Success Factors for an Information Systems Projects Team Creating New Context

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Abstract

This paper aims to investigate the factors that influence cohesion and success of an IS project team. Based on the literature regarding project team success and IS, a complex framework has been adopted in order to develop the research model for the study. Consequently, the research model will incorporate variables increasing the stability and chance of success of the IS project team. The case study and the conclusions are based on the interpretation of the results of a survey and a number of semi-structured interviews with members of an IS project team that were and still are involved in many IS projects at the University of Craiova, between 1999 and 2008. Our research findings show that different approaches to IS project team members dictated by their different specializations (skills and competencies) create a new context of team complexity and team cognition, which might affect IS in different ways.

Keywords: IS Project Team, team cohesion, e-learning Platform TESYS.

1. Introduction

Economic discrepancies, at international level, between various countries, are reflected in the image the universities from different countries present to the world. Serious international competition between universities has been taking place lately [18], with the view of attaining a higher place on a hierarchy scale at both national and international levels [22], [23]. This competition is for funds as well as for prestige and recognition

In order to reduce these discrepancies and, implicitly, to get a positive international image, universities work at two levels: *to improve their research activity* and *to better the knowledge transfer* (teaching activity).

Research activity is highly valued because the better the outcome, the higher the university is placed, and national and international evaluation is more valuable [10], [12]. Starting from these facts, in 1999 the Faculty of Economics and Business Administration from the University of Craiova, Romania, decided to create a multidisciplinary research team.

Literature is very rich in studies of traditional and virtual teams, some of the former meant to measure the impact of a large range of variables on the team's success or lack of it [6], [19]. Thus the questions worth pondering are: In what way/ways is

this paper original? and What is the present paper's contribution to IS Project Team?

The answer we posit is this: The originality and contribution of the present paper to IS Project Team consist in approaching team issues starting from results toward objectives, underlying the IS role, i.e. of the e-learning platform TESYS, for the cohesion and transformation of the team.

In this work we study what development strategies to adopt in order to ensure the success of the IS project team, and how to re-dimension IS in the context of rising team complexity. Our research model examines the relationship between how information systems (system quality and information quality), along with IS project team characteristics impact the performance and the cohesion of the team.

We have structured this paper as follows: we start with a theoretical framework, followed by the description of our methods and how we have applied them. Then, we present the case study, and results.. Finally, we provide conclusions and suggestions for further research.

2. Theoretical framework

The literature suggests a strong correlation between IS project performance and performance of IS project team and the fact that IS project success depends on system quality, system functionality, system impact, team member satisfaction, motivation and cohesion [9], [25].

Many scholars have succeeded in reaching a consensus in defining the team and describing a project team as composed of people who work together, or have mutual goals. Consequently, team members should be involved in the performance of common activities and individually contribute to the cohesion of the team [13], [15].

An IS project team is defined as a group of people who have common goals, have complementary skills and share the responsibility of success or failure of the project.

The IS project team is engaged in a complex process: every stage is important for team's cohesion and success.

The **first stage** in the formation process of an IS project team is the setting of a goal that should create the direction for the team.

The general, goal of an IS project team consists in creating new or perfecting an existing information system.

The second stage aims at establishing the adequate number of people on the team, i.e. the team size.

There are various views in literature as far as the structure and the size of a team is concerned [1], [2], [3], [4], [5], [11], [17]. For example, Gibbs [11] believes that the optimal number of the team members should be six (6), Belbin [1], [2], [3] considers that the most effective teams comprise eight (8) people, each having a different team role. In his research, Schlicksupp [21], identified a limit number of team members of fourteen (14). Thus the question still remains: how many members should be on a team? It is important to be six, eight or fourteen members?

Confronted with this problem, we propose that the optimal number of people on an IS project team should be established by means of an algorithm that correlates the complexity of the common goal, knowledge and the required skills in order to accomplish the former and ensure team cohesion, according to:

$$N_{omt} = (\sum_{i=1}^{n} A_{isi} + \sum_{j=1}^{m} C_{tm}) K_c \qquad (1)$$

Were:

N_{omt} = optimal number of team members Correct this with a subscript notation as in the formula above.

