

## **AGILE METHODOLOGY AS A TOOL FOR REDUCING INFORMATION ASYMMETRY IN THE IMPLEMENTATION OF IT PROJECTS COMPLETED ON THE BASIS OF THE OUTSOURCING STRATEGY**

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An excessively high level of information asymmetry between the supplier and the client occurring during the whole life cycle of an MIS is an important factor influencing the success of a project. The methods chosen to minimise information asymmetry in IT projects constitute an important research area which can impact their successful outcome. The aim of this article is to present research results on the use of Agile Methodology as a tool for minimising information asymmetry as part of an IT project completion consisting in a DMS system implementation with the use of outsourcing. The article may be interesting both for theoreticians of business informatics and for practitioners specializing in IT project implementation.

Keywords: information asymmetry, IS, IT management support system, IT system implementation, ERP, Agile Methodology

### **1. Introduction**

The author's research has shown that amongst IT projects completed in Poland between 2010 and 2014, the average success rate equalled 61%, which means that on average 39% of IT projects ended in complete or partial failure [1]. For many years, researchers in Poland and worldwide have been analysing the factors of success and the causes of failure in IT projects consisting in MIS implementation. The majority of

them focus on project management, different aspects of project organisation and technological conditioning. This applies to research conducted by R. Charette [2], K. Ewusi Mensah [3] and R. Glass [4]. It is also worth pointing towards interesting articles by Polish researchers: B. Kubiak [5] and A. Korowicki [6], T. Lis and S. Nowak [7], J. Szych [8], J. Skalik and A. Strzelczyk [9], P. Lech [10], P. Soja [11], as well as fragments of books dedicated to this subject by J. Kisielnicki and H. Sroka [12], as well as Z. Czarnacka-Chrobot [13].

The author believes that throughout the years the factors determining the success of an IT project change and their character has become more nuanced. It results from many factors, i.e. dynamically changing technology, available project completion methods, rapidly increasing saturation of IS markets and hyper-competition amongst the suppliers. According to the author, the current research concerning success factors and the causes of failure in IT implementation projects completed on the basis of the outsourcing strategy does not sufficiently consider the influence of new institutional economics, which consists of three theory groups: the theory of transaction costs, contract theory, and agency theory. These theories are a key tool in developing the concept of IT outsourcing and should also be used to explain success factors and the causes of failure in IT implementation projects. A basic unit in the analysis of agency theory is the agreement, defining the rules of cooperation between the principal (client) and the agent (supplier). In the research undertaken, we search for optimal solutions for agreements defining the relations between the owner-manager and the principal-contractor, considering all the social and transactional threats described by the transaction cost theory: the self-interest of both parties, limited rationality, the character of assets and information asymmetry [14]. Hence, the problem of information asymmetry is a basic concept in agency theory, which is an element of the new institutional economics. The phenomenon of information asymmetry also occurs in projects which concern particularly advanced technology, such as the completion of IT projects consisting in the implementation of MIS. The author's research to this date has indicated information asymmetry between the supplier and the client as a significant success factor in IT implementation projects [15, 16]. In IT implementation projects completed on the basis of the outsourcing strategy, both parties have conflicting goals and interests, i.e. to maximise their profits during the project completion according to the planned goals and with the lowest cost possible. In the times of global economic slump from the macroeconomic perspective, as well as hypercompetition amongst suppliers and clients, the phenomenon of information asymmetry may intensify and result in a struggle to achieve goals in IT project implementations. For this reason, the author believes that it is important to take actions aimed at minimising the level of information asymmetry on IT projects [17] in order to minimise the markers of complete or total failure. In this article, the author would like to present the main assumptions concerning the use of the Agile

Methodology aimed at reducing information asymmetry between the supplier and the client in an ERP system implementation. The article is part of a cycle of articles presenting research results concerning the phenomenon of information asymmetry in IT projects.

