Towards the Causal Structure of Problems in Enterprise System Adoption

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Abstract
The goal of this paper is to understand the nature of the difficulties experienced during Enterprise System (ES) adoption and to reveal the interrelations between problems. Drawing from the experience of a few dozen ES adopters and using grounded theory approach, this study proposes a categorisation of difficulties into groups connected with: employees, system, system misfit, enterprise, IT infrastructure, training, system replacement, implementation process, and system vendor. Furthermore, the analysis suggests the causal relationship among different types of difficulties. On the basis of the proposed causal relationship, this study illustrates what is the real problem in ES implementation, and what is the manifestation or the consequence of the other problem. Finally, on the basis of the research, conclusions and recommendations were drawn for the researchers and practitioners dealing with ES implementation projects.

Keywords
Enterprise System, implementation, difficulties, causal relationship

Introduction
The implementation of an Enterprise System (ES) is usually a lengthy and complex process during which the company undergoes many difficulties and has to remove various impediments to project success. Naturally, the results of ES implementation can be varied, from overall success manifested in the increase of a company’s profitability, to a complete failure and the firm’s bankruptcy. Consequently, it is valuable to investigate implementation projects and try to discover issues having an influence on implementation outcome. In particular, it is valuable to examine the difficulties experienced by the practitioners and learn from their experience in order to avoid traps and minimise the risk of failure.

The issue of problems experienced during ES implementation has attracted the attention of several researchers. There are studies dealing with difficulties in Enterprise System implementation which are based on research conducted among adopters and experts dealing with ES implementation. Some research works were conducted only among adopters, others only among experts representing the system supplier, finally there are studies inquiring both groups. An example of the last study is the research performed by Markus, Axline, Petrie and Tanis (2000). This research was conducted among a few dozen respondents, both adopters and experts representing system suppliers, dividing the discovered problems into groups on the basis of project phase.

The field studies conducted among ES adopters include a survey of Fortune 500 organisations performed by Kim, Lee, and Gosain (2005). The authors use a few dozen impediments identified from the previous ERP implementation studies and
extract the five most critical impediments to ES success. Another study was performed by Kremers and van Dissel (2000), who, focusing on the issues connected with migrations of ERP systems, conducted research among 24 Baan customers mainly from Europe, the USA, and Australia. Finally, Themistocleous, Irani, O’Keefe and Paul (2001) performed an Internet survey and gathered 50 responses from adopters mainly from Europe, North America, and Australia.

Enquiries involving external consultants and experts include Wright and Wright’s (2002) study. They conducted interviews with 30 experts from Big 5 consultancy firms, who specialized in assessing risks for ERP systems. Similarly, the experts dealing with many implementation projects from the system supplier site were the respondents of a survey performed by Soja (2006) in Poland.

Studies investigating difficulties during ES adoption and exploitation use different concepts, which have various scope and meaning, and employ various categorisations of difficulties. As a result, comparing and integrating their findings is relatively difficult. The problems most often enumerated by the aforementioned studies include time over-run, lack of business process redesign, system drawbacks and lack of users’ involvement.

The researchers suggest various problems which represent diverse levels of generality. Some problems, such as lack of benefits (O’Leary 2000), seem to be the general consequences of difficulties which appear during the implementation process. Other problems, on the other hand, although they are the difficulties in the implementation projects on their own accord, additionally, they seem to be the causes of further problems. The examples of such difficulties may include: business processes not redesigned or system drawbacks (Kim et al. 2005; Kremers & van Dissel 2000; Wright & Wright 2002). Furthermore, those source difficulties may also have various causes, which suggest that there might be a chain of causal relationships among problems.

Hence, there is a need for research on understanding the causal relationship among problems. The discovery of such a relationship would allow us to reveal the difficulties which cause other problems. In consequence, this would be helpful in concentrating on the real causes of difficulties in ES adoption, instead of struggling with the problems’ symptoms.

The goal of this study is to examine the difficulties experienced by organisations during the process of ES implementation and to reveal the interrelations between the problems recognised. The analysis builds on research conducted among a few dozen companies which had implemented ES. The difficulties were discovered, carefully analysed and categorised using grounded theory approach. Next, the causal relationship between the problems was proposed. Finally, this study suggests what the source difficulties are, i.e. the problems which cause the occurrence of other problems.

