INFORMATION ASYMMETRY IN FOUR
IT PROJECTS: THE CLIENT'S PERSPECTIVE
A MULTIPLE CASE STUDY

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The IT system market belongs to the group of markets characterised by imperfections in information access both amongst the suppliers and the recipients. Literature studies indicate a research gap concerning the phenomenon of information asymmetry between the supplier and the recipient in an IT project. My research thus far has indicated that an excessively high level of information asymmetry between the supplier and the recipient, occurring during the entire life cycle of a management support IT system, is an important factor, which has a key significance to the success of the project. The scope of this article is to present the results of research on the phenomenon of asymmetry in information access both amongst suppliers and recipients as part of a conducted case study.

Keywords: information asymmetry, IS, IT management support system, IT system implementation, client's perspective, multiple case study

1. Introduction

Why do IS projects fail if we know what leads to failure? This is one of the most intriguing questions. The answer is that we still do not know the nature of IS failures. Interaction of many small, not particularly important factors creates a complex amalgam which is difficult to break down [1]. R.Ackoff [2], Lyytinen & Hirschheim [3], Sauer [4], Keil [5], Beynon-Davies [6], Schmidt et al. [7], Ewushi-

Mensah [8] and Avison et al. [9] have been conducting wide and detailed research on IS failures for more than forty years. Since the 1980s, many frameworks have been established to better understand the idea of an information system (IS) failure. We can divide IS failures into expectation failures [3] and termination failures [4]. Expectation failure happens when the implemented system is incapable of meeting the business needs of the stakeholders. These types of failure can be further divided into failures of correspondence, process and interaction. Correspondence failure occurs when IS is evaluated in comparison with previously defined project goals. A lack of correspondence between project goals and the evaluation is viewed as a failure. Process failure takes place when the results of development are not satisfactory, i.e. when an attempt to create a working system or to deliver it within the time frame and cost defined by the budget ends in failure. We sometimes call these failures "runaways" or "project escalation" [10] [11]. Interaction failure occurs when users' requirements and acceptance do not align – it happens when the users do not use a given IS. An additional dimension of this problem, not included in these descriptive models, has been identified: Outsourced Information System Failure (OISF). In order to explain OISF, we can use agency theory, according to which the problems occurring in the environment of outsourcing result from three elements: the differences of goals, the differences of risk behaviours and information asymmetry. OISF is a failure which happens during an IS project in the environment of an outsourced project, i.e. when the client orders the implementation of an IT system from an external supplier.

Both as a practitioner and as researcher, I focus on understanding and explaining the causes of such numerous failures of IT projects consisting in implementing Enterprise Resource Planning, Customer Relationship Management, Business Intelligence, Document Management Systems and E-learning class systems through external suppliers in SMEs. My research thus far has indicated that an excessively high level of information asymmetry between the supplier and the recipient, occurring during the entire life cycle of a management support IT system, is an important factor, which has a key significance to the success of the project. I believe that the factors that are crucial to the success of an IT have changed throughout the years and their character has become more nuanced. It results from a number of factors, i.e. the quickly evolving technology, the proposed methods of project completion, the fast increasing saturation of IS markets and hypercompetition amongst suppliers. The scope of the article is to present the results of research on information access phenomenon amongst suppliers and recipients as part of a conducted case study carried out from the client's perspective. In my research, I use the case study method. The subjects of research are four SMEs in Poland, which have implemented and use management support IT systems, i.e. ERP, CRM, DMS. The article belongs to a cycle of articles that I wrote to present the results of research on the phenomenon of information

asymmetry in IT projects. My aim is to present the logics and the important traits of information asymmetry in IT projects from the client's perspective on the stage of bidding, implementation and operation, using the agency theory.

2. Using agency theory in IT project implementation

The positive agency theory [12] [13] has already been used to describe different phenomena in chosen IS projects. The majority of ERP, CRM, BI, DMS and E-learning class IT systems is implemented through external suppliers with the use of outsourcing. These projects are implemented in an environment where at the stage of bidding, implementation and operation, we can observe three factors [1]:

1. The conflict of goal and interests of both sides, i.e. the supplier and the client. The client's major goal is to obtain economic and non-economic benefits, which in case of enterprises will allow them to achieve temporary competitive edge. The major goal of the supplier is to achieve profitability of the implemented project. We need to stress that the conflict of goals and interests appears at three stages, i.e. the bidding stage, the project implementation stage and the system operation stage.
2. Activities linked to minimising the risk of not being able to achieve the planned goals and interests, on the supplier's side and on the client's side.
3. Information asymmetry between the supplier and the recipient.