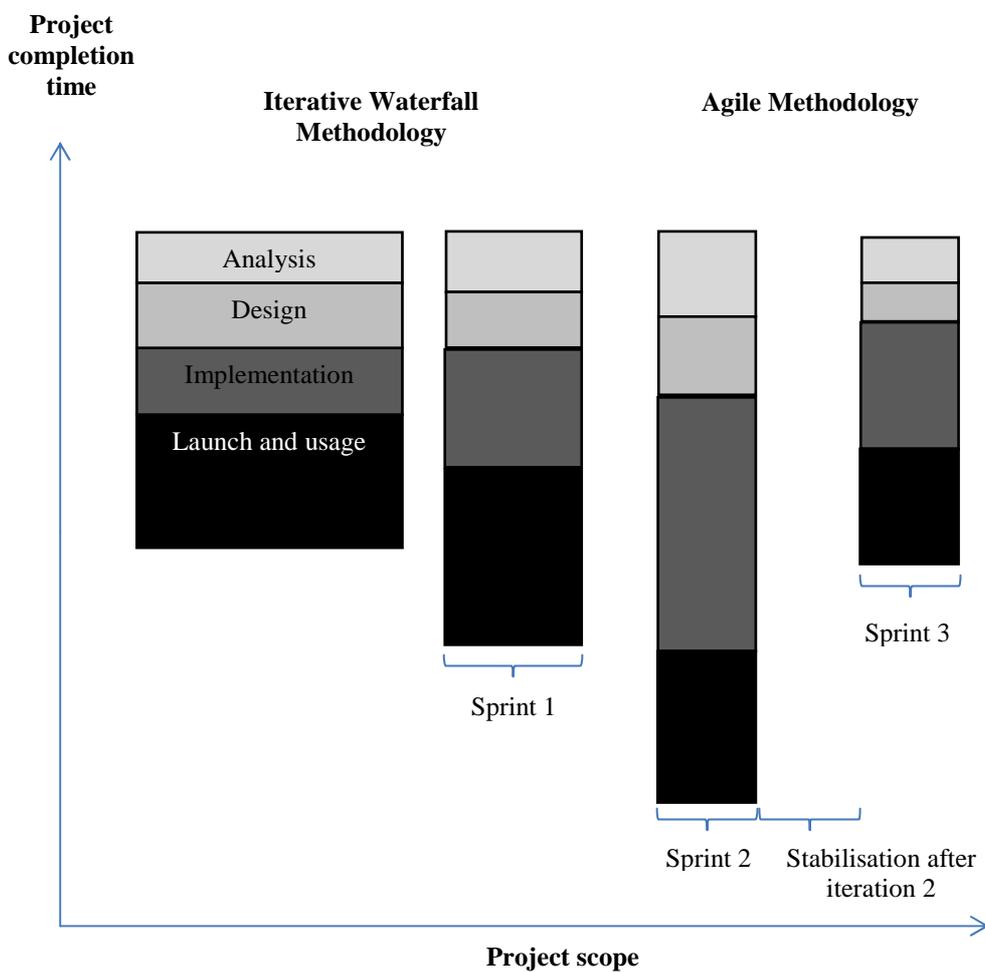
## 2. Agile Methodology

Many methodologies that belong to the Agile group were invented in the 1990s during the growing popularity of iteration in design, and also as a result of opposition to bureaucracy, mostly linked to completing vast and detailed documentation. The date considered as the beginning of the “Agile movement” is the year 2001, when the *Agile Manifesto* was announced – a document containing the Agile principles, the criteria allowing for an evaluation whether a given methodology can be considered Agile, and formulating guidelines for creating agile methodologies [18]. The *Agile Manifesto* defined 12 rules of IT project completion based on the Agile Methodology [19]:

1. “Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
4. Business people and developers must work together daily throughout the project.
5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
7. Working software is the primary measure of progress.
8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
9. Continuous attention to technical excellence and good design enhances agility.
10. Simplicity—the art of maximizing the amount of work not done—is essential.
11. The best architectures, requirements, and designs emerge from self-organizing teams.
12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly”.