Research Methodology

The goal of this paper is to answer the following research questions:

- What is the causal relationship between problems and what are interrelations between problems?
- What is the real problem in ES implementation, and what is the manifestation or the consequence of the other problem?

This study adopts the broad understanding of ES implementation where ES project covers a number of stages which not only refer to actual ES rollout but also span through the post-implementation period (e.g. Markus and Tanis 2000; Ross and Vitale 2000; Somers and Nelson 2001). In this understanding, after ES rollout a company stabilizes, improves its business processes, and transforms its organisation.

The authors’ intentions were to draw a theory on the basis of information gathered from the people located at the source of the issues investigated, rather than to adapt the achieved results to the existing theories. In order to discover the problem sources and their interrelationships, a qualitative approach based on grounded theory proposed by Glasser and Strauss (1967) was adopted. Grounded theory found successful application in Information Systems research (e.g. Oliver et al. 2005; Orlikowski 1993; Volkoff et al. 2005). The directions for using grounded theory in IS studies were summed up by Hughes & Jones (2002).

During the interviews with ES practitioners, semi-structured questions were asked in order to allow the respondents to express their thoughts in an unrestricted manner. An example of such a question is “Please specify the most essential problems which, according to your opinion, occurred during the implementation process”. Open coding procedure was applied during the process of data gathering (Corbin & Strauss, 1990). The respondent statements were compared and analysed in the search of similarities and differences. The statements were labelled and consequently categories and subcategories were created.
In the process of axial coding (Corbin & Strauss, 1990), categories and subcategories which emerged during the process of open coding were inspected and verified. After referring to data source, it turned out that some categories may be merged. Next, using causal mapping (Bryson et al. 2004), the interrelations between problem categories were illustrated in a graphical manner. During the final phase of the research, casual mapping analysis were performed which allowed us to answer the research questions.

**Research Sample**

This study is based on the research conducted among enterprises that had implemented Enterprise System into their organisations. During the research, companies located in southern Poland were addressed. In consequence of the research, data has been gathered from companies of various size and operating in a variety of industries. 82 opinions were gathered from respondents who expressed their thoughts about 65 implementation projects introducing Enterprise Systems into their firms. In general, in each researched company one ES implementation project was conducted. In several cases, a number of respondents within the same organisation expressed their opinions about an ES project, hence the number of respondents is greater than the number of companies. Practically all inquired respondents were present in their companies when an ES project was conducted. The investigated companies implemented a wide range of ES systems, which include internationally known packages such as SAP or IFS Applications, as well as systems developed and known in Poland like CDN, Impuls BPSC or Simple.

A semi-structured questionnaire was employed as a data-gathering method. Beside the sections aiming at gathering demographic data about the investigated projects, companies, and respondents, the questionnaire included questions whose purpose was to collect information about the conditions of projects examined. Particularly, in order to diagnose the difficulties that occur during the implementation projects, an open-ended question was adopted. Such a solution was chosen in order to allow the respondents to express their opinions in an unconstrained way. The other reason which had an influence on this decision was the exploratory nature of this study. As mentioned earlier, a question designed for the collection of difficulties was: “Please specify the most essential problems which, according to your opinion, occurred during the implementation process”. Apart from enumerating the most crucial difficulties during the Enterprise System’s implementation and exploitation, the respondents were asked to express their opinions regarding the causes of each problem enumerated. The following question was employed: “For each problem enumerated, please indicate what the cause of the problem was”.

The respondents were diverse as regards their role in the implementation process and their organisational position. Table 1 illustrates the distribution of respondents by their role in the implementation process. It turns out that members of the Project Team form the most numerous group, followed by people who were not directly involved in the implementation process, members of the Steering Committee, and project managers. The least numerous group is formed by system users taking part in the implementation project.