According to agency theory, in relations between the buyer and the supplier in IT projects, we have the following players:

1. The client, who decides to purchase a management support IT system software licence and an implementation service – Principal.
2. The supplier of licence and implementation services – Agent.

Agency theory relates to relationships where one of the parties (principal) commissions work to another party (agent), who then carries it out according to the contract that they both agreed on. Both sides selfishly act in their own interest and have conflicting goals. This leads to two problems [1]: 1) ex-ante, before the agreement is signed: the problem of negative selection and 2) ex-post, after the agreement is signed: the problem of moral hazard. Negative selection appears before signing the contract because of the private or hidden information that the agent has about the real quality of their services which are unavailable to the principal. This results in information asymmetry, where the principal's position is an unprivileged one, dealing with a group of bidders who frequently lack sufficient qualifications. The principal who decides to implement an IT system finds it very difficult to see the difference in quality of two groups of goods offered by the agent, analogically to what Akerlof presented in his article [14], i.e. the licence of a specific software and the implementation service for a given software.

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Moral hazard appears after signing the agreement when the principal is not able to monitor and validate the actions of the agent, and they may be put in a situation where the agent is carrying out hidden activities without considering the principal's interest as a result of differences in their goals. Hidden information and hidden activities (also known as opportunistic behaviour) occur when the principal is not able to observe the behaviour and performance of the agent without facing agency cost [12].

Apart from information asymmetry and differences of goals, there is one more important factor: differences of risk behaviours. IS implementation poses a high risk as the outcome is not always defined as a measurable output, and the members of a given organisation may only be partially able to verify it. A failure is very likely mostly because the possible outcome is not certain. Agency theory is a well-known theory, used in research on IT projects carried out by external suppliers [15] [16]. Even though researchers accept the significance of agency problems, the majority see them as one-sided: opportunistic behaviour is associated with the agent. Few researchers understand in greater depth how, and why, agency problems appear. Here, using case study research, I would like to uncover and explain the appearance and culmination of agency problems from a dual perspective.

3. Research methodology

In my research, I have used the multiple case study method. Four enterprises which implemented and are currently using management support IT systems, i.e. ERP, CRM and DMS, constituted the subject of research. These selected enterprises belong to the SME group and operate in Poland. Four projects were chosen from a group of 150 projects. The main criteria of selection were: implementing ERP, CRM and DMS systems as the leading management support applications implemented in Poland, annual turnover below 100 mln EUR, total implementation budget below 250 000 EUR, implementation agreement based on a fixed budget, and the partial failure of all implementations. The scope of the case study is theory creation linked to the issues of information asymmetry in IT projects consisting in the implementation of management support IT systems. I analyse the case study as it allows to develop the existing theory, provide explanations of phenomena unrecognised before, such as information asymmetry in IT projects, and understand the course of management support IT systems implementation in the context of information imperfections. Further development of the research, i.e. confirming the hypothesis presented in the article on information asymmetry in IT projects from the client's perspective, will be a quantitative study employing the method of nonlinear regression using the results presented in this article. Here, I focus on the client's perspective during the whole life cycle of an IT project in an enterprise, i.e. from the bidding stage to the

operation of management support IT systems. My choice of research method – case study, is motivated chiefly by two circumstances [17]:
1. The early stage of knowledge development in the given research area, i.e. information asymmetry in IT projects.
2. Recognising the current phenomenon in real conditions.

Table 1. Five main criteria of case selection

Criterium	Information on the fulfilment of criteria
Data availability	Guaranteed
Distinctiveness of the case, clearly [unequivocally] illustrating studied patterns	Projects that ended in partial failure, but not interrupted during the implementation
Variation in analysed cases	Variation in analysed cases is expressed in the selection of: - IT projects consisting in the implementation of management support IT systems, i.e. ERP, CRM, DMS - Client profile - Sales value and the number of client's employees - The results of project implementation
Critical character of the phenomenon allowing to formulate a general statement	The level of information asymmetry between the supplier and the client as part of the whole life cycle of project implementation from the client's perspective influences the results of project implementation.
Metaphor allowing to point the researcher's attention towards a specific course of the studied phenomenon.	Aiming to analyse the phenomenon of information asymmetry in the entire project life cycle, I selected cases that could be studied on the stages of: bidding, contract negotiations, implementation and information system operation.

