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Investigating the Impact of Project Team Composition in Enterprise System Implementation: an Exploratory Study

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ABSTRACT

The goal of this paper is to investigate the issues connected with project team composition in enterprise system (ES) implementation. This exploratory study builds on research conducted among a few dozen enterprises introducing ES into their organisations. The paper analyses how the inquired companies organised an implementation team and a steering committee. The investigated issues include the project team composition with reference to ES scope introduced, the presence of a system provider's representative, project manager's organisational position, and the composition of a steering committee. Furthermore, the paper examines if the projects were headed by an IT/IS person and to what extent they were supported by top management. Using the ES implementation success measure and statistical analysis' techniques, the study seeks to discover the impact of project team related issues on implementation success. The findings suggest that ES implementation should be a business-lead initiative as contrasted to an IT-driven project. Finally, on the basis of the research, recommendations regarding the implementation team composition were formulated.

Keywords

Enterprise System, implementation, implementation team composition, steering committee, project manager, project success.

INTRODUCTION

Introducing an enterprise system (ES) into an organisation is an enormous task. One of the reasons is that ES is very complicated software. Its implementation in a particular business environment usually requires meticulous system configuration and serious changes in the business processes of a given company. However, it is often said that ES implementation is about people, not processes or technology (Bingi et al. 1999). An ES project involves different people and teamwork is an important implementation issue of enterprise systems (e.g. Stefanou 1999). Key players in ES implementation include the steering committee, the project manager, project team members, IT specialists, and vendor representatives/consultants (Markus & Tanis 2000; Somers & Nelson 2004).

The steering committee usually consists of senior management from different corporate functions, senior project management representatives, and system end users. It is usually involved in system selection, monitoring during implementation, and management of outside consultants (Somers & Nelson 2004). The steering committee determines the scope and objectives of the project in advance and then adheres to it (Parr & Shanks 2000).

The project manager is one of the most important people in ES implementation project. S/he should possess adequate knowledge, skills, abilities, and experience (Somers & Nelson 2001). The project manager must be capable of balancing the technical, business, and change management requirements (Bancroft et al. 1997). During the implementation, s/he should be given broad authority to manage all aspects of the project (Welti 1999).

The implementation team should consist of the company's best workers representing all functions (Umble & Umble 2002). A cross functional implementation team consisting of both business and IT/IS people and of internal personnel and external consultants can be very effective in implementing ES (Stefanou 2001). The implementation team should be balanced; it should form the right mix of business analysts, technical experts and users from within the organisation and consultants from external companies (Parr & Shanks 2000). The members of the project team should be highly respected individuals from each function and should be entrusted with decision making responsibility (Umble & Umble 2002).

It is important that, apart from people representing various functional areas in the organisation, the supplier's consultants are part of the implementation team (Volkoff & Sawyer 2001). They usually have product knowledge of the ES package and

experience in implementing ES in various organisations. The consultants mediate, enable, and confine the organisational learning about the ERP systems and its inherent constructs for business process structures (Baskerville et al. 2000). Furthermore, they bring external perspectives and knowledge, which can contribute much to the process of technical and business innovation (Willcocks & Sykes 2000).

The goal of this paper is to examine the issues connected with project team organisation in ES implementation. The issues investigated concentrate on implementation team composition, the project manager, and the steering committee arrangement. Another interesting topic for this study is connected with the participation of IT/IS people and top management representatives in the above-mentioned project roles and groups. Building on research conducted among ES adopters this study seeks to discover the impact of project team related issues on implementation success.

RESEARCH METHODOLOGY

The research questions posed in this study are connected with steering committee, implementation team composition, the project manager, and project leadership. The concrete issues investigated in this research are described by the detailed research questions listed below.

Research questions related to project team composition include:

- How complete was the implementation team, i.e. did it consist of enough people responsible for the system scope introduced?
- How was the IT department represented on the project team?
- Was the provider's representative a member of the project team?

Research questions related to a project manager cover:

- What organisational position (seniority) the project manager held?
- Was the project manager an IT/IS person (came from IT/IS department)?
- What functional department of the company did the project manager represent?