<table>
<thead>
<tr>
<th>Role in the implementation</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>none/lack of participation</td>
<td>22</td>
</tr>
<tr>
<td>member of the Project Team</td>
<td>28</td>
</tr>
<tr>
<td>supervisor/member of the Steering Committee</td>
<td>15</td>
</tr>
<tr>
<td>project manager</td>
<td>10</td>
</tr>
<tr>
<td>user</td>
<td>7</td>
</tr>
</tbody>
</table>

As far as the organisational position of respondents is concerned (Table 2), half of them are classified as specialists, not much fewer are regarded as managers, and only a few belonged to top management. It is worth noting that among the respondents there are representatives of all organisational levels – from specialists through managers and directors to members of top management.
Table 2 Respondents by Organisational Position

<table>
<thead>
<tr>
<th>Organisational position</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>specialist</td>
<td>41</td>
</tr>
<tr>
<td>manager</td>
<td>30</td>
</tr>
<tr>
<td>top management</td>
<td>5</td>
</tr>
<tr>
<td>director</td>
<td>4</td>
</tr>
<tr>
<td>n/a</td>
<td>2</td>
</tr>
</tbody>
</table>

Research Results

Problem Categories

During the analysis, 341 answers which pinpoint problems and problem categories were identified. Table 3 contains the classification of the extracted problems into categories, categories’ descriptions and the percentage of responses belonging to each category in the overall number of the problems identified. The presented list of categories was ordered in decreasing order of frequency, which is given in column % of responses. In the description of categories, problems indicated by the respondents more than once were included. Similarly, they are listed in a decreasing order of frequency.

Table 3 Problem Categories

<table>
<thead>
<tr>
<th>Problem category</th>
<th>Problem description</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>fear, reluctance, skills, habits, knowledge, lack of system acceptance, general problems with employees, mistakes in system operation</td>
<td>23%</td>
</tr>
<tr>
<td>Enterprise</td>
<td>changes, project, finance, preparation, structure, cooperation with vendor, lack of experience, needs</td>
<td>14%</td>
</tr>
<tr>
<td>System</td>
<td>errors, communications across modules, efficiency, too complicated</td>
<td>14%</td>
</tr>
<tr>
<td>IT infrastructure</td>
<td>network infrastructure, inadequate hardware, general problems with infrastructure (technical, hardware-related), printers</td>
<td>13%</td>
</tr>
<tr>
<td>System misfit</td>
<td>general system misfit, functional deficiency, customisation, document templates</td>
<td>10%</td>
</tr>
<tr>
<td>System replacement</td>
<td>data import, smooth replacement, legacy systems</td>
<td>8%</td>
</tr>
<tr>
<td>Training</td>
<td>schedule, general problems with training, cooperation with vendor, scope</td>
<td>7%</td>
</tr>
<tr>
<td>Implementation process</td>
<td>duration time, employees, project definition, project manager</td>
<td>6%</td>
</tr>
<tr>
<td>System vendor</td>
<td>lack of time, consultants, lack of sufficient resources</td>
<td>3%</td>
</tr>
</tbody>
</table>

The most numerous group is made up of problems related to employees, mainly connected with their fear, reluctance, and lack of sufficient system operation skills. After that, in decreasing order of frequency, there are groups connected with enterprise, IT infrastructure and system implemented. Next, there are problems related with the lack of system fit to enterprise needs, systems replacement, and training. Simultaneously, difficulties directly connected with implementation process and problems with system vendor attracted the respondents’ attention to a lesser extent.

The remaining problems, not included in the table due to single indications, cover the problems connected with external causes, such as legal regulations or a difficult situation in the company’s industry.
Problems in Different Perspectives

In order to fully understand the context of the study, the authors investigated the influence of organisational size and the respondents’ role in the implementation on perceived problems from different categories. The results of this investigation are summarised in Table 4. It presents an average number of problems from each category which was enumerated by respondents belonging to different groups. Statistical techniques were used to find out if significant differences exist between the extracted groups of respondents/projects. In particular, in order to increase the reliability of data analysis, the methods employed include both parametric T-test and non-parametric Kruskal-Wallis test to assess the significance of the mean values of the numbers of problems (e.g., Walpole et al. 1998).

For the purpose of analysis, this study adopted the criterion defining organisational size as the number of employees. The understanding of small and medium-sized companies is derived from the European Community’s definition (The Commission of the European Community 1996) and covers companies with the number of employees not greater than 250 (column Organisational size/S&M in Table 4). Companies employing more that 250 people form the group of large organisations.

