



22nd International Conference on Knowledge-Based and
Intelligent Information & Engineering Systems

Determinants of Using Project Management in the Implementation of Information Systems

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Abstract

The main purpose of this article is to identify the factors which influence the IT project management. It has been noted that in the practice of the implementation of IT projects there are large discrepancies in the approach to the implementation of IT project management. They result from the fact that experts and consultants were accustomed to applying previously used methods, their simple incompetence, convenience or lack of understanding of the essence of the need to manage IT projects. Among the selected group of specialists in this field and field consultants at the turn of 2016 and 2017, the CAWI method was used to study opinions on the use of project management techniques and processes in the implementation of IT projects. Then, based on the obtained results, the analyses were conducted, and relevant conclusions and recommendations resulting from the study were presented. The formulated conclusions may be the starting point for creating an effective quality management system for project management.

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Selection and peer-review under responsibility of KES International.

Keywords: Project management; process management; IT enterprises

1. Introduction

In the classic approach, project management is understood as a unique, individual project undertaken to create a quantitatively and qualitatively defined specific product or service, using the allocated human, physical and capital resources, limited in time with the defined start and completion date, which are linked by particular stages of implementation distinguished within a given method [11].

Currently, determinism, clear-cut nature and stability in determining the characteristics and results of the projects move in the direction of probability, uncertainty or dynamism. Theoretically - the spread between the two basic types

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of activities distinguished in today's organisation: projects and processes should increase. Projects are defined as unique, one-off undertakings that require proper preparation - while processes are repetitive and can become automated or routine activities [3], [1].

The main difference is that the processes are performed consistently and are inherently repetitive, while projects are carried out when new needs arise, and each one is different. But in general, in a sense, projects are subsets of processes - these are all the processes which may be defined as non-routine, innovative, pragmatic, burdened with high risk and characterised by uniqueness. This is due to specific similarities - both kinds of activity are carried out by selected human teams, determined with specific resources which are limited in time, on the basis of planning, managing, supervising and controlling particular actions [2].

This, in turn, results in the fact that changes in process management directly influence project management. The objective of project implementation is to improve the existing processes, creating entirely new processes and solutions of specific problems related to the necessity of the changes of processes. In each organisation, there are both procedural and project activities. Contrary to its classic definition, projects are of continuous and perpetual nature. The end of one project means that a new project is to begin. They sometimes constitute a never-ending cycle of projects, which cannot even be referred to as sub-projects, because one never knows - due to the high level of uncertainty and high risk, the direction in which the requirements of final users would develop [9].

However, the most symptomatic for the development of projects is the fact that basically methodologies of project management were in its classic version created, generalised, "fixed", unified, etc. in such a way as to standardise the processes which occur as part of the project. And minimise the likelihood of unforeseen events which may lead to the failure of the project (risk) [10].

The paradox - which emerges - consists in the fact that project management is moving closer towards the methodologies of process management, since it aims at applying standard rules to solve non-standard problems, which it tries to standardize (or change into processes) by means of specific methods and techniques by far-reaching formalisation [3].

Table 1. Similarities and differences between projects and processes; Source: own work

Traditional projects	Processes	Contemporary projects
Dynamism, change management	Stability (repetitiveness)	Dynamism driven by economic pragmatism
Uniqueness	Repetitiveness	Good management practices
Pragmatism	Automation	Knowledge management
Change management (revolution)	Modifications (evolution)	Adaptability, responding to changes
Threat to project implementation	Low risk	Minimisation of risk
Innovativeness	Traditionalism of conduct	Unconventional control of models
Managers' engagement	No influence of the managers on the course of the processes	Cooperation of the teams and the management
Conflicts in the organisation	Cooperation in organisations	Cooperation in the organisation to minimise conflicts

The distinction found in the literature (see Table 1) appears to be somewhat artificial and does not fully reflect the reality.

