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REDUCING INFORMATION ASYMMETRY IN IT PROJECTS – ACTION RESEARCH RESULTS

Introduction

Management support IT systems are numerous and dynamically developing application group. It is more and more often that not only are the management support IT systems subject to research, but also the conditions and the organisation of an IT project completion. It stems from the fact that IT projects cover a larger spectrum of analysis, including, apart from technological or functional aspects of an information system, a set of activities, resources and links between them aimed at creating a complete IT solution. Wider research conducted by the author is intended to help the theoreticians and practitioners of business IT understand why so many IT projects fail and what should be done to change this. According to the author, an important problem that affects the completion of complex IT projects, in the difficult and changeable circumstances of the enterprises, is the difficulty in the access to information, especially an excessively strong information asymmetry which appears between the project participants both at the stage of negotiating the transaction's terms and conditions and at the project stage of implementation and operation. The goal of this work is to present the results of action research linked to limiting information asymmetry in IT projects consisting in the implementation of management support systems, i.e. ERP, CRM, BI and DMS between the supplier and the customer. The first part discusses the nature of information asymmetry in accessing information in IT projects according to the subject literature. The second part describes research methodology – action research. In the last part, research results and their analysis are presented, followed by a conclusion.

Information asymmetry in IT projects

Information asymmetry is defined as a situation where one of the transaction's parties has more information about a given market transaction than the other side [PoPW08]. The issue of information access occurs at every stage of information project completion. The role of information is also highlighted in agency theory [KaTu06]. The author's research has shown that IT service recipients believe that a high level of information asymmetry observed amongst the customers has a negative impact on the effectiveness of project implementation, and may lead to the project's partial or complete failure. Additionally, research has shown that the phenomenon of information asymmetry was characterised by a dynamic variability at all three stages of IT system implementation projects: **Stage 1.** IT system purchase. **Stage 2.** Completing the IT project according to the methodology. **Stage 3.** Information system exploitation. It means that a high level of asymmetry occurred in all the specific tasks at all subsequent project stages, both on the customer's and the supplier's side.

The role of information is also highlighted in agency theory. It presents a model of a relation between the company owner (principal) and an information system supplier (agent), which implies the existence of information asymmetry. According to Y. Lichtenstein [Lich04, pp. 61-65], agency theory can be used to describe the realisation of the first stage of an IT project, i.e. clarifying terms and conditions of the transaction. He points out that there is a conflict of interests between the two parties and a clear contradiction between the supplier's desire to maximise profits and the company's wish to complete the project at the lowest cost possible.

Additionally, the high level of technological, functional and organisational complexity leads to an increase of information asymmetry. Y. Lichtenstein [Lich04, pp. 61-65] shows that due to the high level of information asymmetry, while creating rules of cooperation between the supplier and the buyer of an information project defined in the contract, the principal may be prone to an abuse of trust (the risk of moral hazard).

According to K. Eisenhardt [Eise89, pp. 57-75], the problem of information asymmetry resulting from agency theory in IT system transactions may be limited through designing an information system between the principal and the agent, for example by designing a detailed reporting system of the project completion progress. Every method of IT system implementation recommended by the producers contains a reporting system including a set of documents used during the completion of project tasks, e.g. project risk management. It is important that the supplier adapts a reporting system recommended for the specific IT project with all its particular characteristics and conditions.

Information asymmetry in the completion of an IT project may result in not fulfilling the goals set by the customer before the project, exceeding the planned budget or not keeping to project completion deadlines.

As part of the completion of a management support IT system transaction, we can observe the so-called 'pig in a poke' syndrome [Wach13] which highly increases the risk of trust abuse (moral hazard) by the supplier. A supplier conscious of information asymmetry may try to ruthlessly maximise the profit through limiting the cost linked to the completion of project tasks, which may decrease service standards.

Analysing economic questions in the context of information asymmetry, we need to consider the structure of these types of contracts based on which IT projects are completed in Poland. According to the author's research*, the percentage structure of contract types on the management support IT system market in Poland has been presented in Figure 1.