In projects using Agile Methodology it is assumed that the requirements will be subject to constant analysis and verification aimed at shaping a flexible and agile IT infrastructure, directed at achieving an ever higher level of return on software investment, contributing to further modernisation and perfecting of software design in economic and business terms, as well as achieving the highest business value. In case of projects managed with the use of traditional methodologies, the requirements of the client – the future user of the system – are collected at the beginning of the project and treated as unchangeable, defining the scope of completed work. The completion of software design projects carries a high risk of failure, which for instance can result from: incomplete requirements or a change in the project's scope, the tools used and external components planned for future use not meeting the expectations, insufficient skills of the project team members, sudden manifestation of faults in the created software, entailing unexpected costs, or a loss of key members of the project team [20]. In case of traditional methodologies, risk management is carried out as one of the elements of project planning, necessary even before its beginning, in an attempt to identify and conduct parameterisation of all types of risk. It is difficult, and in most cases impossible, to complete, just like drawing up a detailed and exhaustive description of the final product or a full task completion plan at a stage when the project has not been fully defined. As opposed to the traditional methodologies, Agile Methodologies treat risk as a type of natural element. This approach assumes that future risks will be identified and defined during the iterative phase of project completion. Iterative work completion allows us to detect and minimise every emerging risk threatening the project. Agile methodologies do not include a separate dedicated stage or a set of tasks linked to risk management and possible threat prevention, or covering the resulting additional costs; they are, however, prepared to function considering risk, which is treated as natural for software creation projects [21]. Agile methodologies make the completion of IT projects based on outsourcing infinitely easier by minimising information asymmetry between the supplier and the client. In an IT project, a restrictive approach to completing a project based on a fixed budget may lead to project failure. In the agreement between the supplier and the client it is assumed that functional requirements established before the beginning of the IT projects, i.e. at the stage of negotiating the offer and then the contract, is a sufficient basis for defining the final product scope in MIS-class software configuration and the detailed delivery plan. In case of projects of software creation, it is usually at odds with the actual state of affairs. Clients often consciously choose ready-made software at the stage of acceptance tests and seeing the ready-made, configured product they are dissatisfied and unhappy with it. Meanwhile, when we use Agile Methodology,

the situation is contrary: it assumes permanent communication between the supplier and the client, mostly based on informal contacts. Is it important that the project scope completed through Agile Methodology is divided into functionality groups, the so-called sub-projects. Agile Methodology calls these sub-projects “sprints”. Figure 1 presents the milestones in the Waterfall Methodology and the corresponding milestones in the three sprints completed as part of Agile Methodology.



**Figure 1.** A characteristic of two methodologies for managing an IT implementation project

The completion of sprints allows for a more effective control of sub-project results, it is carried out more frequently and applies to a narrower functionality scope, which makes a smooth completion of the project easier for both parties to the agreement. To sum up, traditional methodologies assume that before starting the project, the final plan of the end product and the production work will be known. If we make this assumption, it is possible to encounter a situation favourable to increasing information asymmetry between the supplier and the client, and consequently decrease the chances of successfully completing the project. Designed budgets may turn out to be incorrect because MIS project implementations are characterised by a high level of insecurity and correct evaluation is impossible in many cases. In agile projects, it is treated almost as a given that the product requirements may change and so progressive estimation is used. This process takes place gradually and reflects the level of knowledge about the created software.

### **3. Research methodology**

In his research, the author has used the case study method. The object of research is a Polish enterprise from the electromechanical industry, specialising in the production, sale and maintenance of technologically advanced products for offices. The enterprise implemented an ERP system three years ago and the project was completed successfully, i.e. project business goals were achieved, the project was delivered on time or with a small delay and on budget.

The chosen enterprise belongs to the SME group. The aim of the case study is theory creation linked to reducing information asymmetry between the supplier and the client in MIS implementation projects completed through outsourcing. In this article, the author focuses on the client's perspective in the whole project life cycle, i.e. from the bidding stage to the use of MIS. As part of case studies analysis, the author poses the following research question:

What characteristics and important assumptions of Agile Methodology influence the reduction of information asymmetry between the supplier and the client in an ERP system implementation?

The choice of the author's research method – case study – mainly results from two circumstances [22]:

1. An early stage of knowledge development in the given study area, i.e. reduction of information asymmetry in IT projects.
2. Recognising the current phenomenon in real conditions.

#### 4. Research results

Case studies have allowed the author to make the following observations on an ERP system implementation project. The respondents stressed that before deciding how to complete an IT project they analysed similar ERP implementations. During the analysis, the clients stressed that they were prone to a high level of asymmetry between the supplier's and the client's project teams. The client's project team indicated that the main elements of information asymmetry were:

- client's lack of knowledge about Total Cost of Ownership during 4-7 years and where the cost will come from. The supplier was unable to give credible information;
- client's insufficient knowledge about the methods of completing an IT project. Comparing the knowledge about project completion transferred by the supplier with market information indicated that the supplier's information was not complete and not credible;
- client's insufficient knowledge about the functionalities of the implemented system;
- client's insufficient knowledge about the technological aspects of the implemented system;
- insufficient verification of the information given by the supplier regarding their level of competence, certificates, etc. In practice, the information given by the supplier was only partly verifiable.

