# Networks of Pain in ERP Development

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Abstract:    Enterprise resource planning (ERP) systems have been providing business benefits through integrated business functions for two decades, but system implementation is still painful for organizations. Even though ERP projects are collaborative efforts conducted by many separate organizations, academic research has not fully investigated ERPs from this perspective. In order to find out the challenges of ERP development networks (EDN), a multiple case study was carried out. We identified three main categories of pain: evolving network, inter-organizational issues, and conflicting objectives. The dynamic nature of the EDN causes challenges when new organizations and individuals enter and leave the project. Relationships between organizations form the base for collaboration, yet conflicting objectives may hinder the development. The main implication of this study is that the network should be managed as a whole in order to avoid the identified pitfalls. Still more research is needed to understand how the EDN efficiently interacts to solve different problems in ERP development.

## 1 INTRODUCTION

Recently, both researchers and practitioners have paid a great deal of attention to Enterprise Resource Planning (ERP) (Dezdar and Sulaiman, 2009). ERP offers organizations an all-in-one solution for the seamless integration of information flow across the organization and, as a result, increased competitiveness (Davenport, 1998). ERP research in Information Systems (IS) has focused on areas such as critical factors (Al-Mashari et al. 2003), failures (Barker and Frolick, 2003), organizational development (Berente et al., 2008), and organizational fit of ERP (Hong & Kim, 2002).

Moreover, it was noted in the literature already a decade ago that implementation projects are prone to failure, lead to cost overruns, and, in the worst-case scenario, to project cancellations (Pekkola et al., 2013). Unfortunately, examples of ERP project failures are not difficult to find, see e.g. Hershey, Nike, or HP (CIO, 2009). In fact, it has been estimated that more than 90 percent of ERP implementations are unsuccessful to some degree (Momoh et al., 2010). Due to contemporary practices, ERPs are often developed in networks of organizations that comprise a multitude of

stakeholders from different levels of each of the organizations (Dittrich et al., 2009). The network aspect of ERP development has not, however, gained enough attention in ERP research communities.

In this paper, the challenges in ERP development are investigated by examining the ERP development networks (EDN) of three large enterprises. The research question is as follows: *what kind of pain can be identified in ERP development networks?* To accomplish this, we conducted an interpretive case study comprising 43 semi-structured interviews.

In section 2, the findings from a review of the related research are presented. Section 3 introduces the case organizations and the research approach. Section 4 presents, the findings from an analysis of the data. In the discussion section, the findings are elaborated on and linked to existing literature. Finally, the conclusions section highlights our key findings and suggests areas of future research.

## 2 RELATED RESEARCH

An ERP system is a packaged information system that provides, through a process-oriented view, an

integrated solution for an organization's information processing needs that enables the organization to efficiently manage its use of resources (Nah et al., 2001).The implementation of an ERP system affects most parts of the organization and usually involves external stakeholders (Davenport, 1998). Together, these actors form a development network that comprises all actors starting from the flagship organization (e.g. SAP) to the users in the adopting organization (AO) (Dittrich et al., 2009; Sarker et al., 2012). There may also be various other actors from different organizations that provide diverse areas of expertise, e.g. implementation consultants or offshored developers (Dittrich et al., 2009; Ernst and Kim, 2002). Communication and interaction between these actors are prone to errors and misunderstandings (Sarker and Lee, 2003).

The development networks, their problems, and interactions are understudied in IS literature. Previously, these global networks were approached from a general business perspective (Ernst, 2010), from a global vendor's and its partners' perspective (Sarker et al., 2012), or based on human communications research from single companies' internal perspective while separating the network from the development activities (Isomäki and Pekkola 2010).

To highlight the pain in ERP development, we have drawn on the literature that describes the critical factors in ERP implementation. A preliminary literature review revealed a large number of IS papers that were concerned with critical factors and other impediments in ERP implementation. None of them, however, explicitly focused on network related issues, except for Nour and Mouakket (2011). Instead, they investigated factors from a multi-stakeholder perspective, mapping the factors identified from the literature to proposed fundamental stakeholders in ERP implementation. We, on the other hand, used the literature on critical factors to assemble a holistic picture about the possible issues encountered in ERP implementation in general.