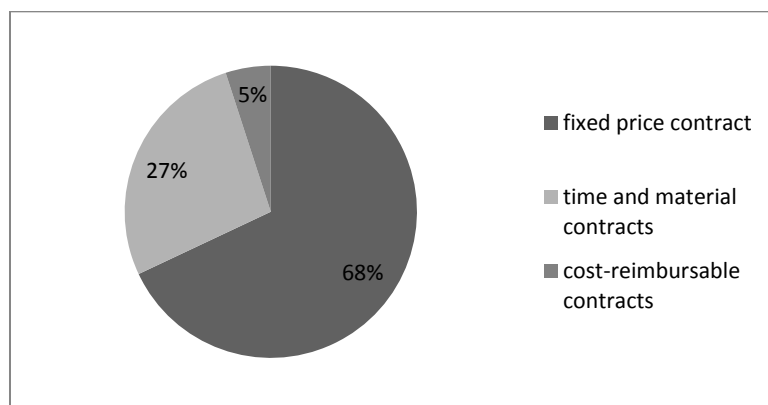


Fig. 1. The structure of contract types in Poland

Source: Own study.

68% – fixed price contract, 27% – time and material contracts, 5% – cost-reimbursable contracts, increased by the supplier's premium. According to Y. Lichtenstein [Lich04, pp. 61-65], in fixed price contracts the supplier may have a strong motivation to make the cost lower than the budget. The subject literature, however, does not describe a reverse situation, where the customer may

* The research was carried out in 2013. It covered 500 enterprises where 895 IT projects consisting in management support IT system implementation, i.e. ERP, CRM, BI, DMS, BI, E-learning, were completed. The research covered enterprises operating in the Mazovian and Lesser Poland voivodeships and it was conducted in companies with a number of employees exceeding 400 people.

have a strong motivation to commission or even force additional tasks upon the supplier when the contract does not clarify precisely the range of the project, which could effectively lead to losses on the supplier's side. In this situation, there could also occur an abuse of trust, but on the side of the customer.

Serious difficulties in the completion of project tasks for both transaction parties that result from incomplete information often lead to an escalation of problems and conflicts, causing an impasse in the completion of the project or even its termination. It has both microeconomic consequences for the customer and the vendor, and for the whole IT industry. Consequently, bad PR for complex IT projects is created.

A lack of assurance when it comes to the quality of a management support IT system implementation services available on the market means that in the future the buyer will not pay for this type of service more than its average market price (in this case the average daily consultant wage in a given country). As a result, customers will pay lower prices for IT services offered by smaller companies that lack high qualifications, experience and certificates, e.g. by freelancers. Consequently, information asymmetry implies the appearance of adverse selection, in this case high-quality services being pushed out by lower quality services. In fact, this process is similar to the one described by Copernicus-Gresham's law of so-called currency debasement. As Akerlof [Aker70, pp. 488-500] stressed, there are ways to eliminate negative selection on the market. According to him, there are markets where a repeated process of purchase and sale or the seller's reputation eradicate the problem of negative selection. A broader method of eliminating negative selection is screening, a method used in the decision-making process in information asymmetry conditions.

To sum up, facing the 'pig in a poke' syndrome and a strong information asymmetry between the supplier and the customer in the IT industry, with all its negative consequences, such as the temptation to abuse trust or negative selection, it becomes essential to introduce adequate techniques and procedures in order to decrease information asymmetry. The results of conducted research indicate the possibility to limit information asymmetry in IT projects realisation.

Research assumptions and research method

The choice of subject matter stems from the belief that issues linked to information asymmetry between the supplier and the buyer in IT projects may have lead to an abuse of trust by both transaction parties (the so-called moral hazard) which results in not completing an IT project according to plan. The re-

search was based on Action Research method. The author believes that this research method will help achieve results that will have cognitive and utilitarian goals. It is a generally accepted and applied method in the field of knowledge on organisation development and education [CaKe86, ElCh93], also more and more frequently used in researching broader issues linked to IT systems [BaMy04]. The aim of action research is solving a practical problem through broadening research knowledge. A researcher choosing this method introduces changes in the researched object and then simulates the functioning of the changed object [BaRa92]. It is an iterative research method consisting in performing consecutive analyses and simulations on the object of research. According to G.J. Bakehouse [Bake00], the action research method promotes defining theory through practice and speculating on how to lead this practice better. J. Gil indicates that researchers using this method intend to contribute to existing knowledge but also help to resolve some practical problems. Research is learning on the basis of experience, as well as creating and implementing recommendations. Action research is a useful way of conducting research for practitioners who aim to perfect the understanding of their actions. Research had been conducted in two project phases, i.e. **Stage 1.** Purchasing an IT system. **Stage 2.** Completing an IT projects according to a chosen method. Conducting research according to the action research method can be divided into two stages, i.e.:

1. **Diagnostical stage.** During this stage, the researcher, using available knowledge, aims at diagnosing the researched problem occurring in the object. This stage often includes designing recommendations for changes in the object aimed at solving the problem.
2. **Therapeutical stage.** During this stage, recommended changes are implemented and the results triggered in the object analysed [Blum55].

