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**REDUCING INFORMATION ASYMMETRY
IN IT PROJECTS**

Summary: An IT project consisting in implementing a management support information system is characterised by information asymmetry between the supplier and the client. The presented research results are part of the author's broader research pointing to imperfections in the access to information amongst the providers and buyers of IT projects. The scope of this article is to present the methods of avoiding information asymmetry as part of an IT project implementation. The research results may be interesting for researchers specialising in the subject matter of IT project implementation and for practitioners completing IT projects.

Keywords: asymmetry, access to information, management support IT systems, game theory, agency theory.

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1. Introduction

Management support IT systems constitute a numerous and dynamically developing application group. More and more often not only the management support IT systems are subject to research, but also the organisation and the conditions of an IT project completion. This results from the fact that IT projects cover a broader spectrum of analysis, including not only technological or functional aspects of an information system, but also the set of activities, resources and links between them that are aimed at creating a complete IT solution. Broader research conducted by the author is meant to help the theoreticians and practitioners of business IT understand why so many IT projects fail and what should be done to change this. Research conducted every year by the frequently quoted American organisation, the Standish Group, which publishes the so-called *Chaos Report* [The Standish Group 2005], is very thought-provoking. It is worth referring to some statistics, as the research concentrates on the realisation of IT projects (especially programming development projects) and the respondents participating in the research are managers from IT management areas. Generally, the statistics summing up the interviews are alarming:

- Projects exceed their budget by an average of 189%.
- Projects exceed their scheduled duration by an average of 222%.
- Projects meet their goals/scope only by an average of 60%.

Synthetic data shows that, on average, only 16% of projects are completed within the planned parameters, about 13% of projects are in danger of failing to complete at least one parameter and 32% fail utterly, which means they are terminated before they are completed. According to the author [Wachnik 2014], in the control group of 290 Polish enterprises that completed 380 IT projects between 2011 and 2012, the following percentage of IT projects consisted in re-implementing the following classes of systems: 18% – ERP, 14% – CRM, BI – 13%, DMS – 8%, after their initial failure.

A significant problem that influences the completion of complex IT projects in the currently difficult and changeable circumstances of enterprises is the difficulty in accessing information, especially information asymmetry, which occurs 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 aim of this work is to present the methods that allow for limiting information asymmetry between the supplier and the client in a project consisting in the implementation of management support systems, i.e. ERP, CRM, BI, DMS, BI and E-learning.

The first part presents the nature of information asymmetry in accessing information in IT projects according to the subject literature. The second part describes the research methodology. The last part is dedicated to the presentation of the research results and their analysis, followed by the conclusion.

2. Information asymmetry in an IT project

A project of adapting a standard ERP, CRM, BI, DMS, BI and E-learning class management support information system package is an activity limited in time and budget, aimed at creating a unique configuration that, by supporting the enterprise's strategy, will help it achieve a temporary competitive edge. The end product of such an enterprise will be a programmed and configured IT system, operating within a specific range, not only supporting its users in completing the functions of planning, filing and reporting economic events taking place in the company, but also working as a catalyst of change for the enterprise. A full transaction of an ERP, CRM, BI, DMS, BI, E-learning class information system purchase consists in the purchase of:

- software licence and a carrier of the purchased system,
- implementation services aimed at carrying out a number of project tasks according to the methods recommended by the software producers.

Information asymmetry is defined as a situation when one of the transaction's parties has more information about a given market transaction than the other side [Polański et al. 2008].

We need to stress that information asymmetry between the provider and the buyer of the information system appears both during the completion of the information system purchase transaction and at all the other stages of the project, i.e.:

Stage 1. The purchase of an information system.

Stage 2. Implementing an IT project according to the methodology.

Stage 3. Information system usage.

A client who does not have *ex ante* access to the full information about the purchased information system and implementation services that will give the application utility purposes, is concerned that the investment may end in economic loss and serious organisational problems. At every stage of their collaboration with the provider, the client has to just make do with certain, usually difficult to define, meta-information, i.e. a presentation of standard software or one minimally adapted to the client's need, a visit and a reference contact with the company that has implemented a similar information system in the past and information about the system implementation.

The issue of information access appears at every stage of the information project completion. The role of information is also stressed in the agency theory [Kataja, Tuunanen 2006]. This presents a model of the relation between the company owner (principal) and an information system provider (agent), which implies the existence of information asymmetry. According to Y. Lichtenstein [2004, pp. 61-65], the agency theory can be used to describe the realisation of the first stage of an IT project, i.e. clarifying the terms and conditions of the transaction (contracting). Lichtenstein points out that there is a conflict of goals between both parties and a clear contradiction between the provider's wish 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 increases information asymmetry. Lichtenstein [2004] shows that due to the high level of information asymmetry, the principal may be prone to an abuse of trust (the risk of moral hazard) while creating the rules of cooperation between the provider and the buyer of an information project.