Research questions related to a steering committee embrace:

- Did the organisations researched appoint a steering committee?
- Who was the head of the steering committee (seniority)?
- Was an IT person a member of the steering committee?

Research questions related with project leadership contain:

- Was the implementation headed by an IT person?
- To what extent was top management involved in the project?

Another vital topic of interest for this study is to examine how the project team related issues influenced the implementation success. In order to evaluate the ES implementation success, this research employs project phase success metrics defined by Markus et al. (2000), i.e. project cost, time, and scope. The synthetic measure of project success was constructed on the basis of three partial success metrics/dimensions:

- actual expenditures with regard to the planned budget,
- the actual duration with respect to the assumed duration,
- the actual scope of an implementation with respect to the planned implementation.

Furthermore, some researchers believe that user satisfaction is an overarching measure of IS success (e.g. Sedera & Tan 2005). Hence, this study seeks to examine the relationship of issues investigated with user satisfaction.

Therefore, for each issue defined, the additional question is posed as to how the given issue is connected with implementation success. The impact on implementation success was analysed taking into consideration overall success measure and each dimension of this measure, i.e. budget, time, and scope. Consequently, the influence of issues investigated on user satisfaction was also evaluated.

The appropriate variables were defined on the basis of issues identified by the research questions. These variables, in turn, were the basis for dividing the researched projects into groups and assessing the influence of a given variable on the project

success. Statistical techniques were used to find out if significant differences exist between extracted groups of 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 success measures (e.g., Walpole et al. 1998). In addition, correlation coefficients were calculated in order to investigate the influence of selected variables on project success.

This study builds on exploratory research conducted among practitioners dealing with ES implementations in Poland. A field study was used as a general research approach and a questionnaire was employed as a data-gathering technique (Boudreau et al. 2001). The study used the questionnaire, which was sent by regular mail or by e-mail to the respondents. In the questionnaire, the respondents were asked to enumerate the composition of implementation teams, providing the roles within the team and the organisational positions. The questionnaire also included questions for capturing demographic data and details regarding success metrics.

The research questionnaire was directed to the people playing leading roles in the ES implementation, the project leader if it was possible. The supporting argument is that they had insight into their projects and thus were able to answer the survey questions and to assess the measures included in the questionnaires.

RESULTS

During the research, 223 enterprises were contacted and 68 answers were gathered, which gives a 30% response rate. However, due to the nature of the data gathered, the responses obtained represented various level of completeness. Therefore, during analysis, for particular variables investigated, the appropriate subsets of sufficiently complete data were taken into consideration. For example, all answers were taking into consideration during examination of the presence of a steering committee, while the seniority of the head of a steering committee was examined on the basis of a subset of 41 responses.

Table 1 illustrates the companies researched as regards their size defined by the number of employees. It contains, in subsequent rows, the number of companies (column *n*) employing a number of workers which falls within a specified range.

Number of employees	n	%
20 to 50	3	4%
51 to 100	3	4%
101 to 200	11	16%
201 to 300	12	18%
301 to 500	12	18%
501 to 1000	14	21%
over 1000	13	19%

Table 1. Companies by number of employees

Table 2 summarises the projects as regards the implementation scope defined by the number of installed modules of an ERP system. It contains the number of companies implementing subsequent modules of a system.

Module	n	%
Finance	65	96%
Inventory	63	93%
Sales	59	87%
Purchasing	58	85%
Shop Floor Control	41	60%
MRP Explosion	32	47%

Table 2. Projects by implemented modules

The implementation projects researched make up quite a diverse population when project duration time is taken into consideration. Among the companies examined, there were projects lasting not more than a couple of months, as well as

implementations which had a duration time longer than 3 years. Table 3 illustrates the number of projects regarding planned and actual duration time.

Duration time	Number of companies by project duration	
	planned	actual
up to 6 months	12	9
6 to 12 months	20	20
1 to 1.5 year	19	14
1.5 to 2 years	4	9
2 to 3 years	9	7
3 and more years	3	7

Table 3. Projects by duration time

Steering Committee

The projects were analysed from the perspective of several issues describing steering committee use during the project. They were divided into groups taking into account the criteria defined by research questions. Namely, they were examined if they appointed a steering committee, what seniority (position) the head of the steering committee had, and if an IT person was a member of the steering committee.