At times the concept of 'project' is also used interchangeably with the term 'programme' or 'multi-project' (a very complex, expensive, risky, complicated, etc. project). For some time the definition of a programme is evolving towards "... an orderly set of independent projects that are both desirable and necessary as well as sufficient to achieve business goals and deliver the value expected by the programme sponsors..." [7]. The programmes composed of many projects, unlike them, are not limited in time. So, perhaps, one of the directions of the development of projects are programmes? Or, perhaps the problem lies in the fact that the narrow framework imposed on the classical concept of the project does not fit the theory and practice of project management? And the methodology needed for their implementation should consist of coordination and optimisation of common processes?

The second problem which arises at this point is the fact that not only the system consultants on the part of the user but also specialists from IT companies do not always distinguish project management and process management, following one of the methodologies or groups of methodologies which they know best. Thus, they are aware neither of the benefits resulting from implementing them nor the risks associated with using them.

2. Description of the methodology and research sample

From September 2016 to February 2017, the authors conducted an opinion survey on the possibility of using techniques of project and process management in the implementation of IT enterprises. The survey applied a CAWI (Computer Associated Web Interview) method, and it involved 146 respondents (89 survey participants completed the questionnaire correctly, which constitutes 61% of the response rate). The respondents were selected using a method of a purposive sampling - the research involved students of postgraduate studies of project management, IT project management, IT management in higher education, etc., and among the postgraduate students, there were process and project management specialists engaged in the implementation and modification of IT systems. It was a group of the most active users of modern technologies and - in this case - individuals directly involved in the application of information technologies (in the group there were 92% of people working in the field or cooperating with the specialists in the sector (implementation consultants).

Among the respondents, there were 51.69% of women and 48.31% of men, which is characteristic of all postgraduate studies at the Faculty of Management of the University of Warsaw.

The greatest number of survey participants were from cities with more than 500,000 residents (43.68%), followed by the respondents from cities with 100,000 to 500,000 inhabitants. A similar share of the sample came from towns with fewer than 50,000 residents (16%) and towns with 50,000-100,000 inhabitants (nearly 14%). The smallest share of the sample were inhabitants of rural areas - 4.60%.

The vast majority of survey participants declared having higher education level or holding a Bachelor's degree (42.53% each), nearly 7% held a PhD degree, and nearly 8% declared having secondary education. Over 55% share of the sample was a group of professionals, nearly 25% were working students, 15.24% were students engaged in performing jobs connected with IT, and 4.60% were entrepreneurs.

Among the respondents, the largest group consisted of specialists in the field of information flows analyses - 36.78% and middle managers (mainly computer centres) - 22.99%. Over 9% of the sample were analysts or IT systems designers, and 9.20% held jobs of a software developer, expert, consultant or manager. 3.5% of the group of respondents serve as board members and the same share as directors. Over 15% perform casual work or hold no operations positions.

3. Analysis and discussion of findings

The survey questionnaire devised for the study consisted of 21 questions and included a section concerning demographics. The questionnaire comprised three groups of substantive questions related to the importance of informatisation for organisations, the importance of process management for organisations and their IT systems as well as the importance of project management for organisations and their IT systems. In the first part of the survey, as indicated by the respondents, the most important result of informatisation was supporting all information processes across the company (25%). Slightly less significant (22%) role played by the informatisation was attributed to the new development opportunities with regard to the company activity. The responses related to ongoing monitoring of the company activity or its business environment and those related to operational support for information processes reached a similar level of 21%. The least significant factor in this rather even distribution of responses was the perception of informatisation as an important strategic initiative promoted by the management staff (see Fig. 1).