We need to stress that the Action Research method was a scientific method often used in the 90s, which lead to brining the researcher closer to the researched object and achieving the effect of synergy. The researchers using this method contributed their knowledge about the method and their general knowledge about the issue, while the customers contributed the object and their practical knowledge [BaMy04]. In recent years, leading American journals issue special editions showing research results applying that method, for example „MIS Quarterly” showed three requirements for articles describing the results of research using Action Research method, i.e. the author has to demonstrate their input or their potential input into the practice (the action); the author has to demonstrate their input or their potential input into research development (the theory); the author should indicate research methods along with their choice criteria to describe how their methods fulfil these criteria in the research they are conducting.

The author conducted his research amongst companies located in Mazovia in 2013. The companies qualified for the research met the following criteria: between 80 and 1000 employees, own IT department, minimal income of 40 mln zł. The companies included those with both Polish and foreign capital, widely autonomous in terms of their IT strategy. The selected companies achieved good or average results in their industry – so they were neither leaders nor marginal companies. An important research assumption was to reach people directly or indirectly engaged in the completion of management support IT project implementation. The respondents were company owners, directors, members of the board, financial directors and IT directors. The research was divided into two stages:

- **Stage 1 – diagnostic.** Conducting analytical workshops amongst 5 enterprises that completed 8 IT projects in 2012. The analytical workshops consisted in collecting data concerning the problems of information asymmetry between the supplier and the buyer. The analysed IT projects consisted in implementing: an ERP system – 2 projects, a CRM system – 2 projects, a BI system – 1 project, a DMS system – 3 projects. On the basis of conclusions, recommendations for changes were made in order to minimise information asymmetry between the supplier and the buyer during an IT project completion.
- **Stage 2 – therapeutic.** In the proposed research, recommendations for changes were implemented in four chosen projects of management support IT system implementations that took place in 2013. The aim of modifying an IT project completion is the reduction of information asymmetry between the supplier and the buyer. As part of this project stage, a number of projects was completed, providing recommendations for changes resulting from stage 1: an ERP system implementation – 1, a CRM system implementation – 1, a BI system implementation – 1, a DMS system implementation – 1. Analytical workshops held again after the conclusion of the above mentioned projects indicated changes in the completion of IT projects. The final conclusions will constitute practical recommendations concerning a swift and effective organisation of knowledge transfer during the completion of all phases of management support IT system implementation methods.

Research results

8 IT projects analysed in the first stage of research, the so-called diagnostics stage, had the following characteristics:

- 6 out of 8 projects were completed on the basis of a fixed budget. The two remaining projects were completed on the basis of a consultants' time and material.

- 4 out of 8 projects were carried out on the basis of the Agile method. The remaining 4 projects were completed on the basis of the traditional waterfall method.
- Average implementation budget – 78 000 EUR.
- Average project completion time – 7 months.
- Average number of end users in customer's project group – 18.
- 4 out of the 8 projects ended within the planned period, budget and all the project goals were completed; 2 out of the 8 projects ended within the planned period, the budget was exceeded and all the goals were achieved; 1 out of the 8 projects was not completed within the planned period and budget, but the goals were achieved; 1 out of the 8 projects was not completed within the planned period and budget, and the majority of goals were not achieved.

Analysing project characteristics and the obtained results of analytical workshops with the respondents on the customer's side, we can point to the following conclusions after the completion of the first, diagnostic stage:

- 6 out of the 8 representatives of IT projects admitted ex post that they did not have the appropriate knowledge about the implementation of IT systems before the project. They believe that there has been a significant knowledge asymmetry between the suppliers and the customers in the sphere of the software and implementation method. The other two respondents declared they had a basic knowledge about the implemented product and the implementation method. However, all the respondents felt that they were being sold a 'pig in a poke'. After the completed implementation all the respondents admitted that they realised how little knowledge about the system and the implementation they had and that they were exposed to the possible temptation of abuse of their trust on the side of the IT system supplier.
- All the respondents underlined that already during the implementation, there was an asymmetry of information between the supplier and the customer regarding important information influencing project completion by the supplier, where the customer was the dominant party. The customer's supplier limited information about the following issues that had a great impact on the quality of project completion:
 - the details of functional requirements on the basis of which the supplier carried out the functional analysis and, subsequently, system parameterisation,
 - 'bottlenecks' in some functional areas that should have been eliminated after the IT system implementation,
 - details of strategic plans regarding the development of IT in the enterprise, based on which the supplier could complete an implementation project,
 - details of the enterprise's strategic plans, based on which the supplier could design the required functionalities in the IT system.