The results of calculations are presented in Table 4. The variables investigated are placed in subsequent rows, and for each variable, the following rows contain the results of calculations for the groups of projects defined by the values of this variable. The outcome of the calculations includes number of projects within the group (column *N*), mean values of success metrics/dimensions (columns *Time*, *Budget*, *Scope*), mean value of overall success measure (column *Success*), and mean value of user satisfaction measure (column *User satisfaction*).

Issue or Variable / Value	N	Success dimension			Success	User satisfaction
		Time	Budget	Scope		
Was a steering committee appointed?						
Y	46	0.71	0.84	0.88	0.81	0.67
N	22	0.66	0.82	0.84	0.77	0.64
Seniority (position) of the head of the steering committee						
specialist or manager	10	0.66	0.83	0.86**	0.78^	0.66
director	16	0.69	0.74	0.84**	0.76^	0.64
top management	15	0.76	0.92	0.95**	0.88^	0.69
Was an IT person a member of the steering committee?						
Y	11	0.62*+	0.79	0.86	0.76	0.64
N	35	0.74*+	0.85	0.88	0.83	0.67

Note:

^ $p < .08$ as indicated by Kruskal-Wallis test

* $p < .07$ as indicated by Kruskal-Wallis test

+ $p < .07$ as indicated by t-test

** $p < .03$ as indicated by Kruskal-Wallis test

Table 4. Average values of project success measures for the issues related with the steering committee

It turns out that two thirds of the projects researched appointed a steering committee and those companies achieved a slightly higher level of success metrics. However, no statistical significance was discovered. Considering the organisational position of the head of a steering committee, it should be noticed that in the case of *Scope* measure and, to a lesser extent, overall success measure, statistically significant differences have been found. It turns out that the most successful were projects employing top management representatives as the head of a steering committee. Examining if an IT/IS person was a member

of a steering committee, the results show that projects where IT/IS people were not present in a steering committee achieved a slightly higher level in all success metrics. In addition, in the case of *Time* measure, the difference between means is statistically significant.

Project Manager

The first issue investigated connected with the project manager was his/her organisational position (seniority). The projects researched were divided into groups regarding the organisational position of the project manager. Furthermore, two subsequent issues are connected with the project manager's organisational background/area. Firstly, the companies were divided into two groups, taking into consideration whether the project manager came from IT/IS department. Secondly, the projects were divided into several groups on the basis of project manager's organisational department. Finally, those projects which were led by an IT project manager were divided into groups on the basis of the project manager's position.

The outcome of the calculations, presented in Table 5, shows that the majority of projects investigated employed a manager as an implementation project leader. Next, a director was involved as a project manager in not more than one fourth of the implementations investigated. Finally, some projects employed specialists, top management representatives, and external consultants as projects managers. The average success levels in the extracted groups of the projects are more or less equal, while the partial success dimensions vary. Only in the case of user satisfaction measure the differences are significant and the calculations show that projects led by managers achieved the highest user satisfaction level. Also, those led by top management representatives achieved the highest level of user satisfaction; however, this group of projects consists of only five implementations.

Issue or Variable / Value	N	Success dimension			Success	User satisfaction
		Time	Budget	Scope		
Project manager's seniority (position)						
external expert	6	0.77	0.80	0.81	0.79	0.57*
specialist	6	0.72	0.82	0.90	0.81	0.60*
manager	33	0.65	0.82	0.91	0.79	0.72*
director	15	0.75	0.85	0.78	0.79	0.56*
top management	5	0.76	0.82	0.83	0.80	0.72*
Did the project manager come from IT/IS department?						
Y	28	0.65	0.76** ⁺	0.90	0.77	0.66
N	38	0.73	0.88** ⁺	0.84	0.82	0.66
Project manager's department/area						
IT/IS	28	0.65	0.76	0.90	0.77	0.66
Finance / Accounting	12	0.79	0.87	0.81	0.82	0.73
Manufacturing	8	0.63	0.90	0.77	0.77	0.68
external expert	6	0.77	0.80	0.81	0.79	0.57
Logistics	4	0.67	0.93	0.92	0.84	0.55
IT project manager's seniority (position)						
specialist	3	0.63	0.67	0.82	0.71	0.47 [^]
manager	21	0.63	0.77	0.91	0.79	0.70 [^]
director	4	0.75	0.78	0.90	0.81	0.55 [^]