A_{isi} –activities required to make up the information system

i = 1..n

C_{tm} – skills of the team members engaged in attaining the common objectives

j = 1..m

K_c – cohesion coefficient

$K_c \in (0,1)$

Were:

1 – total cohesion

0 – lack of cohesion

The above-mentioned formula is difficult to establish with precision, i.e. the optimal number of people on an IS project, because sum of individual expertise does not necessarily add up to an expert team.

The sum total of knowledge can be evaluated only unilaterally and unidirectionally. Therefore, it is extremely important that each member of the project team should be aware of their creative potential based on their individual knowledge acquired from various information sources at different times.

The difficulty of the work increases project complexity, which can undermine IS project team performance [20].

In the third stage, the role of each team member is established, as well as the degree of interaction between team members and the level of professional diversity in the team [17]. In an IS project, team members roles become apparent and evolve through the team's adaptation process due to the complexity of the common project goal [7], [14].

The eight team roles proposed by Belbin are: *implementer, coordinator, sharper, plant, resource investigator, monitor evaluator, team worker and completer* [3]. However, IS projects increasingly involve project teams that consist not only of specialists in informatics, but also representatives of other specialties: *finance, business analysts, statisticians*. In our opinion, Belbin's 8 roles are not enough, and there are several ways to solve the problem:

- either we attribute the same role to more than one member of the team, grouping the 8 roles in 3 categories in terms of behavioural focus (i.e. ideas, tasks and people) and two categories in terms of team environmental focus (i.e. internal and external). We note however, that this may lead to the deferral of responsibility, when team members transfer tasks to one another;

- or we create a distinct role for each member of the team; if the roles are correctly assigned this might trigger high motivation level for a project team. All these ideas are presented graphically in Figure 1
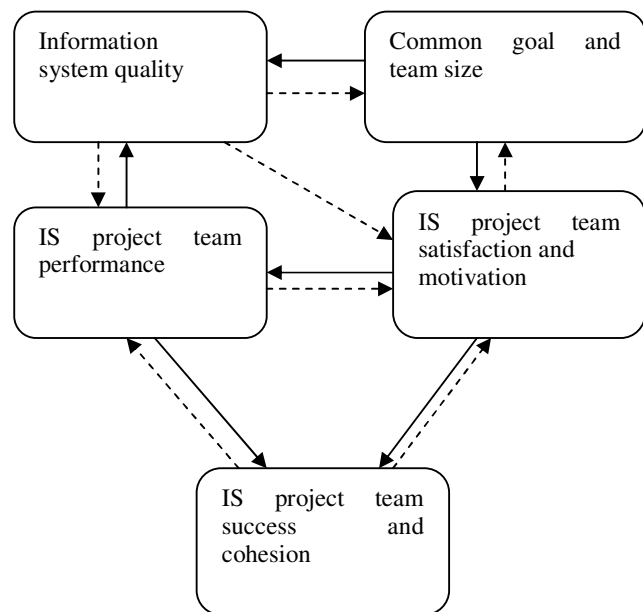

Fig 1. Research model for IS project team success and cohesion

The research model (Figure 1) elucidates the relationship between the information systems and the IS project team. Factors such as information system

quality, common goal and team size indirectly affect IS team project success and cohesion, while IS project team performance, IS project team satisfaction and motivation affect IS team project success and cohesion directly.

3. Research methodology

The present study investigates not only the way multiple variables (e.g. identification of goals, clarity of roles, common feeling and co-operative attitude, motivation) affect IS project success, but also which processes teams use to cope with challenges. Our study is exploratory and qualitative and, therefore, cannot completely tease out all the various effects.

The primary data collection technique used was semi-structured and unstructured interviews. A variety of complementary techniques used included participant and non-participant observation, document study. The research was evaluated according to the principles for the conduct and evaluation of interpretive field studies developed by Klein and Myers [16].