Six articles (Al-Mashari et al. 2003; Amid et al., 2012; Dezdar and Sulaiman, 2009; Kim et al., 2005; Momoh et al. 2010; Shirouyehzad et al., 2011) were chosen as the starting point from which to gather the general ERP challenges from the literature. Forward and backward searches were also applied when considered necessary (Webster and Watson, 2002).

The pain in ERP development was divided into eight categories comprising 40 issues. The examination of these issues strengthens the earlier observations that the current literature does not pay
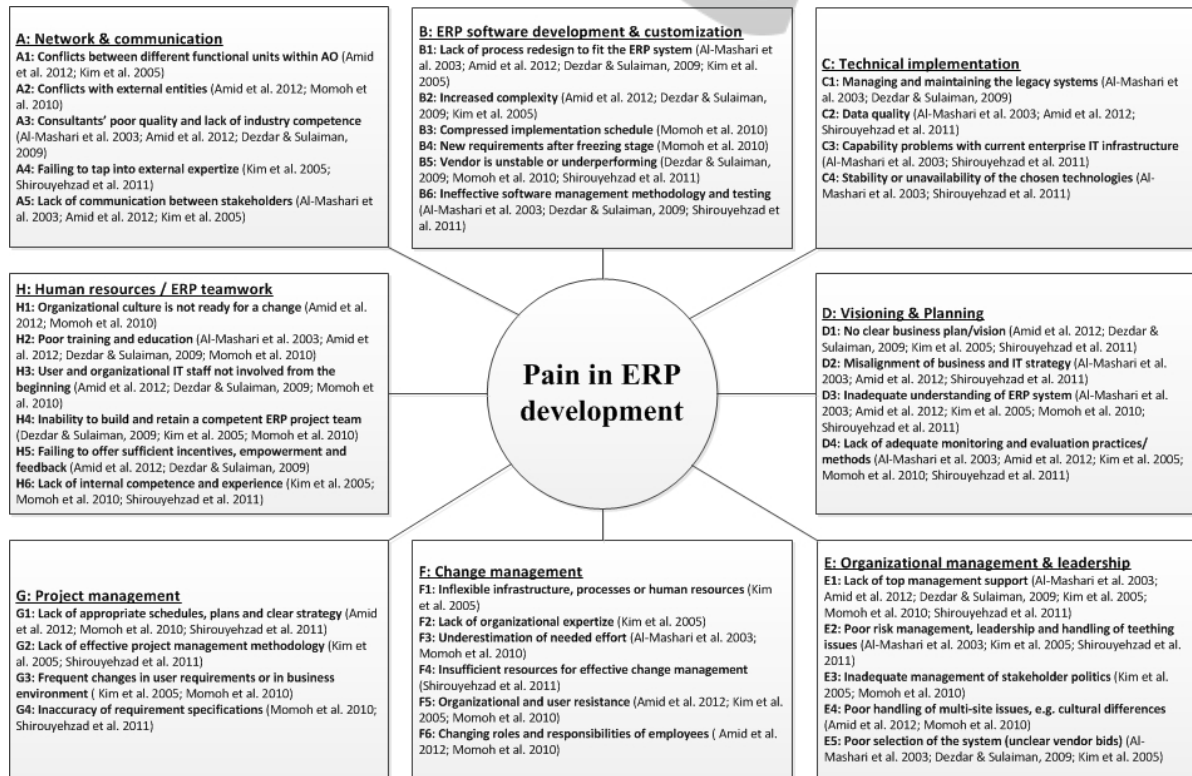


Figure 1: Pain in ERP development.

much attention to network-related issues. For clarity, the themes are labeled alphabetically and the issues under them are numbered accordingly. The findings are presented in Figure 1.

# 3 RESEARCH APPROACH

An interpretive case study approach (Walsham, 1995) was selected in order to gain in-depth knowledge on EDNs. Data was gathered from three different organizations to identify characteristics and issues related specifically to ERP development networks rather than idiosyncratically to a certain organization. The interviews were conducted between January and June 2013 and analyzed between June and September 2013.

## 3.1 Case Organizations

Case A is a large, global manufacturing organization with almost 30.000 employees. In the mid-1990s, the company initiated a customized ERP system for sales and logistics to replace the legacy systems. The existing ERP products on the market did not support the specialized business processes. The project encountered many challenges that included architectural redesign and a merger with another company. These challenges resulted in both budget and schedule overruns. The system is currently in use in its intended scope and it is still being developed in cooperation with the original vendor.