- All the respondents pointed out that during the sale of the IT system, the supplier provided mostly highly general meta-information that was often difficult to verify. 7 out of the 8 respondents representing the customer as part of the project were not able to verify the information given by the supplier on a satisfactory level because the information was too general and not verifiable.
- All the respondents admitted that they were not efficiently prepared for the choice of IT system and project realisation. The customers did not complete a proper analysis that would precisely define functional requirements for the IT system. None of the projects included an ex ante economic analysis of the IT system investment.
- 4 out of 8 projects included project completion according to the Agile method and a fixed price contract. The respondents highlighted that linking the Agile method and a fixed budget helped eliminate the abuse of trust on the supplier's side.
- All the respondents admitted after the project completion that a legal agreement regulating the IT project completion had the characteristics of asymmetry, where the interest of suppliers was far better protected than the interest of customers. The main reasons for asymmetry were:
 - the customer was not sufficiently prepared to define functional requirements for the system,
 - the customer lacked knowledge about the complete cost of system maintenance (Total Cost of Ownership) in a period of 4-7 years,
 - insufficient knowledge about the IT project completion method,
 - insufficient knowledge about the implemented IT system,
 - insufficient verification of information signalled by the supplier regarding their competence, certificates, etc.

On the basis of these conclusions, the author has designed the following recommendations that were implemented on the second stage of research.

- An agreement regulating the transaction of an IT system purchase and its implementation services should be more symmetrical and have a provision for interests of both sides. Including the so-called guarantee premium in the agreement is an important instrument reducing asymmetry, as part of fixed budget agreements. The premium would be paid by the customer after the completion of the whole project.
- A more effective preparation for project completion on the customer's side.
- Recommended Agile project completion method. Using the Agile method in management support IT system implementation is characterised by:

- the method can be used in small project teams, i.e. up to about 10 key users on the customer's side where the communication is smooth and there is no need to create a robust project documentation structure,
- methods aimed at a quick creation of systematised functionality groups of management support IT systems,
- the consecutive stages of configuring completed and closed functionality groups (e.g. pricing policy functionality, discount functionality in ERP or Balanced Scorecard configuration functionality in BI system) are integrated in iterations.

The second stage of research consisted in implementing recommendations within the IT projects (ERP system implementation – 1, CRM system implementation – 1, BI system implementation – 1, DMS system implementation – 1) and carrying out analytical workshops that pointed to the issues linked to information asymmetry in the completion of IT projects. Four IT projects analysed on the second stage had the following characteristics:

- All four projects were based on fixed price contracts.
- All four projects were completed on the basis of the Agile method.
- Average implementation services budget – 112 000 EUR.
- Average project completion period – 9 months.
- Average number of key users in customer's project group – 9.
- Average number of end users in customer's project group – 24.
- All four projects (ERP, CRM DMS, BI) ended within their planned budget and schedule.

Three of them (CRM, DMS, BI) met their planned goals.

Analysing the characteristics of projects and the collected results of analytical workshops with respondents on the customer's side, we can indicate the following conclusions after completing the second stage, the so-called therapeutical stage:

- Using the recommendations resulted in the customers preparing their management support IT system implementation more thoughtfully. All the respondents indicated that they no longer had the impression of being offered "a pig in a poke". The phenomenon of information asymmetry diminished.
- Using the recommendations resulted in all the projects ending according to schedule and budget on the second stage of research project (the therapeutical stage). Only one project, i.e. an ERP system implementation, did not end in achieving planned business goals. According to respondents from this company the business goals defined at the planning stage, i.e. before the system purchase, were too ambitious, e.g. reducing warehouse cost or reducing the level of employment.