Note: ⁺ p<.08 as indicated by t-test

[^] p<.09 as indicated by Kruskal-Wallis test

* p<.07 as indicated by Kruskal-Wallis test

** p<.03 as indicated by Kruskal-Wallis test

Table 5. Average values of project success measures for the issues related with the project manager

Project managers came from outside the IT/IS department in the majority of projects and these implementations achieved, on average, higher levels of success metrics. Only in the case of *Scope* measure the relation is opposite, and the average value of user satisfaction measure remains the same in both extracted groups. It is worth noting that *Budget* measure is significantly higher for projects led by a non-IT person.

The examination of a project manager's functional department shows the mixed results without statistically significant differences. Therefore, no important tendencies were observed. Furthermore, the groups' cardinalities are quite diverse, which makes the comparison difficult.

The last issue connected with the project manager person relates to the organisational position of an IT person being a project manager. Considering the projects that employed a project manager from the IT/IS department and analysing his/her position, we receive diverse groups' cardinalities. However, we can observe the tendency that projects led by the IT people of lowest organisational rank (i.e. specialists) achieved the lowest levels of success metrics.

Project Team Composition

The issues investigated connected with the project team composition cover team completeness, the position of an IT person within the team, and the involvement of a system provider's representative.

Team Completeness

We understand that the implementation team is complete when it contains people responsible for each system module introduced. In order to assess how complete was the implementation team, the variable *TeamCompleteness* was calculated. Its purpose is to reflect whether the introduced scope was "covered" by the project team members. This value is based on a ratio *ScopeCoverage*, which is achieved by dividing the number of people in a project team responsible for system modules by the number of introduced system modules.

The variable *TeamCompleteness* is defined by the formula below:

- 0 when $ScopeCoverage \leq 0.5$
- 1 when $ScopeCoverage > 0.5$ and < 1
- 2 when $ScopeCoverage \geq 1$

Next, the projects investigated were divided into two groups taking into account the number of people involved in the project team. The group of projects where all system modules had responsible people within the team and there were more people involved than modules was given a variable *MorePeopleInTeam* equal to 1. The remaining projects formed the second group with the variable *MorePeopleInTeam* equal to 0.

IT Person's Position

The next issue under investigation was how IT related issues were tackled by the project team. Firstly, the implementations investigated were checked to see if there was an IT person in the implementation team. Secondly, those employing an IT person in the team were examined to find out the highest position of an IT person within the project team. The positions discovered include an external consultant/expert and a range of organisational positions: specialist, manager, and director.

System Provider's Representative Presence

Another problem related with the project team composition is connected with cooperation with the system supplier. The issue investigated is whether the project team included a system provider's representative. Therefore, the projects were divided into two groups depending on the presence of a system provider's representative.

The results of calculations for the above-mentioned variables and issues are presented in Table 6.

Issue or Variable / Value	N		Success dimension			Success	User satisfaction
			Time	Budget	Scope		
<i>TeamCompleteness</i>							
	0	3	0.86	0.97	0.98	0.93*	0.80
	1	21	0.73	0.89	0.88	0.83*	0.65
	2	25	0.64	0.72	0.87	0.74*	0.62
<i>MorePeopleInTeam</i>							
	0	22	0.66	0.77	0.85	0.76	0.59
	1	27	0.72	0.84	0.90	0.82	0.68
Was an IT person a member of the project team?							
	Y	39	0.67	0.79	0.87	0.78**	0.62
	N	10	0.77	0.88	0.92	0.86**	0.74
Position of an IT person in the team							
	specialist	14	0.64	0.76	0.82	0.74	0.50***
	manager	20	0.67	0.80	0.90	0.79	0.71***
	director	5	0.78	0.82	0.89	0.83	0.56***
Was a system provider's representative a member of the project team?							
	Y	11	0.71	0.79	0.87	0.79	0.58
	N	38	0.69	0.81	0.88	0.79	0.66

