INCENTIVES AND OBSTACLES IN IMPLEMENTING INTER-ORGANISATIONAL INTEROPERABILITY

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Abstract: This paper explores the incentives and obstacles that rise when implementing interoperability in organisations. In the focus we have an inter-organisational information system that has interfaces with several information systems managed by different organisations. Inter-organisational information systems are often connected to the information systems that are aimed to support functionalities in the partnering organisations and that are implemented earlier, even several years earlier in the organisations. This complexity increases degrees of difficulty of the implementation projects. In this paper we argue that there are obstacles that are not noticed or understood in the very beginning when the idea of implementing a joint information system is emerged. On the other hand, we found that mutual trust is an important factor to support the interoperability between the organisations. We limit this paper to consider only inter-organisational information systems that are implemented to support pre-defined joint functionalities.

1 INTRODUCTION

Modern technology enables organisations to interact with each other without physical contact or attendance (Markus, 2006). Close interaction is necessary when enterprises and other organisations collaborate with their partners or with their surrounding society. Inter-organisational information systems (Johnston & Vitale, 1988) are planned to transfer information across organisational borderlines. In recent years inter-organisational information systems have increasingly tended to support partnering among organisations (Hong, 2002) and organisations should link with each other to perform effectively in present-day environments (Daniel & White, 2005).

In this paper we explore the issues that organisations face when they are building a joint information system. We want to know what drives these organisations towards a common target. We argue that there are issues that are not noticed or understood in the very beginning when the idea about a joint effort is emerged. *"It's a question of politics instead of technology",* as was recorded in a project memorandum. In this respect we want to highlight that by reacting on the changing situations early enough the output may be even more satisfying than what was thought in the early stages of the project.

Our research methods were case study (Yin, 2003) and participatory observation (Flick, 1999). The study material was gathered from a single case where several organisations decided to implement an information system to support their collaboration. The research approach was very subjective and the interpretations based mainly on subjective experiences. However, there were several sources used when performing the study and the principles expressed by Klein and Myers (1999) acted as a backbone in the research.

2 IMPLEMENTATION AND INTEROPERABILITY

We consider implementation as an entire process from needs analysis and choice of technological solution, to the realisation of the full benefits from the technology (Munkvold, 1999). Information system implementations are also instances of organisational change (Davis & Olson, 1985, Sawyer & Southwick, 2002). Organisations and

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information systems are closely related because there is ever growing interdependence between business strategy and information systems and telecommunications (Laudon & Laudon, 1998). Any change in this relationship requires changes in other components of the relationship. Organisational aspects are recognised as key factors in the reasonable use of information technology (Southon et al., 1999). Organisations have differing cultures that are affected by the events of the past and by the climate of the present, by the technology of the type of work, by their aims and the kind of people that work in them (Handy, 1999).

Before any information system can be implemented, a lot of background work must be performed (Laudon & Laudon, 1998). Laudon and Laudon note that understanding information systems requires understanding the problems they are designed to solve, their architectural and design elements and the organisational processes that lead to these solutions. Likewise, Halonen (2007) emphasises the need to understand and know the process thoroughly.

Furthermore, trust is recognised as an important part of business as a facilitator of transactions (Gustafsson, 1996, Kramer, 1999). Trust plays three interrelated roles in inter-organisational relationships: it acts as an obstacle to opportunistic behaviour, it substitutes for hierarchical governance and it provides a competitive advantage (Karahannas & Jones, 1999). In addition, prevailing trust influences people's willingness to comply with organisation's directives and regulations and their willingness to voluntarily defer to organisational authorities (Kramer, 1999).

3 RESEARCH APPROACH

Our research was qualitative and it required the researchers to interpret the incidents (Walsham 1995). We also recognised the principles introduced by Klein and Myers (1999) for conducting and evaluating interpretive case studies. Especially the principle of interaction between the researchers and the subjects was realised by several discussions, emails and encounters in the study.

The idea behind the principles is to offer an approach that enables more rigour to conduct and report results of case studies (Klein & Myers, 1999). This was possible when the researchers carefully considered how and which of the principles applied in any particular research setting.

The empirical material was gathered remembering Yin's notion: an exemplary case study includes five features: 1) significance, 2) being "complete", 3) considering alternative perspectives, 4) displaying sufficient evidence, and 5) composed in an engaging manner (Yin, 2003). The case was reported by bearing in mind the idea of van der Blonk (2003) when he states that cases are written with a purpose that heads to the goal of the research project. Further, Walsham (1995) notices how an in-depth case study necessitates frequent visits to the field site over an extended period of time.