The respondents indicated three main reasons why they were unable to reduce information asymmetry during their ERP system implementation:

- lack of specialists with the necessary qualifications amongst their employees.
- inability to verify the supplier's information regarding their level of competence, certificates, etc.
- in the dynamically changing conditions of the current market, it is practically impossible for the client to fully and completely define their functional requirements at the stage of the implementation agreement negotiations, i.e. before sprint 1. Clients' functional requirements often change and evolve, resulting amongst other things from the organisation's learning curve. Confronting the client's argument about the inability to fully and completely define their functional requirements with their limited ability to obtain information about the functionalities and technology of the purchased system from the supplier, it is clear that this is the dominant source of information asymmetry in an IT implementation project.

This is the reason why the enterprise decided to start the project according to Agile Methodology. The respondents were particularly interested in implementing and adapting the following rules of the *Agile Manifesto* in their ERP implementation project:

1. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
2. Business people and developers must work together daily throughout the project.
3. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
4. Working software is the primary measure of progress.
5. Continuous attention to technical excellence and good design enhances agility.
6. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

The analysed enterprise decided to divide the implementation project into sub-projects, the so-called sprints, according to the functionality scope. After each sprint, the parties have agreed to have a stabilisation period, as part of which the supplier will provide post-implementation support. The aim of this stabilisation period was to fully ensure that the system functions correctly as part of the implemented functionalities. Table 1 characterises individual sprints. It is important that sprint 1 includes all the necessary tasks, which will allow it to complete a basic sub-project, whose functional scope applies to financial and logistic modules.

Next sprint concerns the completion of the production management functionality. Comparing the tasks completed between sprint 1 and sprint 2, we can indicate that in sprint 2 the technological project is no longer being completed, and the session of implementation planning and the functional analysis adjusted to the functional scope are being completed to a limited extent.

Research based on the case study method consisted in the completion of 3 interviews with a member of the board, who was fulfilling the function of the financial director and was responsible for the completion of an ERP system implementation project. During the interviews, the author identified the following reasons behind the choice of Agile Methodology for the completion of project work, dictated by the wish to minimise the high level of information asymmetry in an ERP implementation project, system functionalities and technological aspects of the applications:

1. The division of project's functional scope into sub-projects, the so-called sprints. The client assumed that they were not able to specify the entire functional requirement for the implemented system in advance. They believed that the completion of each individual sprint will allow them to be better prepared for the

implementation of the tasks. Additionally, the client assumed that their organisation may not be able to absorb knowledge about the vast functional scope of the whole implemented system in a brief period of time and that is why the functional scope should be divided into sub-projects.

**Table 1.** The characteristic of sprints

	Sprint 1	Sprint 2	Sprint 3
Functional scope	General ledger, managing obligations and receivables, fixed assets, bank account management, enterprise funds management, sales and purchases management, warehouse management	Production management, i.e. managing the main production schedule, planning production capacity planning, material requirements planning, resource planning, preliminary production capacity planning	Debt collection, additional reports, calculating discounts in product-client perspective, price policy
Estimated budget for completion of individual sprints	EUR 60 000 – 70 000	EUR 20 000	EUR 10 000
Tasks completed as part of the project	Kick-Off meeting, technological project, training for key users, functional analysis, setup, preliminary data migration, user acceptance test and tuning, preparation of end user manual, training for end users, go-live, post-implementation support in the stabilization period	Kick-Off meeting, training for key users, limited functional analysis, setup, preliminary data migration, user acceptance test and tuning, preparation of end user manual, training for end users, go-live, post-implementation support in the stabilization period.	Limited functional analysis, setup, user acceptance test and tuning, training for end users, go-live, limited post-implementation support in the stabilization period.
Completion time	4 months	3 months	2 months
Number of employees in the client's company / number of end users	120 / 5 (finances) + 10 (logistics)	120 / 8 (production)	
Stabilization period	1 year after the completion of sprint 1	About 6 months after the completion of sprint 2	
Important characteristics of agreement settlement between the supplier and the client.	Settlement based on a fixed budget. The agreement stipulated the completion of 10 tasks. The acceptance of the results in each task released client's payment.	Settlement based on a fixed budget. The agreement stipulated the completion of 8 tasks. The acceptance of the results in each task released client's payment.	Settlement based on the time the consultant spent on completing the tasks (time-spent basis).
Information about project completion	Sub-project completed on budget, on time, most functional goals completed.	Sub-project completed on budget, with a delay; most functional goals were completed.	Sub-project completed on budget, with a delay; most functional goals were completed.