Case B is a global service provider in the retail business with over 1.000 employees. The company is currently renewing its ERP system with a customized solution because the old system no longer supported the critical business processes. The company and the vendor have had a history of cooperation for over 15 years. The same vendor also provided the previous ERP system. The current project was initiated in 2008 and at the time of the writing of this paper it was in the pilot phase with initial rollouts.

Case C is a globally operating manufacturing organization with over 20.000 employees. It decided to implement a customized ERP system for its raw material procurement business together with a vendor. The initial planning was started in 2003 with the actual project kick-off in 2006. The first version of the system went live in 2008. At the time of writing this paper, the company was continuing to invest heavily in project and maintenance work to further improve the system. The system was rolled into new geographical areas in 2011.

## 3.2 Data Collection

Data collection began in each case organization with an initial interview with our main contact person (e.g. CIO). The rest of the interviewees were chosen with snowball sampling. Additionally, organizational charts were studied in order to consider all the relevant stakeholder perspectives. The interviewees, their work profiles, and organizations are illustrated in Table 1.

Table 1: The work profiles of the interviewees.

| Inter-viewees | Business | IT | ERP vendor | 3rd party | Total |
|---|---|---|---|---|---|
| Case A | 2 | 6 | 7 | 2 | 17 |
| Case B | 7 | 5 | 4 | - | 16 |
| Case C | 6 | 4 | - | - | 10 |
| Total | 17 | 13 | 11 | 2 | 43 |

The content of the interviews was based on the preceding literature review. Each interview was conducted onsite at the case organization. The interviews lasted from 11 to 111 minutes, and the average was about one hour per interview. The interviews were recorded and transcribed for analysis purposes. The researchers also collected secondary research material such as documents and reports to better understand the context.

## 3.3 Data Analysis

One dedicated researcher was responsible for the data analysis of each EDN. The following analysis method was chosen because of the data-driven approach and cooperation of the three researchers. First, the responsible researcher identified and categorized the ERP development challenges from the data. Second, the researchers compared the categories with each other in several brainstorming sessions in order to find similarities and differences as well as to agree on common categories for the analysis. Third, due to the network perspective, the challenges that could occur in in-house development without the presence of EDN partners were excluded. As a result, three main categories and eleven subcategories were identified. Finally, the findings were compared with the existing literature in order to understand the theoretical implications.

# 4 FINDINGS

*"You most likely know the critical success factors of an ERP project? We failed them all."* –Case C, AO

The resulting three most essential categories and their sub-categories are presented below. Some categories are in practice intertwined, but to improve clarity they have been divided.

## 4.1 Evolving Network

*"We have lost some of the key persons [with 20 years' of experience] already before. It always stops the development like hitting a brick wall."* –Case C, AO

The EDN of each case organization has evolved at three levels during the ERP system development. The network can evolve at the organizational level. Also, structural changes in the organization or environment of the EDN can introduce additional challenges for ERP development, as can individual people entering and leaving the projects for various reasons.

### 4.1.1 New Organizations Involved

The development has involved business partners and external stakeholders such as vendor subcontractors and implementation consultants. Some of these organizations have had a periodic role in the development:

*"We have done it in several waves. The latest one, I can't remember the name of the firm, we designed the layouts together and they made the models and designed the usability."* –Case B, Vendor

*"We purchased consulting services for the initial planning, but I can't remember who or which company it was."* –Case C, AO

AO in Case A ended up in a conflict with a database vendor:

*"And things ran smoothly with [the original database vendor] for a couple of years but then they became a little greedy at some point and the license fees starting increasing a little too much and they weren't as flexible anymore so we decided to, [switch the vendor]"* –Case A, AO

The periodic presence of organizations increases the complexity of the EDN at the organizational level, and thus possibly complicates the overall management efforts.