A review of the literature identified two categories of process variables that influence performance of the IS project team. The first category is team coordination (task programming and team communication), which is important in IS projects [8]. The second category includes team cognition (shared knowledge, shared beliefs and trust), which are important for IS project team work [24].

A series of 11 questions were asked, all dealing with team effort and dynamics necessary for a group of individuals to solidify into a successful team, and, particularly, to establish which variable has had the greatest impact on IS project team success and cohesion. Indicative questions that were used in the semi-structured and unstructured case interviews are outlined I Table 1.

Table 1: The specific questions for IS project team and for IS project

IS project team Questions	IS project Specific Questions
Q1.1 What is your role on the project team?	Q2.1 Has the IS project been a motivational factor for you?
Q1.2 How do you measure your role in project team?	Q2.2 What makes IS project different from the others projects?
Q1.3 How have you integrated yourself in this multidisciplinary team?	Q2.3 Which variables have the strongest effect on the success of an IS project team?
Q1.4 What satisfactions/revolts do you have as a member of this team?	Q2.4 Did the IS meet your requirements and those of the users?
Q1.5 If you were to	Q2.5 If you were to do
choose a team, would you give up this team? Q1.6 What makes the members of the IS project team work together?	the IS project again, how would you do it differently?

The study focuses on task processes because we are interested in learning what the IS project team does in order to accomplish their IS project goals.

The final results, analyzed with SPSS 10.0, are based on the average scores for the IS project team.

4. Case study

The bases of an IS project team were laid in 1999, when the necessity of setting up certain research project teams appeared. The stages were:

- **setting goals;** this team was, initially, set up as a PHARE - type project team. This project, through its objectives and activities, aimed at eliciting and transmitting knowledge to the business media of Oltenia.

While the project was carried on, a second goal emerged, which became the common goal of the team and team to the transformation of the project team into an IS project team. This common goal was represented by the necessity of setting up an information system - an e-learning platform, TESYS. This objective had two structural parts:

- ➢ *a theoretical part*, in which underlying conceptualizations of information systems were studied and an appropriate model of e-learning platform was proposed; and
- ➢ *a practical part*, in which the theoretical considerations were put into operation.

- **Establishing the optimal number of team members and the attributing of roles** within the team generated the following problems:
- ➢ *problems referring to the structure of the team*: size - i.e. number of members, attributing roles, correlation between team members' expertise and the optimal number of members on the team;
- ➢ *problems generated by the functioning of the team*: fluctuations within the team, face-to-face and virtual communication, leadership.

Needs identification led to multidisciplinary teams consisting, initially, of 10 members. Team structure was: 4 specialists in IS, 3 in statistics and economic analysis, and 3 in management and knowledge management.

Currently the team structure is: 4 specialists in IS, 4 in statistics and economic analysis, and 3 in management and knowledge management plus one specialist in accounting.

Fluctuations within the team between 1999 and 2007 were not quantitatively significant, but had an important impact on the team members, in the following ways:

- in 2004, team members required the presence of a specialist in finances, a person of remarkable professional expertise, but who proved to be the Trojan Horse in the tea. Therefore, this person left the team after a short time interval;
- in 2007, an important member of the team, one of the managers, - a specialist in the field - passed away. No other member was recruited and his tasks were re-distributed.

The team spent four years studying the process of IS, from the beginning to early implementation.

After 9 years this team continues to yield good results, because the **common goal** – e-learning platform and the t**ime spent together** was one of the factors of success

5. Results

The analysis of the interview answers elicited the key-factors that led to the success, stability and cohesion of the team.

Table 2 reveals the existence of a strong correlation between information systems (system quality and information quality) - IS project team characteristics - and team cohesion.