### Table 4 Problem Categories Depending on Organisational Size and Respondent’s Role in the Implementation

<table>
<thead>
<tr>
<th>Problem category</th>
<th>Overall</th>
<th>Organisational size</th>
<th>Role in the implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>overall</td>
<td>S&amp;M</td>
<td>Large</td>
</tr>
<tr>
<td>All categories</td>
<td>4.49</td>
<td>4.76</td>
<td>4.15</td>
</tr>
<tr>
<td>Employees</td>
<td>1.05</td>
<td>1.05</td>
<td>1.06</td>
</tr>
<tr>
<td>Enterprise</td>
<td>0.64</td>
<td>0.62</td>
<td>0.68</td>
</tr>
<tr>
<td>System</td>
<td>0.61</td>
<td>0.64</td>
<td>0.56</td>
</tr>
<tr>
<td>IT infrastructure</td>
<td>0.59</td>
<td>0.74</td>
<td>0.41</td>
</tr>
<tr>
<td>System misfit</td>
<td>0.46</td>
<td>0.67***^</td>
<td>0.21***^</td>
</tr>
<tr>
<td>System replacement</td>
<td>0.37</td>
<td>0.48</td>
<td>0.24</td>
</tr>
<tr>
<td>Training</td>
<td>0.32</td>
<td>0.21</td>
<td>0.44</td>
</tr>
<tr>
<td>Implementation process</td>
<td>0.26</td>
<td>0.17</td>
<td>0.38</td>
</tr>
<tr>
<td>System vendor</td>
<td>0.13</td>
<td>0.14</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Note:
* p<.05 as indicated by Kruskal-Wallis test
** p<.02 as indicated by Kruskal-Wallis test
^ p<.05 as indicated by t-test

As regards organisational size, only in the case of System misfit category the difference between means appears statistically significant. Respondents from large companies on average indicated three times more difficulties connected with system fit than their counterparts from small and medium enterprises. This may suggest that Enterprise Systems, which were initially developed for the large organisations, still better match the needs of larger companies even though ES vendors started to address their solutions to SMEs. Another reason can be connected with greater system affordability in the case of large enterprises, who may afford better and more costly system solutions and implementation service providers.
As far as the respondent’s role in the implementation is concerned, it turns out that the role in the project significantly influences the number of perceived problems. In particular, people taking part in the implementation project at the operational level seem to perceive the most difficulties, while those not involved in the project indicate the fewest problems. When we take into consideration problem categories, it turns out that only in the case of the category System replacement are the differences between respondents statistically significant. Namely, difficulties related with system replacement affect first and foremost system users and, to a lesser extent, project team members.

Interrelation between Problems

In order to answer the first research question i.e., „What is the causal relationship between problems and what are interrelations between problems?” a casual map for interrelations among problem categories and subcategories in Enterprise System adoption was arranged (too big to fit into the paper format). For the purpose of capturing the relationship among problems and causes, the following rules were assumed:

- **Proposition 1**: if a problem and its cause, declared by the respondents, belong to the same category we can assume that the problem’s cause is the other manifestation of the same problem defined by the category.
- **Proposition 2**: there is a causal relationship among problems if the problem and its cause belong to different categories.

In order to investigate the causal relationship among problems, the causal map for interrelations among problem categories in Enterprise System adoption was prepared (Figure 1). An arrow between categories appears when problems which belong to the category indicated by an arrowhead were caused by the problems from the second category, e.g. problems with training were caused among others by problems with system vendor.

Figure 1 Causal Map for Interrelations among Problem Categories in Enterprise System Adoption

The causal map in Figure 1 demonstrates the complexity of the relationship among problems; nevertheless, it depicts a number of interesting relationships. The pairs of problem categories are emerging, which have mutual influence on each other, e.g.: employees and implementation process, employees and enterprise, as well as system and system misfit.

Problems related with employees are caused by difficulties with training, implementation process and enterprise. In the latter case there is a two-way relationship.

