides an extended language that can be used to analyse perceptions of trust and their implications, and eventually to provide theoretical descriptions of trust issues and guidance for practitioners in these difficult situations.

However, we have also identified more problematic issues regarding the conceptualization of trust by using Giddens' theory of modernity. First of all, the theory leads to a quite complicated set of concepts that is difficult to apply to the domain of information systems, especially because Giddens only provides a very limited set of normative guidelines. Next, the theory applied to IS could benefit from input on trust aspects from other fields, such as psychology or anthropology.

More studies are needed to gain further insight into trust and the implementation of information systems using the lens provided by concepts from Giddens' theory of modernity. First of all, it could be beneficial to analyse the results from a case study of the implementation of a large information system, to learn more about trust during implementation. Such an interpretative case study would also provide feedback on using the lens, thus letting us adjust it. In particular, a more precise understanding is needed of the relationships between the abstract system and the social procedures and information systems that constitute the abstract system.

Future research will systematically extend the analysis over the complete duration of the project and all the participants interviewed. We expect that Giddens' theories can be adapted to describe specific aspects of enterprise system implementation, including the study of the information system artefact itself and its part in the dynamic evolution of trust. This work can use earlier adaptations of structuration theory as a model. We also expect to investigate causal relationships in the evolution of trust, and to translate our findings into practice-related guidance for project teams.

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