In the present study, one of the researchers was involved in the research scene acting as a project manager for several years (2003-2006). From the beginning, she wrote a personal research diary (c.f. Schultze, 2000), and at the end of the project there were notes about 350 days. However, the research approach was not emphasised in the project meetings because the utmost goal from the organisational view was to get the information system implemented. On the other hand, the research role of the project manager was explained in the first meeting (Memorandum June 16, 2003) and it was never hidden from the attendees.

4 THE CASE AND FINDINGS

The case consists of an information system project where an inter-organisational information system (called I-System in this paper) was designed and implemented to be piloted before taking into nation-wide use. The participating organisations had their representatives in the project group and a commercial vendor was hired to implement the system.

The information system was highly waited for and also people outside the project were interested in its progress. The project manager wrote into her diary June 16, 2003: *"They also told me about a new agreement and how it necessitates an information system."* The importance of the new information system was realised by one participant in a meeting: "*If the information system will not be implemented, the actions will be declined in our organisation. The stipulation for the nation-wide actions will be an information system!*" (Memorandum September 12, 2003). The high motivation was also expressed in words by the chairman in the same meeting: "*Our motive is to get this information system as soon as possible because it's impossible to act in the current way.*"

The commitment was not consistent, though. On the contrary, also negative comments were

expressed: *"sRegister [pseudonym] does not want to be involved if they have no role of their own."* Another message came from an attendee to the project manager and thus she denied their involvement into the work of the project group: *"vOrganisation [pseudonym] will only participate by separately made agreements."*

We perceived other problems with commitment by some of the participating organisations. The project manager got email (September 16, 2004): "*It really seems that all tasks that were assigned to Acro [pseudonym] are left half-way.*" There were problems with the user organisations, too. The project manager got email May 12, 2005: "*The situation is as before. We'll start the technical implementation at the end of the summer.*" This email discussion continued on February 10, 2006: "*The progress has been slow. The specifications are almost ready. We'll try to get this fixed in the second quarter.*" However, the assignment was not completed until the project was ended.

We also perceived reluctance in delivering information in organisations when there was need to get changes made in other information systems. On several occasions it was found that knowledge was not available there where it was needed. "*I'm sorry about this outburst but we really don't know anything about this task and this 'cgi' is everything we have been told even if we wanted to know something else about it, too!*" (Email August 8, 2005).

The users expressed their trust when participating in the development work. Also the project managers felt deep trust on each other: "*This email is only for you ...*" (Email September 16, 2004). In addition, several SMSs were sent even late in the evening telling about the progress: "*JK got today a preliminary version of the new XML reader ready. Use of memory 2Mb, use of CPU 100 % when reading in, dummy courses 200000, file size 139 Mb. Time 6 secs, with full debug 4 min. With database latent 30 secs. This sounds really promising!*" (SMS 9:36 pm October 15, 2005).

The project members were used to trust on each other and they kept saying in project meetings: *"Of course we rely on that [they] offer qualitative [services] and do not suspect it."(*Diary October 25, 2005). *"I don't believe that anybody would on purpose do wrong or anything unauthorised."* (Diary November 4, 2006)

At the end of the project the response received from the users was mainly positive and supportive. Altogether 580 feedback notes were received. The received feedback enabled us to interpret also the output from the users' point of view. The feedback was divided in three categories: contents and development 520 notes; technical issues 46 notes; and other 14 notes. As the order of categories was as listed above, the order may have influenced the numbers per category. However, the feedback messages discussed either the perceived observations, use of I-System or problems with finding additional information. The main impression was positive and the users were grateful for the possibility to use the system without need of footwork or to send paper forms to different organisations.

5 DISCUSSION AND CONCLUSIONS

Inter-organisational information systems differ from intra-organisational information systems in several aspects. Firstly, they are accessed by users from several organisations instead of only one organisation. Secondly, the data inserted in the information system is influenced by information systems managed by people coming from other organisations. Thirdly, the database of the information system is influenced by people coming from several organisations instead of people hired by one organisation and who follow procedures used in that organisation.

In the present study, the main driver towards higher interoperability of the participating organisations was the fact that mutual cooperation was practically impossible without a joint information system. We saw that this motivation was strongly pushing the implementation project forward. Also, trust was perceived to support interoperability between organisations and its role was emphasised especially when developing and taking I-System into use. Trust was present in the project meetings when discussing the procedures and transferring information between organisations.