2. The client's intention was to minimise the risk linked to wrongly choosing the supplier of implementation services and for this reason they did not decide to sign

an agreement for the completion of a project including a big range of functionalities, i.e. combination of sprints 1, 2 and 3, and consequently an agreement covering a big budget. The client decided to divide the functionalities into sub-projects, i.e. sprints that would be paid for on the basis of smaller fixed budgets.

3. The client's intention while completing a project according to the Agile Methodology was to guarantee the correct functioning of the information system as part of project management. The client wished to avoid an overly formalised mode of communication, which according to them could lead to a delay. Agile Methodology stresses the importance of informal and clear communication on each level of the project group, i.e. consultant – key user, project managers, members of the steering committee, etc.

4. Formal project documentation should be solely limited to:

a. Designing process work instructions in their basic scope without additional documentation linked to system parameterisation or other documentation linked to the technological area.

b. Documentation of project meetings along with the documentation of project risk register, which allows for the description of the current project status and possible problems occurring at a given project stage.

5. Efficient project risk management through spotting risk factors as something natural to the completion of IT projects consisting in MIS implementation. Risk management was carried out both during informal contacts between the members of the project group and as part of the project group management meetings, which in sprint 1 took place once every three weeks and once every two weeks in case of sprint 2 and 3.

To sum up, in order to reduce information asymmetry between the supplier and the client, company management used Agile Methodology in their project of ERP system implementation. Agile Methodology facilitated project completion, in particular:

1. Defining the functional scope of the project, i.e. the individual sprint.
2. Settlement of the outsourcing contract based on a fixed budget during sprint 1, 2 and 3. The client's intention was to minimise financial loss related to the cost of one sprint, not the entire project budget.
3. Client's gradual absorption of knowledge regarding system functionalities in the consecutive groups of functionalities implemented during the individual sprints, not the entire system functionality.
4. A more effective project risk management, since risk analysis applies to smaller subprojects. More frequent and detailed inspection of individual task results took place, allowing for the detection of undesirable variations from the expected course of work completion at an early stage.

5. Introducing an information system in the project management, responsible for informing the client's and supplier's project group about work stages, monitoring work progress, risk management and changes concerning strategic aspects of the project
6. Increasing team discipline in the client's project group.

## 5. Summary

The phenomenon of information asymmetry occurs in projects applying to a particularly advanced technology, including MIS implementation projects, e.g. ERP-class implementations. We need to stress here that it is impossible to directly define the level of information asymmetry in this type of project. A direct measurement of asymmetry would have to consist in identifying the actual differences in the levels of information on the supplier's and client side in case of each MIS sale/purchase transaction. The researcher would need to have access to all the information possessed by the supplier and then compare its scope with the scope of information possessed by the client. Apart from the enormous workload that such research would entail, another barrier would be difficulties in accessing complete information. Researchers are forced to carry out direct information asymmetry measurements through an approximation of asymmetry levels based on variability indicators. The difficulty in carrying out this type of measurement is certainly one of the reasons why there is a gap in the literature analysing the influence of information asymmetry on the completion of IT projects, especially MIS projects. The cycle of research conducted by the author focused on the analytical perspective of the client during an IT implementation project including an ERP system implementation has shown that respondents stress the high level of information asymmetry between the supplier and the client, which may influence the project success.

To synthesize research results, we need to stress the benefits resulting from the use of Agile Methodology in the area of decreasing information asymmetry between the supplier and the client:

- Minimising the risk of a failed investment in an individual sub-project's budget. Hence, the risk of financial losses resulting from a failed project will only apply to only one sub-project.
- A smaller functional scope within one sprint allows for a more effective and more exact collection of client's requirements.
- The possibility to control the constantly changing client requirements concerning system functionalities.
- More exact task completion planning, both in the supplier's and client's project group.

- The possibility to identify delays and risk factors early and react to them swiftly. In the Agile Methodology, the scale of project problems and risks do not accumulate during one sprint on the same scale as during the completion of the whole project in the Waterfall Methodology.
- Current monitoring of the supplier's project team capacity (team velocity).

The author hopes that the research results presented in this publication will help achieve two goals – revealing important characteristics of the Agile Methodology, allowing us to reduce the high level of information asymmetry between the supplier and the client, and also contribute to increasing the success rate of IT implementation projects consisting in the implementation of MIS.

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