Even more uniform distribution of responses occurs in the case of identifying the areas of an organisation whose facilitation in the form of an IT system would contribute, to the largest degree, to the revenue increase. The largest number of respondents think that innovativeness of this kind is realised mainly by implementing technology solutions supporting organisational management and the development of new products or services (15% each). The responses which followed were the improvement of methods and techniques of organisational management (14%) and creating a vision or devising a strategy for the development of the organisation (nearly 12%). The least important appear to be the improvement of after-sales service (6%) and the improvement in the financing processes of the organisation (7%). Interestingly, the respondents indicated technological solutions and R&D as the most important aspects in the evaluation, and financial issues, even though crucial from the point of view the organisation, were seen as the least important areas. Perhaps the experts believe that these problems have long since been resolved effectively by the

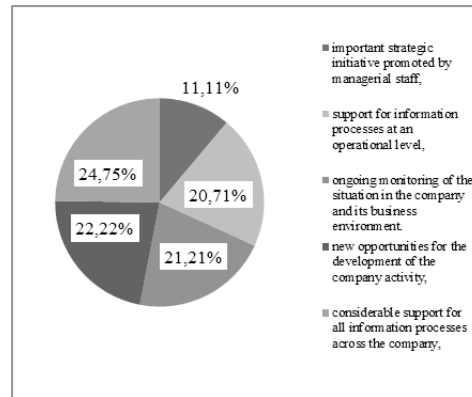


Fig. 1. The importance of informatisation for the organisation; Source: own work

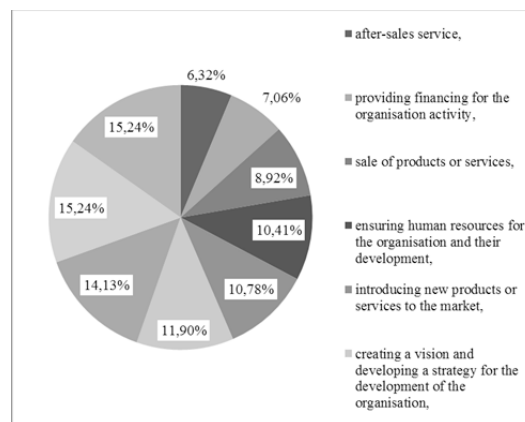


Fig. 2. Organisation areas whose improvement may contribute most to revenue increase; Source: own work

IT systems at an operational level, and presently the focus should move towards the development strategy of the organisation (fourth place in the ranking - see Fig. 2).

The most important result of informatisation for the respondents was the support of IT processes and the possibility of their improvement. Therefore, the subsequent questions contained in the questionnaire provide greater insight into the issue. More than half of the respondents (51.14%) said that process management was crucial for the success and coordination of operations across the organisation, and as many as 35.23% of survey participants claim that the impact is average. Thus, it emerges that, among the surveyed individuals, only 13.67% presented a differing opinion, for example, they believed that process management had no significant impact on the operations, and it may be seen as diversionary or decoy activities, or they had no experience of their practical application (Fig. 3).

The second question in the section concerned the role of the management in the use of process management. A specific dualism appeared with regard to the opinions on the subject. Nearly 32% of the respondents believe that the management staff declare their support for the process management, however, in practice they do little to promote them, top management are largely indifferent (11.36%) or even question its value (2.27%), which basically translates into 45% of the respondents being convinced that the managerial staff are not interested in this issue. On the other hand, more than a fifth believe that the management of the organisation strongly support process management. Thus, a question arises - to what extent the broadly perceived organisation management should be involved so that they are not suspected of opportunism and declarativeness in this regard? The second question is - why so many individuals (nearly 1/3) know nothing on the subject? The first opinion is confirmed in subsequent reports of "Kroniki Chaosu" Standish Group [e.g. [8]] - for many years the lack of engagement on the part of the company management has constituted a major problem in the implementation of IT projects. The second opinion has a much deeper foundation - it is primarily

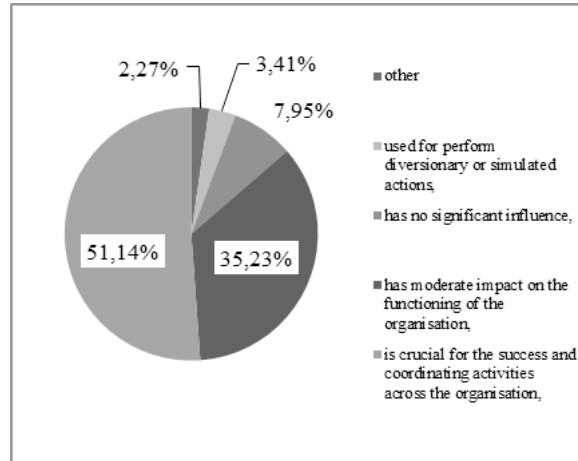


Fig. 3. The impact of process management on the organisational operations; Source: own work