Although high motivation was expressed in the project meetings, the commitment of the same participants was not necessarily consistent. Some of the organisations could not even complete their assignments before the end of the implementation project. Also, one of the main obstacles was the reluctance to deliver the needed information inside the participating organisations, especially in the case of distributed departments and units. This lack of information sharing inhibited future development and influenced also plans to develop I-System. These issues were not noticed or understood in the

beginning when the idea of implementing a joint information system was emerged.

The findings of the present work came from a single case. Despite that, we believe that the issues found in this research can be quite common to all projects that are implementing inter-organisational interoperability. Future study could deepen the analysis, especially to give a better understanding of the influence of the organisational structure on the information sharing.

REFERENCES

Baskerville, R., 1992, The Developmental Duality of Information Systems Security. *Journal of Management System* 4 (1): 1-22

Blonk. van der H., 2003. Writing case studies in information systems research. *Journal of Information Technology* 18 (1): 45-52.

Daniel, E.M. & White, A., 2005, The future of inter-organisational system linkages: findings of an international Delphi study. *European Journal of Information Systems* 14 (2): 188-203.

Davis, G.B. & Olson, M.H., 1985, *Management information systems: Conceptual foundations, structure and development.* New York: McGraw-Hill Book Company, p 561-601

Flick, U., 1999, *An Introduction to Qualitative Research,* Thousand Oaks: Sage Publications Inc.

Gefen, D. & Ridings, C.M., 2003, IT Acceptance: Managing User – IT Group Boundaries. *The DATA BASE for Advances in Information Systems* 34 (3): 25-40.

Gustafsson, M., 1996, The Power of Trust. Nr 185 *Preliminära forskningsrapporter*, Åbo Akademis tryckeri, Åbo

Halonen, R., 2007, Digitized information management: The dynamic information system. *Journal of Digital Information Management* 5 (1): 23-29.

Handy, C., 1999, *Understanding organizations*. London: Penguin Books, p 180-216.

Hong, I.B., 2002, A new framework for interorganisational systems based on the linkage of participants' roles. *Information & Management* 39: 261-270.

Iacovou, C.L., Benbasat, I. & Dexter, A.S., 1995, Electronic data Interchange and Small Organizations: Adoption and Impact of Technology. *MIS Quarterly* 19 (4): 465-485.

Johnston, H.R. & Vitale, M.R., 1988, Creating Competitive Advantage with Interorganizational Information Systems. *MIS Quarterly* 12 (2): 153-165.

Karahannas, M.V. & Jones, M. 1999, Interorganizational systems and trust in strategic alliances. In: De P & DeGross JI (Eds.): *Proceedings of the Twentieth International Conference on Information Systems*, December 13-15, 1999 Charlotte, North Carolina, USA. Association for Information Systems, Atlanta, GA, USA, p 346-357.

Klein, K. & Myers, M., 1999, A set of principles for conducting and evaluating interpretative field studies in information systems. *MIS Quarterly* 23 (1): 67-94.

Kramer, R.M., 1999., Trust and Distrust in Organizations: Emerging Perspectives, Enduring Questions, *Annual Review of Psychology* 50: 569-598.

Laudon, K.C. & Laudon, J.P., 1998, *Management Information Systems, New Approaches to Organization and Technology.* New Jersey: Prentice-Hall, p 4-33, 506-537.

Markus, M.L., 2006, Building Successful Interorganizational Systems. In: Chen, C.-S., Filipe, J., Secura, I. & Cordeiro, J. (Eds.) Enterprise Information Systems VII, Heidelberg, Springer.

Mumford, E., 2003, *Redesigning Human Systems*. Hershey, PA: Idea Group Publishing.

Munkvold, B.E., 1999, Challenges of IT implementation for supporting collaboration in distributed organizations. *European Journal of Information Systems*, 8: 260-272.

Sawyer, S. & Southwick, R., 2002, Temporal Issues in Information and Communication Technology-Enabled Organizational Change: Evidence From an Enterprise Systems Implementation, *The Information Society,* 18: 263-280.

Schultze, U., 2000, A Confessional Account of an Ethnography About Knowledge Work. *MIS Quarterly* 24 (1): 3-41.

Shibboleth, 2006, http://shibboleth.internet2.edu/. (Accessed November 20, 2006)

Southon, G., Sauer, C. & Dampney, C.N.G., 1999, Lessons from a failed information systems initiative: issues for complex organisations, *International Journal of Medical Informatics* 55: 33-46.

Walsham, G., 1995, Interpretive case studies in IS research: nature and method, *European Journal of Information Systems* 4: 74-81.

Yin, R.K., 2003, *Case Study Research. Design and Methods*. Third Edition. London: SAGE Publications.