Source: Flyvbjerg B. (2004) *Five Misunderstandings about Case-Study Research*, Seale C., Gobo G., Gubrium J.F., Silverman D. [eds]: Qualitative Research Practice, Sage Publications, London-Thousand Oaks, UK

The nature of „case study" research means that the researcher does not presuppose the existence of defined patterns or particular characteristics of the phenomena in question. As opposed to the quantitative research, the beginning is not marked by a prediction of reality included in the hypothesis, but the state of ignorance. We need to underline that it is not a general state of ignorance, but a knowledge gap resulting from literature research and observation of reality. Ignorance, which constituted the starting point of case research, is thus an inter-subjective state, not referring to the researcher as such.

As part of the multiple case study analysis, I would like to pose the following research question:

What factors influence the level of information asymmetry between the supplier and the recipient in project implementation from the client's perspective?

The choice of studied cases was carried out through purposive sampling. According to B. Flyvbjerg [18], there are five main criteria of case selection. Table 1 presents the criteria along with their characteristics in the context of conducted research.

4. Research results

Table 2 presents information characterising the four projects.

Table 1. The characteristic of researched projects

	Company X	Company Y	Company Z	Company A
Client (principal) profile	Sales and service company	Distribution company	Manufacturer of electromechanical elements	Legal firm
Client turnover	EUR 45 mln	EUR 30 mln	EUR 90 mln	EUR 20 mln
Number of client's employees	50	35	150	65
Supplier (agent) profile	Reseller of ERP software designed by the market leader	Reseller of CRM software designed by the market leader	Reseller of ERP software designed by the market leader	Reseller of DMS software designed by the market leader
The type of purchased IT system	ERP	CRM	ERP	DMS
Total project budget (the cost of licence and outsourced services)	EUR 200 000	EUR 50 000	EUR 0.5 mln	EUR 35 000

Total operation cost declared by the supplier at the bidding stage without system expansion in a 3-year period	EUR 25 000	EUR 20 000	EUR 300 000	EUR 10 000
Total real cost of system operation (licence and additional services purchase) in a 3-year period	EUR 75 000	EUR 120 000	EUR 0.6 mln	EUR 15 000
Implementation period	March – December 2005	August - December 2007	January - December 2006	November - December 2005
Operation period	7 years	5 years	6 years	7 years
Implementation results	Project completed on time, within budget, not all the business goals completed.	Project not completed on time, within budget, not all the business goals completed.	Project not completed within budget, on time, all the business goals completed.	Project not completed within budget, not on time, not all the business goals completed.
Type of implementation service agreement	Fixed budget	Fixed budget	Fixed budget	Fixed budget

Source: Own study

Table 3 presents the respondents' answers as part of the case study research.

Table 3. The respondents' answers as part of the case study research

Did the supplier guarantee fixed prices of licence purchase during the operation?	NO	NO	NO	NO
Did the software producer increase the price of licence during the operation? If "yes", by how much?	YES (30%)	YES (30%)	YES (70%)	Software producer was sold to a different company, which significantly changed the price policy, leading to a 120% increase in software licence price
Did the software have important producer flaws (making some system functions impossible to use), which should have been eliminated during the entire project?	YES	YES	YES	YES
Evaluation of knowledge transfer quality during the implementation	Bad	Very Bad	Bad	Good

The causes of transfer knowledge quality during the implementation	Consultants' lack of skills in transferring knowledge	The supplier used information embargo policy in reference to system development in order to lock the client in	Consultants' lack of skills in transferring knowledge	Consultants' high level of skills in transferring knowledge
Did the supplier conceal the implementation cost at the bidding stage?	YES	NO	YES	YES
What are the proportions of costs linked to the system operation? I.e. what percentage of costs linked to the system development and day-to-day system administration?	40% development, 60% administration	30% development, 70% administration	60% development, 40% administration	30% development, 70% administration
Did the supplier inform about the system administration cost during its operation at the stage of bidding?	NO	NO	PARTLY	NO
Did the supplier assign consultants with implementation knowledge and experience to the project?	YES	YES	NO	NO

Did the supplier present implementation methods in detail?	NO	NO	YES	NO
Where project group meetings held regularly?	NO	NO	NO	YES
Was risk management conducted formally in the project?	NO	YES	NO	NO
Did the supplier hand over a project management support IT system?	NO	NO	NO	NO
Did, at the implementation stage, the client know what resources would be managed and developed by the implemented IT system?	NO	NO	NO	NO
Did the client design detailed business requirements for the IT system?	Only general	Only general	Only general	Only general
Did the client design detailed technological requirements for the IT system?	NO	NO	NO	NO

Did the client design an economic analysis of the IT system investment (ex-ante) ?	NO	NO	NO	NO

For the first time in the available literature, research on information asymmetry between the agent and the principal in an IT project concerned all the stages of product life cycle, i.e. the bidding stage, as well as IT system implementation and operation, not only the bidding stage. The subject of analysis were implementations of ERP, CRM and DMS-class management support IT systems, completed as part of a contract based on a fixed budget. All the analysed implementation projects ended in partial failure, however their completion was not halted. I diagnosed four factors influencing the high level of information asymmetry between the client (principal) and the supplier (agent) in IT projects from the principal's perspective.