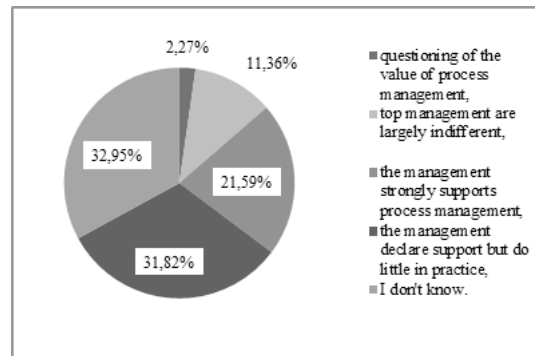


Fig. 4. The influence of organisation management on the support for process management; Source: own work

the confirmation of the lack of internal communication in the companies whose representatives commented on the subject, in particular, the workers of units responsible for information flow with other employees in the organisation.

Business process management is more effective when supported with additional, indispensable knowledge or skills in the area. Respondents were asked which of the relevant aspects are seen as most important. The respondents indicated management of the implementation of changes within the organisation (19.28%), risk management (15.66%) and methods of process modelling in the project (14.06%) as the most important aspects in the evaluation. Among the survey participants, the least significant appear to be the principles of business management (5.22%) and the knowledge in the area of process design in the project (8.43%). Other indicators were rated at 11-12% (Fig. 5).

One of the most important skills listed in the previous question was modelling of processes in project management. The knowledge of the frequency and circumstances of the application of methodologies in the field was the subject of the next study. There is a general belief (36.78%) that modelling of information processes is applied only in the course of selected analyses for complex design problems. Only 12.5% of respondents reckon that modelling is always or almost always used, in each analysis preceding project implementation. On the other hand, as many as 32.18% survey participants think that they are never applied, 18% of the applied models focus solely on the analyses of the newly generated processes or modification of the existing processes (Fig. 6).

Process modelling requires specific psychophysical qualities, among which the most significant appear to be being open to changes (26.97%) and commitment to achieving the objectives (21.35%). Responsibility for the outcome of the project seems to be equally important (20.32%). Interestingly, the ability to adopt the perspective of an external and internal client, a crucial aspect in the analysis and design of the systems, ranked fourth in this evaluation (15.73%), followed by team working skills and focus on improvement (Fig. 7).

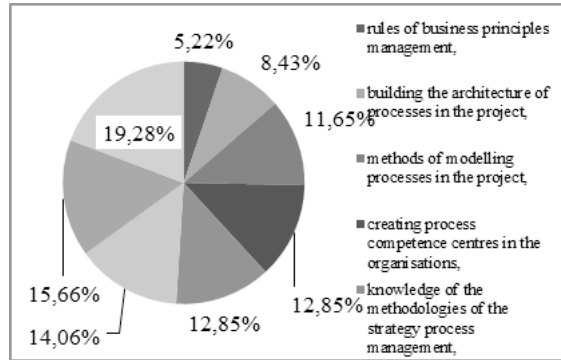


Fig. 5. The impact of different areas of knowledge and skills on business process management in the organisation; Source: own work

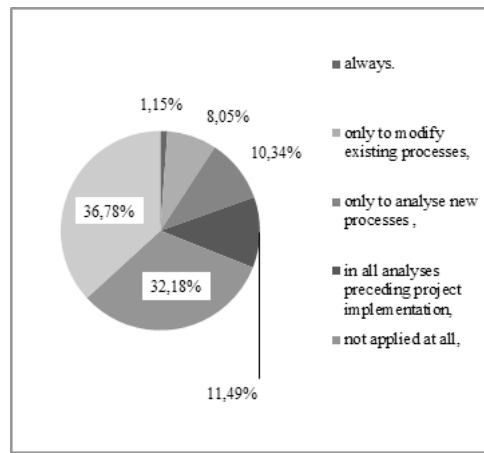


Fig. 6. The frequency of the application of process modelling in the analysed organisations; Source: own work