### 4.1.2 Structural Changes in Organizations

Structural changes in an organization can hinder the ERP development. For example, a merger changed the original scope of the system in Case A:

*"Then we had a project phase with severe system architectural issues. The original scaling, implemented with the technology of the time, was insufficient for production use at the scale of our company at that time, as the merged company."* –Case A, AO

The merger also introduced competing systems. Upper management had to decide which system to abandon and which system to develop further. The length of time before a decision was made resulted in a period of uncertainty. Even organizational changes on a smaller scale can change the roles and relationships:

*"We had a very good network of specialists, coordinators, super users, and users but the co-determinations killed the whole thing"* –Case C, AO

In addition to the changes in AO, structural changes in the vendor organization were also seen as a challenge to ERP development. The structural changes were the result of the continuously increasing number of employees, new operating models, and the offshoring of operations. These actions introduce difficulties:

*"The vendor and we have changed organizations so that I could not contact him, but instead someone who doesn't know anything about the issue."* –Case C, AO

### 4.1.3 Involvement of Individuals

The EDN constantly evolves on an individual level. Some of the individuals were identified as being crucial for the ERP project because of their experience and tacit knowledge. Thus, their absence creates a void that further disrupts the project dynamics:

*"...there was a clear dip in performance when he [project manager] left, there was no single person who has the 13 years' of experience about the system."* –Case B, AO

The role of key persons was further emphasized. If a key person decides to leave, it can take a long time to train a new person – even with a help of good documentation:

*"Just before a new go-live, one important business stakeholder moved to another country and another person responsible for the specifications retired. Even though we had pretty good documentation we lost a lot of important knowhow."* –Case C, AO

Additional challenges were due to changes in the involvement of different people in different project phases. For example, the business representatives present in the specification phase were different from those in the verification phase.

*"There were over 100 persons during the busiest implementation phase, but only a handful of the original are here anymore."* –Case C, AO

*"As the project dragged on and ran into complications, I must say that the business people disappeared along the way"* –Case A, AO

This caused confusion and misalignment of needs, and, as a result, extra work was needed to re-establish the personal relationships between individuals, after changes in involvement.

## 4.2 Inter-organizational Issues

*"We have understood for a long time that we are in a kind of a forced marriage"* –Case A, AO

As ERP development is a cooperative effort carried out by a dynamic EDN, the relationships between different organizations are of major importance. Misunderstandings, unevenly divided power, and vendor incompetence were identified as challenges in these relationships. The development model formed by the network and third party relationships were also considered to be problematic.

### 4.2.1 Long-term Relationship with Vendor

In all cases, a long-term relationship between vendor and AO was identified, and both history and personal ties determined this relationship. The vendor-AO relationship turned out to be significant in terms of impact on development activities.

In Case A, the relationship was described as a "forced marriage". The AO had even considered buying the source code of the system from the vendor. In the project phase, a very solid project group was established and development was done in close cooperation, whereas currently the vendor would like to have more direct contact with the AO's business. Also, the constant cost cutting of the AO has forced the vendor to continuously optimize its processes and to outsource the development to low-cost countries.

History between the AO and vendor can affect the development process. For example, in Case B some features are made "off-the-record" to satisfy the AO. However, the long-term relationship can also cause problems. For example, in Case B the AO had "blind trust" in the vendor's knowledge both about project management and business logic in the

initial development phases. This resulted in a miscalculation of the resources required and to misfits between the system and business processes. Also, in Case A, trusting too much on a vendor's expertise when choosing the system's base technologies was a mistake because the system encountered architectural problems during the initial rollouts.

### 4.2.2 Misunderstandings

Misunderstandings between stakeholders hindered the development:

*"There was a completely wrong illusion about the situation."* –Case C, AO

In Case B, the vendor saw the project phase as piloting while AO management considered it to still be planning and development because half the modules were missing. Other misinterpretations concerned the number of missing features; the vendor saw that most of the necessary features were in place: *"At the moment we have an understanding that there shouldn't be a long list of new features"* while the AO thinks these are just the initial ones *"we have four years of development needs waiting"*. Furthermore, in Case A, achieving a common understanding was initially challenging:

*"I was talking about the fence pole and they were talking about the fence. We had agreed on completely different things and neither of us understood anything."* –Case A, AO

### 4.2.3 Unevenly Divided Power

In Case B, there are considerable differences in size and revenue between the vendor and the AO. Thus, the AO is able to dictate the order in which new features for the system are developed:

*"We have a pressuring means towards that end [vendor], so that all the other doings will stop if we have that kind of [major] problem."* –Case B, AO