Note:

* $p < .07$ as indicated by Kruskal-Wallis test

** $p < .06$ as indicated by Kruskal-Wallis test

*** $p < .03$ as indicated by Kruskal-Wallis test

Table 6. Average values of project success measures for the issues related with project team composition

Surprisingly, it turns out that all success metrics decrease when team completeness increases. Moreover, in the case of overall success measure, the differences between groups appear to be statistically significant. However, the first group contains only three projects, therefore it is rather not possible to draw firm conclusions on the basis of these calculations. On the other hand, analysing the *MorePeopleInTeam* variable, we notice that the projects involving more people tend to achieve somewhat higher levels of success measures; however, the differences are not statistically significant.

The vast majority of projects researched involved an IT person in the team. However, all success measures were lower for this group of projects, and in the case of overall success measure, the difference is statistically significant. Taking into consideration the position of an IT person within the implementation team, it turns out that, in general, the higher the position of an IT person, the better results achieved. Yet, the differences are not significant. On the other hand, in the case of user satisfaction measure, the differences are significant. It turns out that the lowest user satisfaction was achieved by the projects employing IT specialists within the implementation team. Interestingly, only a little higher user satisfaction was obtained by the projects where the IT people of highest organisational seniority were involved (i.e. directors). Nonetheless, the projects involving IT managers in the implementation team clearly achieved the highest user satisfaction.

Finally, about 20 percent of projects employed a system supplier representative in the project team. However, this fact had no influence on average values of success measures. Only user satisfaction was on average slightly lower among projects with a system supplier representative within the team. Nevertheless, this difference is not significant.

Project Support and Leadership

For the purpose of distinguishing whether the project was lead from an IT perspective (in contrast to a business perspective), the implementations researched were examined as regards the head of a project team and a steering committee. The information sought for was whether these people represented IT/IS department or area. The simple variable *ITLed* was

constructed representing the level of to what degree the project was IT driven. The variable *ITLed* receives the values 0, 1, 2 according to the definition below:

- 0 when neither the project manager nor the head of a steering committee was an IT person,
- 1 when one of the two above-mentioned people represented IT/IS department/area,
- 2 when both the project manager and the head of a steering committee came from IT/IS department.

The projects researched were divided into three groups according to the value of the above-defined variable and success metrics were calculated. Furthermore, the correlation coefficients were calculated between the variable *ITLed* and success metrics to evaluate how the fact that project was led by IT people influenced the implementation success.

The second problem in question is what the support of top management for the project was. The way of assessing this issue is to verify whether a top management representative was a member of the project team or the steering committee. The projects researched were divided into two groups: in the first group a top management representative was a member of the project team or the steering committee; in the second group top management representatives did not belong to any of these teams. The above-mentioned problems are described in Table 7.

Issue or Variable / Value	N	Success dimension			Success	User satisfaction
		Time	Budget	Scope		
<i>ITLed</i> (Was the project headed by IT people?)						
0	17	0.75*	0.89	0.87	0.84	0.60
1	16	0.71*	0.82	0.94	0.82	0.71
2	2	0.20*	0.35	0.80	0.45	0.40
Correlation coefficients between <i>ITLed</i> variable and success metrics						
		-0.45	-0.33	0.12	-0.37	0.04
		p<.01	p<.06		p<.03	
Was a top management's representative a member of the implementation team or steering committee?						
Y	15	0.73	0.86	0.92	0.84	0.63
N	20	0.68	0.80	0.88	0.79	0.65

Note:

* p<.07 as indicated by Kruskal-Wallis test

Table 7. Average values of project success measures and correlation coefficients for the issues related with project leadership

The calculation results regarding *ITLed* variable show that the presence of IT people in both the implementation team and the steering committee is quite uncommon. In this research, only two companies adopted such an approach and achieved very low levels of success metrics. However, these calculations were put in the table only for informational purposes. Instead, we can analyse the first two groups. It turns out that the majority of success measures were higher among projects not led by IT people and in the case of *Time* measure, the difference is statistically significant. Furthermore, the results show negative correlations between *ITLed* variable and all success measures except for *Scope* metrics and user satisfaction indicator.