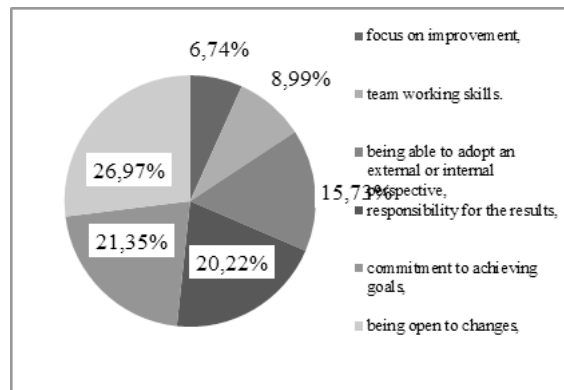


Fig. 7. Characteristics facilitating process modelling in the organisation; Source: own work

As indicated in the Introduction, ultimately, information process management leads to IT project management. The characteristics of a traditionally perceived project which appear to be most significant for the respondents are: purposefulness (31.30%); determinism (20.33%) and uniqueness (19.11%), which in total constitute over 70% of the responses. Such features as: autonomy, complexity or risk in the project reach the average levels of 10% of responses (Fig. 8).

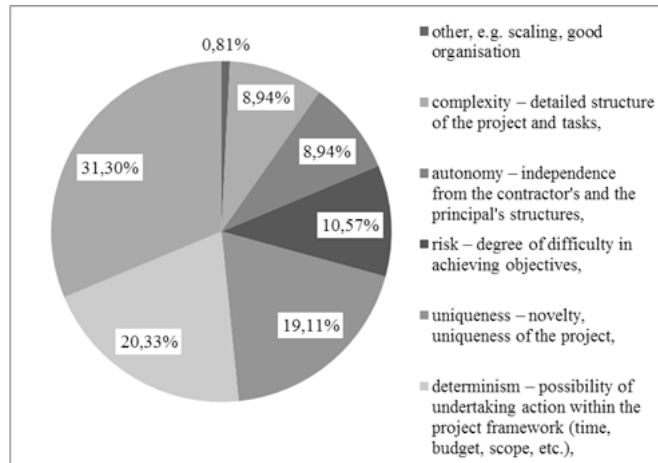


Fig. 8. The most important characteristics of an IT project; Source: own work

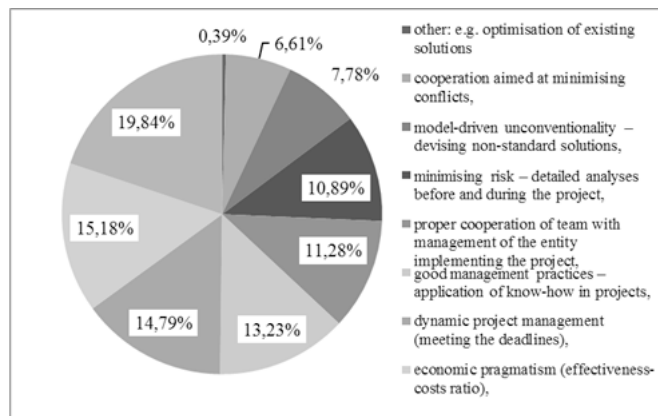


Fig. 9. The most important characteristics of a modern IT project; Source: own work

Table 1 demonstrates the fact that the changes in the approach to modern projects also affect changes in the perception of the most important characteristics of the project by the individuals engaged in its implementation. Nearly 20% of respondents claim that the most significant aspect is the flexibility of project management (responding to changes). Economic pragmatism (proper cost-effects ratio) and dynamic project management (keeping the deadlines) obtained five percent less than the previously mentioned feature. The last characteristic feature of the project is also directly related to the flexibility of project management. The question concerning the economic viability of an IT project emerges in the ranking after years of absence (it was believed that all IT projects are profitable). Slightly less significance (13.23%) is attributed to good management practices - using practical knowledge in projects, which in turn is associated with greater and greater popularity of Business Intelligence systems which are based on pattern management. On the other hand, due to minimisation of risk, the non-standard actions in projects are not valued highly (Fig. 9).