In Case C, the situation is reversed as the AO is struggling to keep the vendor's competent personnel in the project:

*"At the moment, we have to cut our investment budget and we're really afraid to lose the key resources at the vendor side. We know that they will be allocated to different projects if we can't give them enough work."* –Case C, AO

Unlike with Case B, in Case A the power relationships between the AO and vendor are more even. It was estimated that the failure of the ERP project would have caused serious consequences for both sides:

*"I would say so that what saves these kind of*

*projects is the situation where [AO] and vendor are both equally in trouble…Then there is the will to go forward.”* –Case A, Consultant

### 4.2.4 Vendor Incompetence

The vendor's incompetence was highlighted as one of the challenges in ERP system development. The vendor's ability to manage the overall development was criticized in Case B. According to the AO, *“vendor has too many things and changes going on”*. The vendor has not been able to allocate resources properly because the scope of the project has not been fully realized. Furthermore, the vendor has not been able to create a roadmap for the system and that has caused problems for the whole EDN.

*”By roadmap I mean that the vendor could have clearly stated when certain stages are finished and what those will include…That has been the challenge.”* –Case B, AO

Further, due to poor testing practices, too many errors have been found when piloting the system. New versions have caused old functionality to break and the load on the system has not been calculated properly.

In Case A, the vendor had a lack of well-established practices in the beginning of the project. Because of insufficient testing, the first deployment of the system failed. According to consultants, the vendor conducted the testing in an unrealistic environment. Consultants entered the project to cooperate with the vendor to solve the problems caused by non-scalable system architecture. This cooperation was difficult in the beginning:

*“Practically, they didn't have a clue how to make it work… They developed it in a vacuum and when we looked at it, it seemed that the way of implementing the system… was completely wrong.”* –Case A, Consultant

### 4.2.5 Development Model

A development model includes practices and processes for carrying out the cooperative development between the stakeholders in the EDN. The development model was causing problems:

*“The customer and vendor are partially working in their own silos. On a personal level, the co-operation is good but we are not sure if this is the most efficient and optimal way of working.”* –Case C, AO

In Case A, it appeared that establishing a solid project group between the AO and the vendor was considered challenging:

*“I was leading the project at the customer side*

*and the vendor had their own leaders… it was messed up completely… The biggest challenge was to get rid of the mind-set of ‘we pay and you deliver’.”* –Case A, AO

The vendor on the other hand criticized the current development model for being too slow until the requests are turned into features of the system. Similarly, a representative of Case C criticizes the issue management:

*“It takes about two-three weeks if I create a service ticket before someone from India starts calling and doesn't understand anything.”* –Case C, AO

Furthermore, in Case A, the AO and the vendor created separately the business and technical roadmaps of the ERP system. The vendor saw this as a mistake and emphasized the closer cooperation:

*“Their business is a customer to their IT, and our customer is their IT organization. This is the old model that we've stuck with.”* –Case A, Vendor

### 4.2.6 Relationships with Third Parties

Relationships with third parties in the EDN can cause additional challenges for the development. In Case A, consultants estimated that both the AO and the vendor were relying too much on the solutions of large database vendors whose products they were already familiar with. Later, the chosen technology turned out to be insufficient.

Because ERP systems integrate with the systems of third parties, additional organizations may become involved in the EDN. In Case B, integrating the ERP with the systems of two business partners was seen as especially challenging. In addition, in Case C, a major integration challenge has emerged due to a possible need to include the standardized interfaces of a third party in the system.

## 4.3 Conflicting Objectives

*“The local director hated the system and didn't want it…They didn't say it in public but that's how it was.“* – Case C, AO

Conflicting objectives turned out to be a major issue in ERP system development: the vendor's dual objective, ownership issues, and power relationships hindered the decision-making.