According to K. Eisenhardt [1989, pp. 57-75], the problem of information asymmetry resulting from the 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 the 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

provider 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 client before the project, exceeding the budget or not keeping to the project deadlines.

As part of the completion of a management support IT system transaction, we can observe the so-called 'pig in a poke' syndrome [Wachnik 2013] which significantly increases the risk of trust abuse (moral hazard) by the provider. A provider conscious of information asymmetry may aim at the ruthless maximisation of profit through limiting the cost linked to the completion of project tasks, which may decrease service standards.

When analysing economic questions in the context of information asymmetry, we need to consider the structure of the types of contracts based on which IT projects are completed in Poland. According to the author's research¹, the percentage structure of contract types on the management support IT system market in Poland is currently as follows: 68% – fixed price contract, 27% – time and material contracts, 5% – cost-reimbursable contracts, increased by the provider's premium. According to Y. Lichtenstein [2004], in fixed price contracts the provider may have a strong motivation to make the cost lower than the budget. The subject literature, however, does not illustrate a reverse situation, where the client may have a strong motivation to commission or even force additional tasks upon the provider when the contract does not clarify precisely the range of the project, which could effectively lead to losses on the provider's side. In this situation, there could also occur an abuse of trust, but on the client's side.

Serious problems in the completion of project tasks for both transaction parties resulting from incomplete information lead to an escalation of problems and conflicts and an impasse in the completion of the project, or even its termination. This has both microeconomic consequences for the client and the provider, and for the whole IT industry, creating bad PR for complex IT projects.

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 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 the given country). Consequently, clients will pay lower prices for IT services offered by smaller companies that lack high qualifications, experience and certificates, e.g. freelancers. As a result, information asymmetry implies the appearance of adverse selection, in this case high-quality services being pushed out by lower quality services.

¹ 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 the number of employees exceeding 400 people.

In fact this process is similar to the one described by Copernicus-Gresham's law of so-called currency debasement. As G.A. Akerlof [1970, pp. 488-500] noted, there are ways to eliminate negative selection on the market. He underlined that there are markets where the repeated process of purchase and sale, or the seller's good reputation, solves the problem of negative selection. In cases of management support IT system industry, this would be proof of competence, experience and skills demonstrated by the vendor through:

Certificates of the consultants, programmers and project directors regarding project completion management and system functionalities.

1. Product certificates.
2. Access to references and information about previously completed projects.
3. Access to information about the methods of completing IT projects.
4. A broader method of eliminating negative selection is screening, a method used in the decision-making process in information asymmetry conditions.

This includes the processes of:

- 1) acquiring information,
- 2) selecting and filtering information,
- 3) identifying significant information,
- 4) verifying information,
- 5) detailed analysis of available information,

aimed at acquiring as much of the correct and important information as possible through a person or company lacking information about the entity or the subject of a potential contract. The first mention of screening as a method of avoiding negative selection appeared in the work by M. Spence [1973, pp. 355-374] but it was Rothschild and J. Stiglitz who created a coherent concept of screening, similar to the signalling concept [Rothschild, Stiglitz 1976, pp. 629-649; Stiglitz 1975, pp. 283-300]. They analysed insurance markets, where screening as an analysis of data is aimed at minimising information asymmetry between the insurer and insured. The idea of screening, popular in world literature, appears more and more frequently in Poland, for instance in Polish-language documents where the word 'screening' was left as part of the EU accession procedure. In this case screening consists in a review of law-making in a country applying for EU membership.

The subject literature does not point to the formal use of screening as part of ERP, CRM, BI, DMS, BI and E-learning class management support IT project completion, although it should be underlined that practitioners intuitively use, fully or fragmentally, the screening method in this type of projects.

To sum up, facing up to the 'pig in a poke' syndrome and the strong information asymmetry between the provider and the client in the IT industry, with all the negative consequences it entails such as the temptation to abuse trust or negative selection, it becomes indispensable to introduce information systems supervising the completion of IT projects. In cases of information asymmetry between the

enterprise (client) and external parties (providers), this role should be carried out by the information system along with a set of appropriate methods and techniques that would be an integral part of the project completion method recommended by the provider.

3. Research method

Questionnaire research was conducted between August and October 2013. The conducted research is part of a wider research directly concerning information asymmetry in the completion of IT projects consisting in implementing management support IT systems in Poland. The research was conducted by organising analytical workshops with IT directors and members of the board responsible for the completion of IT projects. The research was carried out in 10 enterprises that met the following criteria:

- Commercial and/or manufacturing companies.
- Between 50 and 500 employees.
- Have their own IT department.
- 20 mln zloty minimum income, 500 mln zloty maximum income.
- One of the following systems: ERP, CRM, BI, DMS, BI or E-learning implemented in the last 2 years.
- Average budget of a completed project: 0.75 mln zloty.