The characteristics of an IT project strongly impact the factors which are seen as decisive for the success or failure of an enterprise. The first three positions are taken by a clear business goal (specified requirements in the light of existing limitations 19.81%), client's involvement in the implementation of the project (16.10%) and an experienced and competent project manager (15.17%) (Fig. 10). This corresponds to the previously mentioned studies carried out by Standish Group [8], with one reservation - in the study the greatest importance is attributed to the human factor. Does it mean that, in the opinion of Polish respondents, formulating tasks of IT projects in our country still leaves much to be desired (we do not know what we need)? The last positions of the ranking were taken by - similarly to

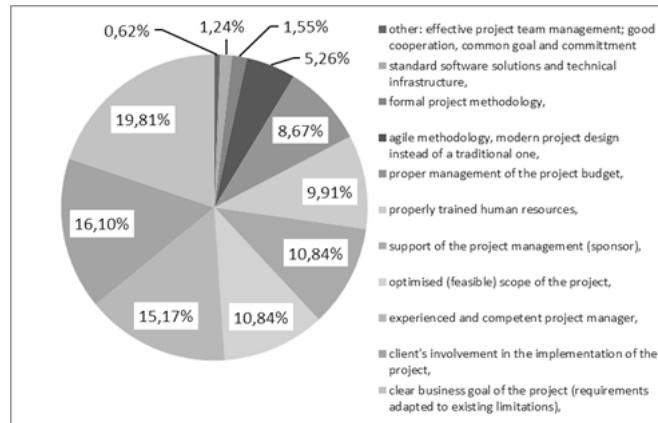


Fig. 10. Success factors of an IT project; Source: own work

other studies - formal methodology of project implementation and standard programming tools as well as the technical infrastructure of the project (less than 5% of responses). This, in turn, suggests that the factors which so far have been developed as first and foremost, and were commonly seen as crucial for the success of the project, are not treated in the same way by the experts engaged in an IT project [ref.: [5]].

The main barriers to the implementation of an IT project are the mirroring reflection of the success factors in its realisation. They include: lack of clearly defined requirements (goals) of the project (nearly 14% of respondents), no involvement of business users or no information provided by them (12.87%) and lack of resources to implement the project (9.20%), incomplete or frequently changing business and functional requirements and an inexperienced project manager (8-8.5% each). Lack of resources is the only aspect which is excluded from this specific "reverse" relation. Consulting the survey participants led to the following conclusion: some of the undertaken IT projects are seen as inadequate in relation to the accumulated resources (mainly financial ones), which indicates either a lack of economic consideration during the preparation of the project or at least no "feasibility study" conducted prior to the project. Unfortunately, for some respondents, the concept of "agile" methods of project management is equal to the omission of this stage (or its elements) in the project (... it does not occur in Scrum ... - a quotation from the participant's comment).

The respondents themselves when asked about the correct parameters of the implementation of an IT project most frequently (57.47%) selected the most complicated variant, including the defined scope, time, budget, quality user requirements and project risk. Only few analysts and designers (9.20%) are aware of the basic "golden triangle" of project management consisting of the scope, time and budget of the project.

In the case of the question concerning the positive effects of the implementation of an IT project, the respondents rarely (2%-7.2%) indicated that the basic parameters were reached or exceeded (Fig. 11). Most frequently (21.18%) they pointed to customer satisfaction, achieving the project goals (16.82%) and compliance with the requirements (10.28% - e.g. achieving higher efficiency, acceptable functionality or usefulness, maintaining quality at a defined level (normative, comparable levels, etc.). The latter tendency changes the way we perceive the implementation of IT projects - moving away from the effects evaluated in strictly economic terms towards the results which are expressed in praxeological ways.