Factor 1. Software licence and implementation services sale policy of the producer and the supplier.

In all the cases, at the bidding stage the agent gave a lowered value of system maintenance cost (TCO – Total Cost of Ownership) to the principal, both when it came to implementation services and licence purchase cost, despite having earlier received assumptions linked to application development from the principal. Agent's behaviour was caused by hypercompetition in the given IT industry sector and pressure for their project to win. Additionally, we need to stress that during project implementation and operation, the principal was prone to the risk of frequent changes in the software licence price list, which is the responsibility of the software producer, and not the agent, who is only a reseller. Research has shown that in the four analysed cases, the risk factor materialised and, as a result, the producer increased the software price during its operation by, respectively, 30%, 30% 70% and 120%.

Factor 2. Knowledge transfer from the supplier to the client.

Research has shown that during the implementation period and system operation, the principal's evaluated the knowledge transfer from the agent to the principal as "bad" in two cases, in one case as "very bad" and as "good" in one case. An in-depth analysis of the knowledge transfer from the agent to the principal evaluated as "bad" indicated that there were two main causes of this phenomenon, i.e.:

− The quality of knowledge transfer completed by the agent's consultants to the key principal's users was low or very low, resulting from the low level of consultants' competence.

− The agent consciously used the policy of limiting knowledge transfer to the principal in order to render it impossible to complete certain tasks independently, which would have significantly lowered system maintenance cost during its operation.

To sum up, ineffective knowledge transfer from the agent to the principal may have an influence on the failure to achieve planned business goals because the principal will not receive:

− Sufficient amount of information on how to modify work organisation in the enterprise in order to increase its effectiveness.

− Sufficient amount of information about system technology and functionalities, to make it possible to consciously manage and possibly carry out post-implementation system servicing as part of the operation. In this case, TCO may increase.

Factor 3. Preparing the client for an IT project implementation.

We need to stress that relevant preparation for project implementation, along with a rational and effective preparation for the stage of designing project requirements and collecting offers from potential suppliers, is an important factor securing the principal against an excessively high level of information asymmetry.

As the research shows, neither of principals carried out an ex-ante economic analysis of the IT project investment, i.e. before project implementation. At the same time, we should consider the fact that the principals, from the perspective of 7, 5, 6 and 7 years, i.e. the operation period, unequivocally agreed that their preparation for the implementation was not complete, because their functional requirements for the system were defined in far too general terms, i.e. lacking clearly defined business goals and perfunctory organisational changes accompanying the implemented system not leading to the achievement of a competitive edge.

Factor 4. Information system between the supplier and the client at the bidding stage, implementation and operation.

An important factor influencing the level of information asymmetry is an information system including:

− Project risk management.

− Management of changes during project implementation and operation.

− Management of resources during project implementation and operation.

The information system may be supported by an IT system, aiding the communication between the agent and the principal and, as research showed, the agent did not offer using this tool in any of the four analysed cases. Research

indicated that in 3 out of 4 cases the agent did not present the concept of implementation method to the principal, along with the tools of communication necessary for the information system in question, as part of the implementation. In 3 out of 4 cases, project meetings, aimed at discussing project status and the work progress, were not regularly held. To sum up, a lack of an effective information system during project implementation and later operation entails and deepens information asymmetry between the agent and the principal.

5. Conclusions

Presented research results indicate four factors influencing the level of information asymmetry between the client (principal) and the supplier (agent) in IT projects from the principal's perspective. We need to point out that the four factors presented above were diagnosed in the entire product life cycle in the principal's enterprise. This fact constitutes my innovative input into the research and will allow us to obtain a fuller picture of information asymmetry in IT projects. My research to date has shown that an excessively high level of information asymmetry between the supplier and the recipient occurring in the entire life cycle of a management support IT system currently constitutes a significant factor crucial to the success of the project. This is why attempts aimed at minimising the influence of these factors on the level of information asymmetry in an IT project may have an impact on limiting the number of projects ending in complete or partial failure. The presented research results will be verified using quantitative methods.

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