Problems with system were influenced by difficulties with system misfit, IT infrastructure and enterprise. Subsequently, the two first problem groups, i.e. system misfit and IT infrastructure, are caused by the problems with enterprise. This suggests that problems with system are mainly caused by problems at enterprise level.

The problems with system vendor and system itself originated the problems with training; whereas system vendor-related problems have their source in inappropriate system implementation process.
The system replacement category is not clearly connected with other categories. This may suggest that this category contains specific problems which appear regardless of the project conditions and the system implemented.

**Source Problems**

In order to answer the second research question, i.e. „What is the real problem in ES implementation, and what is the manifestation or the consequence of the other problem?” the following criteria of selecting candidates for source problems were formulated:

1. **Criterion 1**: problem subcategories which were reported at least twice,
2. **Criterion 2**: problems (i.e. problem subcategories) which were not reported as the consequence of other problems outside the category (single indications were omitted),
3. **Criterion 3**: problem subcategories declared as problem causes which do not have their counterparts among reported problems.

During the first stage of the analysis, criteria 1 and 2 were applied for the selection of candidates for source problems. In other words, as candidate source problems were selected those difficulties which were indicated at least twice (column 1 in Table 5) and those which were not reported as the consequences of other problems (column 2 in Table 5). In the second phase, the picture describing interrelations among problems was subject to the causal mapping analysis. As a result, the problems which were caused by other problems were dropped from the list of problems defined in the first phase. In Table 5, these problems are equipped with short notes explaining why they were dropped from the list of source problems candidates.

In consequence, a list of 20 difficulties being potential source problems was prepared (column 4 in Table 5). It is worth noting that this list contains all subcategories of problems which did not have their counterparts among the reported problems, i.e. chosen on the basis of criterion 3 (column 3 in Table 5).

### Table 5 Stages of Source Problems Discovery

<table>
<thead>
<tr>
<th>Problem category / problem</th>
<th>Criterion 1</th>
<th>Criterion 2</th>
<th>Criterion 3</th>
<th>Candidates for source problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fear</td>
<td>fear</td>
<td>habits</td>
<td></td>
<td>fear</td>
</tr>
<tr>
<td>habits</td>
<td></td>
<td></td>
<td></td>
<td>habits</td>
</tr>
<tr>
<td>knowledge</td>
<td></td>
<td></td>
<td></td>
<td>knowledge</td>
</tr>
<tr>
<td>skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reluctance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of commitment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of competent workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterprise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>changes</td>
<td>changes</td>
<td></td>
<td></td>
<td>changes</td>
</tr>
<tr>
<td>finance</td>
<td></td>
<td>finance</td>
<td></td>
<td>finance</td>
</tr>
<tr>
<td>preparation</td>
<td></td>
<td>preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>structure</td>
<td></td>
<td></td>
<td></td>
<td>structure</td>
</tr>
<tr>
<td>cooperation with vendor</td>
<td></td>
<td></td>
<td></td>
<td>cooperation with vendor</td>
</tr>
<tr>
<td>lack of experience</td>
<td></td>
<td></td>
<td></td>
<td>lack of experience</td>
</tr>
<tr>
<td>needs</td>
<td></td>
<td></td>
<td></td>
<td>needs</td>
</tr>
</tbody>
</table>
A relatively long list of problems connected with employees was reduced to three, i.e. fear, habits, and knowledge. The most numerous candidate group for source problems comprises problems connected with enterprise which include: changes, finance, structure, cooperation with vendor, lack of experience and problems with a proper definition of needs. Each of the categories: IT infrastructure, system, system replacement, and implementation process has two representatives in the list of source problems, whereas system misfit, training and system vendor have only single representatives.
Discussion of Findings

The list of 45 identified problems was shortened to 20 candidates for source problems. Two questions arise. Firstly, whether problems still exist among them which have their source in other problems. Secondly, what consequences can occur when source problems appear, in other words, what kind of other difficulties not mentioned here can appear which can be caused by source problems. The causal relationship map presented in the paper is a valuable tool for answering these questions.