On the one hand, we deal with theoretical definitions of management of IT projects presented in the introductory section of the article, on the other, the actual perception of this issue by the respondents. For the largest group of respondents, the phenomenon is seen as an initiative aimed at reducing costs and increasing efficiency or information technologies which support management and automation of processes (approximately 27% each). The two remaining characteristics: the approach used to analyse and facilitate single processes and the approach applied in management across the organisation (20-23% of responses) were indicated by a large group of survey participants. The bi-directionality of these responses is consistent with the existing tendencies related to the perception of the concept of project management described in the literature [12] (Fig. 12).

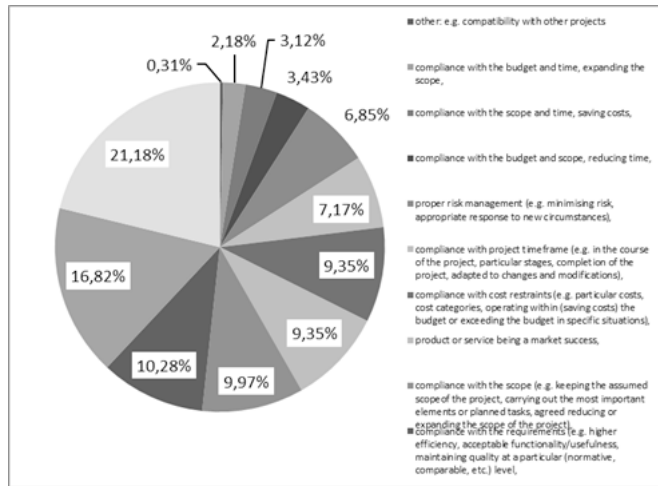


Fig. 11. Positive effects of the implementation of an IT project for the organisation; Source: own work

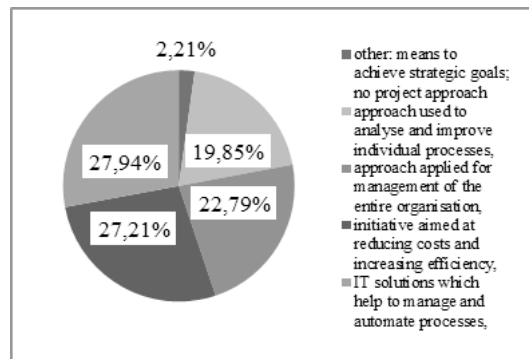


Fig. 12. The perception of the phenomenon of IT project management; Source: own work

The approach to methods of IT project management is changing. So far, the only rule derived from practice was the application of such methods, which a particular project team knew best and applied multiple times (routine). The project teams did so even in the situation when the requirements of the future user included the need to apply a certified method, e.g. scrum. The team implemented the project with the standard method which they knew best, minimally or seemingly adapting it to the requirements of the user. At present, more and more frequently all teams know only agile methods and follow the ever-present, exaggerated ideology of modern methods. This is evidenced with the findings of the survey where more than half of the respondents (51.72%) declare applying modern, agile methods most frequently (for many respondents the common category for those methods is the term "agile" even though they are not always aware what it actually means), and frequently they compare this method to traditional methods, and the only traditional method they have heard of is a waterfall method [4].

Indirectly, this is also evidenced by the features which are indicated by the respondents as the most relevant from the perspective of IT project management methods. Good communication between the contractors and recipients and adapting to changing conditions proved to be most important for this group of experts and consultants (Table 2). They do not trust the decentralised approach; functioning in autonomous self-organising teams and the empirical approach in the processes are not popular. Interestingly, the empirical approach is applied to processes whose course cannot be predicted or precisely defined, and which generate unpredictable and unique results. One of the most important mechanisms of the empirical model of controlling processes is adaptability, which has been given first place among the most important features of project management (besides transparency and inspection).