Amongst the 10 enterprises, 10 IT projects were carried out. 60% of the projects used the Waterfall model designed by the producer of a given software and 40% of the projects followed the Agile method, also designed by the producer of a given software. In the case of 70% of the projects, billing was based on a fixed price contract, the remaining 30% of the projects' billing was based on a time and material contract. The projects ended as follows:

- 60% ended within the planned budget and period, and all the project goals were completed.
- 20% ended within planned budget and period, but the majority of significant project goals was not completed.
- In 20% of cases, the projects failed to be completed within the planned budget and period, and the majority of significant project goals was not completed.

The companies included those with both Polish and foreign capital, widely autonomous in terms of their IT system choice and the way of completing the projects. All the companies came from the Mazovian voivodeship. The structure of the surveyed companies was as follows: manufacture of food products – 20%, sale and servicing of industrial automatics – 30%, B2B services – 30%, medicine distribution – 10%, distribution of building materials – 10%. As part of the analytical workshop, the following subjects were closely analysed:

- The phenomenon of information asymmetry between the provider and the client during the completion of all the project phases.
- The reduction of information asymmetry between the provider and the client during all the project phases.

The selected companies achieved good or average results in their industry – so they were neither leaders nor marginal companies. The author's intention was to reach people directly or indirectly engaged in the choice of IT systems and their implementation. Understanding the views and cognitive maps of top company managers is significant for the analysis of the dominant logics of action in the area of information asymmetry reduction between the provider and the client. Interviews in other companies confirmed the relevance of the respondent group's choice. The majority of respondents was perfectly familiar with the application choice and implementation issues.

4. Research results

After the interviews were completed, the respondents suggested the following conclusions:

1. The respondents stress that there is a strong information asymmetry between the provider and the client in each of three stages of an IT project completion. They pointed to information system providers as the dominant entity possessing most technological, functional and business information. Additionally, all the surveyed respondents have experienced the 'pig in a poke' syndrome [Wachnik 2013] during management support IT system transactions, which may facilitate an abuse of trust on the provider's side. The respondents underlined that the basis of their decision to purchase an IT system is the subjective belief that a product that they do not know may meet their specific needs and its evaluation reflects its use value. It is important to emphasize that the providers often gave the respondents meta-information about the prospective investment, which was difficult to verify, i.e.:

- Assurances that the standard functionality of the IT system they were being offered met the client's requirements.
- Assurances that the technology used in the offered system met the client's requirements.
- Assurances that the proposed implementation method matched the system characteristics and the client's organisational conditions.
- Assurances that the proposed fixed implementation services budget was adequate to the actual cost linked to designing the functionality required by the client.
- Assurances that the total cost of ownership during its operation period, i.e. 3 to 5 years, would not exceed the declared cost.
- Assurances that the level of competence and the skills of consultants would allow for the project to be completed.

2. The respondents pointed out that information asymmetry also existed on the client's side. This means that during the completion of the project, the client might not be able to articulate information concerning its functional requirements based on which the system will be configured. As a result, the provider will not have important information that will allow them for a correct system configuration.

3. The respondents who completed their project based on the Waterfall model complained that they experienced a strong information asymmetry in reference to project management issues, i.e. project completion status, potential project risks, problems linked to functional questions, etc. The main two reasons they pointed to was the ineffectiveness of the project management information system and the low flexibility of the Waterfall model which had been designed for systematic and sequential completion of project tasks based on a previously established plan [Somerville 2001]. The respondents who completed their projects based on the Agile model did not experience information asymmetry in terms of project management, stressing that the Agile method requires the constant contact between the provider and the client, so the client receives regular updates about the project's progress. In addition, the Agile method assures greater flexibility of project completion and encourages the client to develop awareness of application development quicker. To sum up, according to the respondents, using the Agile method reduces information asymmetry between the provider and the buyer.