### 4.3.1 Dual Objective of the Vendor

The vendor can have a dual objective: to customize the system to serve the AO's needs and to simultaneously build a general product for other clients. In Case A, the initial plans for making the

product were discarded, as the amount of custom logic made specifically for the AO increased:

*"We should have thought more clearly about whether we are making a product or a customized system… That's one of the basic things that distracted the project."* –Case A, Vendor

Similarly, the vendor in Case B saw that when making a product, compromises needed to be made:

*"My role began with starting to chew that wish list [of specifications], thinking about how we can fulfill those wishes with our new product...So it's a kind of balance, how many of them can become general features. And some flexibility, that the AO can be flexible about some things that we can make them general features that we can't make everything according to their wishes."* –Case B, Vendor

However, it seemed that the vendor lacks the resources to accomplish both of its goals, especially if the needs of other clients acquiring the product are conflicting with the AO's requirements. This easily leads to tensions between organizations:

*"It is annoying to pay for some basic functionality which you have in a way developed, and afterwards other clients may of course buy it for some package price but they would never buy that plus this [the development work]."* –Case B, AO

Also in Case C, an interviewee commented on how the vendor could benefit the competitors:

*"If the vendor learns something new during this project, they can reuse the ideas with the competitor."* –Case C, AO

### 4.3.2 Internal Conflicts in the AO

Internal conflicts inside the AO can introduce additional challenges for ERP development. Different business functions may have conflicting needs and managing these needs within one system is not easy. As an extreme example, when Case A went through a merger during the project, power relationships changed and some functional areas came under different leadership:

*"They [logistics] started making separate islands ... they wanted to "freeze" the system to a certain point and started to include all kinds of additional systems there. It has been ongoing for ten years now and we have ended up with serious problems ..."* –Case A, AO

Additionally, because of scarce resources, it was found that multiple simultaneously ongoing projects disrupted the ERP development. For example, in Case B the objective is to implement a new operating model along with the ERP. Since these projects were in different phases and managed by

different personnel, misfits occurred, e.g. business project people considered the project as a clean slate approach while the IT department sees it as using the old system as a basis for development, even though their alignment is considered essential.

## 5 DISCUSSION

Even though ERP research has reached a certain level of maturity (Schlichter & Kraemmergaard, 2010), ERP projects often still exceed schedules and costs, heavily (Amid et al., 2012; Momoh et al., 2010). Most of the literature on ERP challenges focuses on the AO while vendor and network related issues are given less attention. Our findings, however, suggest that issues caused by networked development are in fact relevant for an ERP project.

We compared our findings with the literature synthesis presented in Figure 1 and mapped the issues overlapping with our sub-categories (Figure 2). Four categories have already been fairly well documented in the literature, and four categories are found at least some level. Our study has also revealed three new categories of issues that hinder the development activities in such networks.

| Identified pain | Literature coverage | References (as labelled in Figure 1) |
|---|---|---|
| **EVOLVING NETWORK** | | |
| New Organizations Involved | NO | - |
| Structural Changes in Organizations | PARTLY | G3 |
| Involvement of Individuals | YES | F6, H4, H6 |
| **INTER-ORGANIZATIONAL RELATIONSHIPS** | | |
| Long-Term Relationship with Vendor | PARTLY | A3, E3 |
| Misunderstandings | YES | A5, D3 |
| Unevenly divided power | NO | - |
| Vendor Incompetence | YES | A3, B5, B6 |
| Development Model | PARTLY | A4, D2, G2, H4 |
| Relationships with Third Parties | PARTLY | A2 |
| **CONFLICTING OBJECTIVES** | | |
| Dual Objective of the Vendor | NO | - |
| Internal Conflicts in the AO | YES | A1, F5, E4 |

Figure 2: Findings mapped with the existing literature.

*Evolving Network.* Frequent changes in key users or building and retaining a competent ERP project team are found challenging (Amid et al., 2012), yet they focus on the individual level. We found that equivalent issues are also caused on the group and organizational level. Changes in the AO's business environment add challenges to ERP development (Kim et al., 2005; Momoh et al., 2010). Our findings indicate that structural changes, e.g. switching

operating model or outsourcing operations, within the vendor organization may also introduce problems. ERP development in networks becomes challenging as new organizations become involved, but no references from the literature was found to support this. In addition, the changes in the network cause other types of challenges to emerge, e.g. the temporary involvement of third parties may set certain pressures for documentation standards and communication methods.

*Inter-organizational Issues.* Distrust between partners and external parties' lack of industry competence are obstacles for successful cooperation (Al-Mashari et al., 2003). Due to long-term cooperation, these were not identified as problems. In our study, trust was often the term used to describe the relationship between the AO and the vendor. Surprisingly much trust about business processes is placed on the shoulders of the vendor. This, however, introduces new challenges for ERP development, e.g. stakeholders' competence is taken for granted and formal cooperation methods are bypassed. At worst, this leads to a misalignment of the development activities, and thus distracts the cooperation within the EDN.