- All the respondents admitted that the choice of the Agile method resulted in a more effective accumulation of knowledge about the methods of completing the given IT project and about the technical and organisational conditions of the implemented IT system, which had an influence on the reduction of information asymmetry between the supplier and the customer.
- All the respondents pointed out that they had paid attention particularly to an effective transfer of information to the supplier regarding functional requirements so that information asymmetry in the implementation would be eliminated. At the same time, they said they had tried to build cooperation with the suppliers on the basis of mutual trust and a win-win approach.

Final discussion

We need to underline that it is not possible to directly define the level of information asymmetry while implementing these types of projects. A direct measurement of the asymmetry level would have to consist in identifying the real differences in the supplier's and the customer's knowledge in the case of every single purchase and sale transaction of an IT support management system. The researcher would have to have access to all the information possessed by the supplier and then compare its range with the information accessible to the customer. Apart from the enormous workload of such research, what would really hinder its completion is the problem of access to full information. The researchers are forced to carry out indirect measurements of information asymmetry by approximation, using indicators of its differing levels. The challenge of carrying out these measurements accurately is one of the reasons why there is a gap in the literature in the research on the influence that information asymmetry has on IT project implementation, especially management support project implementation. As an attempt to examine the problem of information asymmetry, the author wanted to present the results of research on information asymmetry in IT projects in Poland. An analysis of the material collected during the research of information asymmetry between the supplier and the buyer in IT projects, conducted by the author in 2013, leads us to the following conclusions.

First of all, the phenomenon of information asymmetry between the supplier and the customer and the "pig in a poke" syndrome occur in management support IT projects. An important characteristic of information asymmetry is its dynamism in time and range, consisting in the fact that, at the stage of bidding and negotiating business agreements, the supplier has a greater knowledge about the object of transaction than the customer, which can lead to an abuse of trust in

creating the rules of cooperation and project organisation. At a certain moment after the beginning of the project, the information advantage of one party over the other is not that obvious and may change. For example, during an IT system installation, the supplier may carry out the task in an inappropriate manner or abuse the customer's trust without the possibility of verifying the facts with the other transaction party. In another example, during the functional analysis, the customer may not specify all their functional requirements for the system and then subsequently justify it by a lack of knowledge.

Secondly, the author of the research indicates that all the respondents unequivocally stated that information asymmetry in IT projects between the supplier and the buyer was too big, which may have an impact on the high level of failed IT projects on the IT market. The asymmetry stems from:

- The project and product metadata given to the customer by the supplier is too general. Considering the fact that the international IT system market is becoming more challenging, the vendors who are trying to maximise their profit may tend to abuse the buyers' trust by not sharing the information that might give them a negative image of the offer.
- Lack of sufficient and relevant preparation in the area of an IT project completion on the customer's side.

We need to stress that customers admitted *ex post* that they had not been sufficiently prepared for the IT project and did not pay enough attention to its completion. A lack of customer's knowledge about the software and project completion at the moment of contract negotiations meant that the customers felt that they were being sold "a pig in a poke".

Thirdly, in order to reduce information asymmetry at every project stage, the customer should actively propose the right information system that would allow for information security. During project completion, an information system should be an integral part of the system management project, e.g. within the scope of project management system.

Fourthly, the respondents indicated that linking the use of the Agile method and the fixed budget concept contributes to a faster accumulation of knowledge and skills as well as the possibility to better verify the quality of project work. Thus, in comparison to the Waterfall method, the transfer of information by the suppliers is faster and more efficiently verified. As a result, the customer can assess the real progress of project work and pay (or not) for the accepted work results.

The author hopes that the research results presented in the publication will help achieve two goals, i.e. deepen the theoretical description of information asymmetry in IT projects and contribute to indicating specific solutions and techniques reducing asymmetry in IT projects that may be used in practice.

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REDUKCJA ASYMETRII INFORMACJI W PROJEKTACH IT - WYNIKI BADANIA INTERWENCYJNEGO

Streszczenie

Projekt informatyczny polegający na wdrażaniu systemów TI (technologii informacji) wspomagania zarządzania charakteryzuje asymetria informacji między klientem i dostawcą. Prezentowane wyniki badań są częścią bardziej obszernych badań autora dotyczących kwestii niedoskonałości dostępu do informacji między dostawcami i klientami projektów informatycznych. Celem artykułu jest przedstawienie wyników badań autora dotyczących zastosowania metody badania interwencyjnego (Action Research) związanego z problemem redukcji asymetrii informacji w projektach IT. Wyniki badań mogą być ważne dla przedstawicieli środowiska akademickiego oraz dla praktyków zainteresowanych realizacją projektów informacji.