The projects where top management representatives took part in the implementation duties appear to achieve a slightly higher success. This applies to all success dimensions; however, the differences are not statistically significant. On the other hand, user satisfaction is slightly higher for projects not employing top management representatives in implementation duties.

DISCUSSION OF FINDINGS

The results suggest that companies appointing a steering committee achieve better results in ES implementation. Moreover, the organisations employing an individual of the highest organisational position (i.e. top management representative) attained the highest level of all success measures. On the contrary, the involvement of an IT person in the steering committee does not seem to positively influence the project outcome.

The research findings regarding the project manager person are mixed. There are no clear indications as regards the project manager's organisational position or area. Nevertheless, the results indicate that implementations led by the project manager from outside the IT/IS department tend to achieve better results. However, in this situation, the organisations should take special care for the project scope. Furthermore, once a company decides to employ an individual from the IT/IS department as a project manager, it should ensure the high organisational position of the appointed person (i.e. manager or director).

The results connected with the implementation team composition suggest that the mere involvement of an adequate number of people in the project is not sufficient for ultimate implementation success. There are other issues connected with the project team members that should be considered. These may refer to their position in organisational hierarchy, how they are respected in the company, and what are their decision-making capabilities.

Nonetheless, the findings suggest that companies should avoid appointing IT people having too low an organisational position within the implementation team. This could be explained by the fact that IT specialists may have a tendency to focus on the technological aspects of an ES implementation. Further, an appointment of only an IT specialist in the team may be a message to the whole company that ES is an IT project, not a business endeavour. Moreover, IT people holding managerial positions usually have greater insight into the company's business intricacies, which may have a positive impact on the project.

The results imply that the projects headed by a non-IT person tend to achieve better results. This supports previous findings that claim that successful ES implementations are typically headed by an individual outside the IT department (Umble & Umble 2002). Furthermore, this study's findings illustrate that it is valuable to involve a top management representative in implementation teams. Thus, we can conclude that it is essential for the project outcome to assure that the ES implementation is a business-lead initiative instead of an IT-driven project.

On the basis of the results achieved, we can formulate certain recommendations for the practitioners dealing with ES implementations. In order to achieve the ultimate success of an ES project, they may consider:

- employing top management representatives in implementation teams, in particular as the head of a steering committee,
- involving in the implementation team an IT person holding a reasonably high organisational position,
- ensuring that ES is a business-lead initiative by employing an individual outside the IT department as the head of the implementation project.

CONCLUSION

This exploratory study examines the influence of issues connected with project teams' composition on enterprise system implementation success. The analysis builds on the research conducted among a few dozen Polish companies implementing ES into their organisations. The results suggest that it is essential that an ES project is a business-led initiative and involves top management representatives in the implementation duties. The outcome of the research should be valuable for the practitioners as it suggests several rules that could be helpful in the organisation of the implementation teams. The main limitation of this study is connected with data completeness, which resulted in difficulties with thoroughly examining some issues due to considerable differences in extracted groups of projects. Nonetheless, the data available can be analysed using more advanced methods, such as ANOVA or multiple regression, which might help to understand the relative importance of different factors and their partial contribution. This might be the direction of further data analysis, which should consider multiple factors in an integrated manner and focus on the impact of a combination of factors. Moreover, this study's results indicate the need for further research on the organisation of an ES implementation team. In particular, future studies may focus on the project manager person and explore more fully the influence of his/her organisational position and department on ES success. Other topics of research may be connected with the characteristics of team members and discovering the optimal composition of the project team. Finally, future studies may take into consideration the type of ES project (e.g. scope, duration, size) and company's industry, and seek to discover issues that might be typical of certain environment.

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