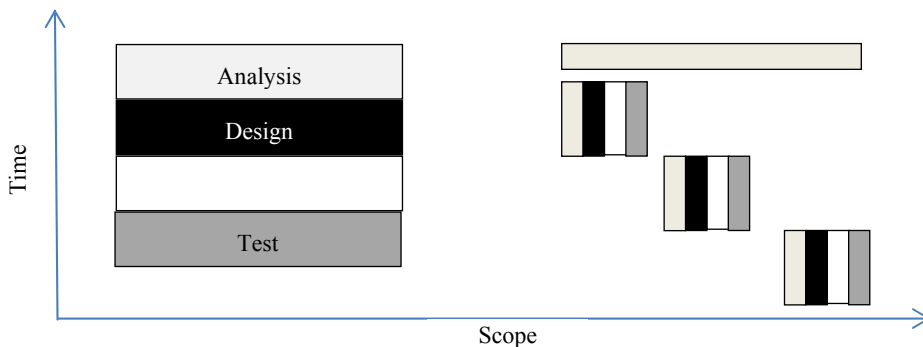


Fig. 1. The general concept of the Waterfall and Agile implementation methods

4. The majority of respondents preferred projects based on fixed time contracts. According to the method used, the contract divided the entire project into two phases, i.e.:

- Analysis
- Design, Implementation, Test

Each phase was divided into a number of tasks and milestones. The billing was based on accepting the results of particular tasks and milestones. The first phase contained analytical tasks that apart from the results of building a model of a theo-

retical IT system, defined a fixed price contract for completing the second phase and its schedule. Thanks to this approach, both sides created the project's functional scope, a matching budget and schedule with a greater awareness. Some respondents using fixed price contracts assigned a guarantee premium constituting between 15 and 20% of the budget for each task. The guarantee premium was paid by the client at the end of a completed project. To sum up, the clients preferred it when the project was completed based on a fixed price contract using the two phase concept, which allowed to create a fixed price contract for the second phase based on a precisely defined functional scope of the project. The clients-respondents concluded that it was a method of decreasing information asymmetry and the results of the 'pig in a poke' syndrome.

5. The respondents indicated that limiting information asymmetry was encouraged by an effective information system linked to project management and information transfer concerning technological and functional issues, as well as system configuration during every stage and milestone. The clients indicated that an imperfect knowledge transfer had an influence on increasing information asymmetry in the last and longest stage of an IT project, i.e. operation, which has a direct impact on the increase of total application maintenance cost.

Many respondents underlined that in cases of knowledge transfer between both parties, a conflict of interests could occur. The provider may not be interested in transferring important information concerning functionalities, technology and project organisation during the second project stage, hoping that it will lead to higher profits during the last stage of the IT project, i.e. operation. To sum up, the respondents believe that an effective knowledge transfer may have a significant impact on decreasing information asymmetry, especially at the second and third project stage.

5. Conclusion

An important characteristic of management support IT systems is information asymmetry and the 'pig in a poke' syndrome. The author would like to underline that the existing subject literature indicated the existence of information asymmetry in IT projects consisting in management support IT system implementation only with the dominant role of the provider at the stage of sale and project completion. The presented research shows that information asymmetry occurs with the dominant role of the client at the stage of project completion, especially as part of functional analysis and tests. This fact may have a significant influence on the precise understanding of the logic of action amongst providers and clients during project implementation. Additionally, the research has confirmed that in order to minimise information asymmetry between the provider and the client, it is important to have a functioning information system that will provide both parties with timely and reliable information regarding the project's progress and the difficulties that might

arise. It is especially noteworthy that the respondents have pointed to the Agile method as the one that helped decrease information asymmetry between the provider and the client in all stages of project completion. This resulted from the fact that the Agile method, as opposed to the Waterfall method, allows for dividing the project into smaller tasks that are easier to manage. Additionally, the respondents have underlined that in order to minimise information asymmetry between the provider and the client, it is worth implementing project organisation methods that will allow to settle the accounts for the results of specific project tasks. Generally speaking, the respondents preferred using a fixed price contract for their IT projects, including a guarantee premium paid after the completion and acceptance of specific task results. The final research result was indicating that an effective knowledge transfer concerning system functionalities, project organisation, project management and the existing risks is an important factor decreasing information asymmetry between an IT project provider and buyer at every stage of an IT project.

The author hopes that the description of information asymmetry on the management support IT systems market presented in this article will help fulfil two goals: it will show the specific character of management support IT system transactions and will contribute to increasing the effectiveness of management support IT system implementation.

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ZMNIEJSZENIE ASYMETRII INFORMACJI W PROJEKTACH IT

Streszczenie: Projekt informatyczny polegający na wdrożeniu systemów informatycznych wspierających zarządzanie posiada cechę asymetrii informacji pomiędzy dostawcą i klientem. Przedstawione rezultaty badań są częścią szerszych badań autora wskazujących niedoskonałości w dostępie do informacji wśród dostawców i odbiorców projektów informatycznych. Celem niniejszego artykułu jest przedstawienie metod uniknięcia asymetrii informacji w ramach realizacji projektu informatycznego. Wyniki badań mogą być interesujące dla badaczy zajmujących się tematyką realizacji projektów informatycznych oraz praktyków realizujących projekty informatyczne.

Słowa kluczowe: asymetria, dostęp, informacji, systemy informatyczne wspierające zarządzanie, teoria gier, teoria agencji.