Generally, the relationship between the AO and the vendor/consultant is considered important (Dittrich et al., 2009; Sammon and Adam, 2002). We found evidence of unevenly divided power between these organizations that hindered the development. One party with the upper hand in decision-making is capable of steering the project in biased way. In addition to the AO-vendor relationship in the network, third parties can establish important relationships between themselves, and hence complicate the network structure and power relationships. Both these issues are challenging for the overall management of the network, yet neither of them was earlier identified in the literature.

Inter-organizational relationships define the development model for the EDN, which was identified as a source of pain. Nevertheless, the current literature does not clearly separate the AO and the vendor when discussing ERP software development and product management challenges. We see that when developing the system in a network, a joint development model is very important in order to avoid the misalignment of business and IT in all organizations, for example.

*Conflicting Objectives.* Since EDNs reach over organizational and national boundaries, and stakeholders may have differing goals, multi-site issues such as cultural differences hampers the overall project (Momoh et al., 2010). Problems arise from the conflicting agendas and objectives between different functional units within the AO (Amid et al., 2012). In addition, our study highlighted the dual objective of the vendor that hinders the development. The vendor's custom versus product dilemma caused significant problems. For example, mutual understanding was difficult to build or the resources for development were insufficient. Similar project management challenges from the AO's point of view have been identified (Kim et al., 2005; Shirouyehzad et al., 2011) but these do not usually take the vendor into account.

The sheer number of stakeholders involved in ERP projects has been considered challenging (Momoh et al., 2010). Sammon and Adam (2002) stress the need to understand the relationships between the organizations involved in ERP development. Current literature is not fully aware of these relationships and their impact on the ERP development. Our study takes a step forward in filling this gap by observing that in all cases both the third parties and the organizations' separate stakeholders can have a huge impact on the ERP project.

This study has its limitations. First, the results of qualitative case studies are not easily generalizable, so quantitative studies on EDNs would also be useful. Second, the context should not be dismissed when applying these findings. These networks are all from similar cultural environments that are in general considered to be democratic in terms of coordination. Within and between the organizations, more emphasis is laid on trust than on different legal agreements. Hence, these findings, as such, may not be applicable, for example, in North American organizations. Third, all cases are from a custom system development context that differs from customization of an off-the-shelf product (Damsgaard and Karlsbjerg, 2010), e.g. the role of the vendor organization is not the same. However, Chiasson and Green (2007) suggest that: "*the differences between packaged software and customized development are one of degree, not kind*" (p. 553). Thus, we believe our findings are also usable for packaged EDN.

In future, we want to understand how the identified pain could be avoided. For example, how can the issues caused by different development models be overcome. Investigating the suitability of agile methods in such environments would be a potential area for future research. Communication between different groups in ERP projects is challenging (Al-Mashari et al., 2003). Thus, the

EDNs should be studied more deeply, and especially how the EDN forms the development model and how information is shared between the EDN.

# 6   CONCLUSIONS

This study contributes to field of ERP and IS research. The objective of this paper was to identify those challenges that may hinder ERP development when co-operating in multiple stakeholder networks. These challenges were uncovered by analyzing 43 interviews from the EDNs of three large organizations. The findings were classified into three main categories: evolving network, inter-organizational issues, and conflicting objectives. These were further divided into 11 sub-categories.

The aim of this paper was not to provide yet another set of critical failure factors. In relation to the literature, however, we found that four of the identified challenges were only partly covered earlier and three of the challenges had not gotten any attention before. The novel issues hindering the ERP development activities were temporal involvement of organizations, unevenly divided power between stakeholders, and dual objectives of the vendor.

This study took an important step to treat ERP development and its challenges from a network perspective. For practitioners, the categories provide a tool to evaluate and seek possible causes of problems in such networks. By doing so, organizations could be able to focus more on the relevant issues in ERP development, and thus improve the overall management of the project. The categorization is not only useful for the AO but may be used by other stakeholders in the network as well.

## ACKNOWLEDGEMENTS

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