The problems connected with employees, which are the most frequently mentioned in respondents’ statements, are the consequences of fear, habits, and insufficient knowledge. The latter can be eliminated by an appropriate training process. However, the question arises whether the first two problems, i.e. fear and habits, can be reduced by training. It is highly likely that they can be minimised by an appropriate training and informative programme; however, one should rather not anticipate the complete elimination of these problems since they are somewhat embodied in human nature. The mutual relationship between problems with employees and difficulties during the implementation process suggests that the human factor plays an extremely important role in a system implementation process. The people are the main source of problems during system implementation; they seem more significant than system vendor or system itself. On the other hand, problems with employees are caused by difficult circumstances which appear during a system implementation. Hence, there is a risk that in extreme cases an escalation of problems during the implementation process may occur.

The category Enterprise appears the most numerous, as far as the number of candidates for source problems is concerned. The first in the list (considering the number of occurrences) are the problems related to the necessary changes in the enterprise. This illustrates that during ES implementation changes in the different aspects/level of enterprise functionality are unavoidable. Closely related to the latter group is the problem Structure, which emphasises the necessity of making significant changes in the enterprise organisational structure to incorporate new ES requirements. The problem Finance demonstrates the common lack of an adequate estimation of the total project implementation cost. The next problem, i.e. cooperation with vendor, is discussed in the paragraph concerning problems with the system. Lack of experience in Enterprise System selection and an inability to define needs are caused by a lack of sufficient knowledge. However, this time it refers to employees on the higher level of management and members of IT departments. To sum up, the list of the source candidates in the category Enterprise could be reduced to: Changes, Finance, and Knowledge.

The category IT infrastructure is represented by two source problems which highlight the necessity of taking into account changes in network architecture and new ES requirements concerning system hardware. It illustrates the need for early estimation of existing infrastructure and making an effort to satisfy ES requirements as regards hardware, network, and operating system. Also, the assessment of the company’s actual state as regards IT infrastructure should be taken into account during the process of ES selection and should precede the decision about ES implementation start.

The category System has two source problems: errors and too complicated, which are related with the category System misfit and its single source problem: customisation. Furthermore, these difficulties are somewhat connected with a problem in cooperation with system vendor from the category Enterprise. Namely, all these difficulties could be eliminated or at least minimised if the process of system and system vendor selection took into consideration enterprise needs. In other words, the listed problems could be eliminated if the selection process employed appropriate knowledge. Therefore, potentially, the system-related problems can be eliminated by the training and education of the appropriate people.

The category System replacement highlights difficulties connected with legacy systems. These systems exist in virtually all enterprises and have to be dealt with during ES implementations. The most important problems in this area are the data import from the legacy systems and the legacy systems themselves which have to function during ES implementation. These problems may result from incompatibilities between systems, different data structures, and errors during data conversion.

The category Training contains one source problem: training schedule. This issue is crucial during the whole implementation process as it has an impact on providing employees with adequate skills and knowledge at the right time. The actual problems connected with training schedule refer to inadequate timetable (trainings organised too late), duration time (too short), and wrong allocations of participants. These may result in absences from trainings, participation in inappropriate trainings and, in consequence, in inadequate knowledge transfer.

In the category Implementation process there are two candidates for source problems which refer to employees and project definition. It must be stressed that difficulties captured by this category stem from an inadequate organisation of implementation process. As regards problems with employees, this group of difficulties comprise the consequences of bad organisation of the project which are experienced by people, i.e. work overload, lack of time, and too few participants in the project. The source of these problems, as well as inadequate project definition, could be insufficient knowledge of people at the higher level of management making decisions regarding the project organisation.
The last category, System vendor, has only one representative in the list of candidates for source problems: lack of sufficient resources. It incorporates lack of sufficient number of consultants as well as lack of adequate consultants’ skills and knowledge. These features stem from an inappropriate selection of the system vendor, which is caused mainly by insufficient knowledge as discussed earlier. It is worth noting that problems with the system vendor can be caused not only by a lack of competence and sufficient resources at the system supplier site. It turns out that bad definition and organisation of the project may contribute to difficulties with a company supplying the system and implementation services. Therefore, as regards good cooperation with the system supplier, the results suggest that many things depend on the company adopting Enterprise System. In particular, the proper definition of tasks and collaboration rules with the system vendor may have a significant impact on this cooperation.