Table 2: The situation of the interviews for each variable

Factor	system quality	system functionality	satisfaction and motivation	Total
1. team coordination	12	24	18	54
1.1 task programming	4	12	6	22
1.2 team communication	8	12	12	32
2. team cognition	6	12	48	66
2.1 shared knowledge	6	12	24	42
2.2. shared beliefs	-	-	12	12
2.3 trust	-	-	12	12
Total	18	36	66	120

* **NOTE**: the numbers indicate the number of interviews in which the variables were important for the IS team project success and cohesion.

As we can see from table 2, an element that is attributed a communication role only - the setting up and the improving effort of the e-learning Platform TESYS - has proved to be the connective element in the team.

If the team had limited its activity to attaining the initial goal - the PHARE project - it would have disintegrated at the conclusion of the project.

The chance of having a common goal for a longer time period had proved beneficial to everybody because it:

- ensured continuity by generating new research themes, and, implicitly, new projects;
- favoured permanent re-distribution of roles within the team, which was, again, a motivating factor;
- improved formal and informal communication between the team members, which, in turn, led to improved sharing of knowledge, beliefs and trust;
- facilitated the acquisition of new knowledge, as follows:
  - ➢ specialists in information systems acquired knowledge in management and statistical data processing which they needed in order to better understand the needs of the platform' users and the "language" of the other team members as well as in order to eliminate a significant amount of communication by establishing protocols and clarifying issues related to processes and tools;
  - ➢ specialists in management, finances, statistics learned about information systems in order to understand task programming mechanisms like division of labour, collaboration technology tools and the adoption of common technical environments, rigorous documentation, common processes, strict project controls and detailed project planning.

Responses to questions Q1.6, Q2.1, Q2.2, Q2.3, Q2.4, Q2.5 clearly indicate that the first satisfying results yielded by e-learning platform TESYS led to more trust and emphasize knowledge sharing between the member of the IS project team, which reflected positively on their knowledge sharing attitudes and cohesion of the team.

These characteristics of our research model for IS project team success and cohesion help to standardize and stabilize the model over time.

Answers to questions Q1.1, Q1.2, Q1.3, Q1.4, Q1.5, and Q1.6 – have proved the fact that IS team project success and cohesion and information system quality affect IS project team performance which, in turn, impacts the IS project team satisfaction and motivation when:

- **team goal is clearly set** and brings benefits for a longer time interval;
- **team size is optimal** - in our study the optimal number is 12 - and was established

in 2 ways: an empirical one, validated by the results of the team from its beginnings to present, and a mathematical one, based on formula (1);

- **role distribution is fair** and redistribution is done at intervals, depending on team coordination and team cognition.

6. Limitations

The limitations of our study consist in the sample group, that is relatively small – 12 interviews with the members of the project team. Nevertheless, all members of the project team were interviewed and our goal was to obtain rich accounts of the effects of various situations in IS and knowledge management.

Further quantitative studies are needed to develop a better understanding of the factors leading to project teams' success.

The further research is required to develop the research area, considering the role of culture and of ethics in promoting IS and knowledge management among virtual/project teams.

7. Conclusion

Research findings indicate that there is a positive relationship between information systems and knowledge sharing in IS project teams. Our research is intended to contribute to another approach to the essential role of IS in knowledge management implementation and the development into virtual project team.

Our study has proved that cohesion is stronger in teams whose members like one another and co-operate. To sum up, while many of the same factors affect the development of team cohesion, the factors contributing to an individual's level of commitment do operate differently, depending on the role and type of information systems used.

By using the research model presented above, we identified false assumptions embedded in the approval process, based on a global, rather than a local understanding of applicant criteria for risk analysis.

IS project team, using an e-learning platform for communication have longer time to develop a sense of loyalty and commitment to the team.

The findings also reveal that knowledge sharing is only likely to occur if new project members are welcomed emotionally as valuable contributors to a common task.

In our case, practical and theoretical results proved that the use of information systems – e-learning platforms - in order to disseminate knowledge among team members led to increased team performance by improved knowledge capture, storage, and transfer. Finally, our work can serve as a framework for larger and more varied projects.

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