To sum up the data analysis, the authors postulate the following source problems in an Enterprise System implementation:

- knowledge of employees holding various positions in the adopter organisations’ hierarchy,
- changes in the enterprise occurring during ES adoption and often imposed by ES requirements,
- finance which demonstrate the necessity of an adequate estimation of implementation project cost,
- enterprise structure which has to be aligned with ES requirements,
- IT infrastructure (network, inadequate hardware) which has to be established or considerably modified,
- data import and legacy systems which have to be replaced by ES,
- training schedule which is vital for providing employees with the necessary skills and knowledge at the right time.

**Implications and Further Research**

The research suggests the following practical implications for enterprises which are planning an Enterprise System implementation:

- the most frequently listed problems which appear during Enterprise System implementation can be eliminated or minimised by an adequate training of employees representing different managerial levels: employees (in order to provide them with the necessary knowledge, minimising fear and acquiring new skills and habits), members of IT department (training in order to acquire skills needed for the optimal selection of new system and system vendor having sufficient resources), managers (in order to learn communication and negotiation skills necessary during contacts with the software suppliers, skills necessary for appropriate definition of the company’s needs and conducting organisational change),
- during the process of Enterprise System implementation, the issues related to employees’ behaviour should be taken into account. The management should understand and be aware of people’s habits and their natural, maybe subconscious, fear about the possible negative consequences of the implementation. There is a chance that the people’s behaviour can be at least partially eliminated by learning new skills in the training process. The key factor to overcome people’s reluctance seems to be knowledge, which can be built during an adequate training process. Nevertheless, one should bear in mind that building knowledge takes time; therefore, it may turn out that the time of system implementation and the involved training could be too short to acquire adequate knowledge by employees,
- special attention should be paid to the training schedule and duration time. Training schedule should be negotiated and agreed upon with the system vendor and should take into account system characteristics,
- the enterprise must be aware of the necessity of changes in order to adjust the organisation to the Enterprise System’s needs, i.e. changes in organisational structure, network infrastructure and hardware. It is vital to remember that difficulties in these areas may be interrelated and influence each other, and in consequence may result in system misfit to the enterprise and problems with employees,
- during system and vendor selection process, the ability of efficient data conversion from legacy systems to an ES should be taken into account. This feature is especially critical at the moment of system rollout, i.e. in the final stage of an implementation process. Therefore, it is valuable to solve this issue at the earliest possible stage of a project, in order to prevent unnecessary difficulties during the new system launching.

The research results illustrate the need for further research connected with the difficulties during Enterprise System implementation. The future research could be continued in the following directions:
working out the difficulties which occur in successful and unsuccessful implementations. The results of such research could be helpful in discovering the difficulties which can be crucial impediments to implementation success,

investigating how the problems occur over the project lifecycle and how they are connected with subsequent phases of the project. The outcome of such research could be a valuable source of information as to which problems should be dealt with in a particular phase of the project. Therefore, this might be helpful in foreseeing future problems,

comparing the opinions of adopters concerning problems encountered during the implementation process with the viewpoints of experts/consultants who represent a system vendor. This kind of research would provide full insight into Enterprise System implementation issues, which incorporate the viewpoints of two main stakeholders involved in the ES project.

Conclusion

This study examines the difficulties in Enterprise System (ES) implementation projects and builds on the experience of a few dozen ES adopters from Poland. Analysing the difficulties reported by the responding adopters, this paper employs grounded theory approach and suggests the causal relationship among different categories of difficulties. The main contribution of this study is that it gives insight into the actual problems experienced by ES adopters and illustrates what is the real problem in ES implementation, and what is the manifestation or the consequence of the other problem. The results achieved should be valuable for practitioners, since reaching the problem’s source helps us in overcoming the problem rather than ineffectively struggling with its symptoms. Drawing from this study’s results, practitioners may better anticipate possible problems and assess potential threats to their projects. This study’s findings should also benefit the academic community as they illustrate the framework of how to investigate the causal relationship among problems. Moreover, the results also suggest the importance of further work in order to incorporate multiple stakeholder view, project phase, and success measure.

References