Table 2. The most important features of IT project management indicated by the respondents; Source: own work

The most important characteristics of the project management methods	% of responses
Application of centralised approach,	2.03%
Functioning in small, self-assembling project teams in the course of the project,	4.41%
Solutions based on empirical processes,	4.75%
Compliance with reality/ Feasibility,	7.46%
Simplicity of the execution,	7.80%
Flexibility of planning works,	13.22%
Focus on the project stakeholders and users,	18.64%
Adaptability, adapting to changing conditions,	20.34%
Good communication of contractors and recipients (users),	21.36%

In the case of the most important aspect of project management - good communication between contractors and users - the respondents were asked about the deficiencies as regards communication between designers and users in managing IT projects based on process modelling in projects with regard to the design [ref. [6]]. It turned out that in over 30% of responses, the survey participants emphasised the lack of common language between designers and users (Table 3). This is especially true in areas where a specific jargon has been created, namely, marketing or finance. Failing to understand the importance of the process modelling for the success of the project was indicated by a smaller group of respondents (10 percentage points fewer). In this context it is important to note that we deal with two extreme approaches:

- The Syndrome of a Colleague - the user should be able to shape the processes, our role consists mainly in implementing them,
- The Syndrome of a Principal - we know best how the processes should look like, the users should not interfere, they do not know what they want.

Both cases lead to the third most important communication barrier - lack of knowledge, skills or experience of designers, frequently hiding their lack of professionalism using schemes, impudence and insolence towards the users. Fewer problems appear when users and designers use a common modelling language (e.g. Adonis, Aris).

Table 3. Deficiencies in communication between system designers and users; Source: own work

Types of communication barriers in project implementation	% of responses
No technical solutions enabling communication (e.g., Adonis, Aris software support),	7.48%
Lack of support on the part of project sponsors for modelling processes in the organisation (poor motivation),	8.41%
Primitive methods of process modelling and their inadequacy with regard to practical application,	8.88%
Inadequacy/Incompatibility of the process modelling methods and IT systems design methods,	8.88%
Lack of knowledge, skills and experience of designers,	16.36%
Insufficient awareness among the users concerning the importance of process modelling in IT systems design,	19.16%
No common language between designers and users	30.84%

Another important issue were the objectives which the organisation wishes to achieve by using methods of IT project management in the process of the informatisation of the company.

Since at least two of the identified processes: unification and standardization of the processes within the organization and reducing the business process costs within the organization are associated directly with the process management, sometimes it is understandable that for some of the respondents process management and project management seem to refer the same phenomenon (Table 4). Nevertheless, no such doubts appear in the case of the improvement of the coordination of activities aimed at the development of the implementation of IT enterprises and creating the foundation for the development of the entire organisation. There is awareness of the inessential nature of these processes with regard to the changes in the organisational structure because such changes do not require the application of an IT system. In many organisations - in almost 2/3 of the companies where the respondents work - there are delegated

Table 4. Objectives in company informatisation in project management; Source: own work

Objectives of informatisation achieved thanks to project management	% of responses
Change in the organisational structure	1.92%
Attempting a new approach to problem-solving, introducing new organisational knowledge	3.19%
Satisfying employees' needs with regard to information which is necessary to carry out their tasks	3.51%
Improving relations with contractors	3.83%
Enabling comparability with competitors	4.15%
Risk control	6.39%
Ensuring timely delivery of products and services,	8.63%
Creating the foundation for the development of the entire organisation	10.86%
Reducing business processes costs for the organisation	11.18%
Unification and standardisation of processes within the organisation	11.50%
Improving coordination of actions	16.61%

organisational units responsible for conducting or supporting the implementation of IT systems. Most of them (nearly 30%) operate for more than five years or 3-5 years (over 19%); less than a year or 1-3 years (9% of responses each). Their main tasks focus on:

- modelling and describing processes in order to develop operating procedures for the employees engaged in the project (15.91%),
- training employees and providing them with the knowledge and skills required for the project (12.50%),
- monitoring and measuring processes in the project (12.50%).

Slightly less important appear to be:

- participation in the project aimed at improving processes (10.80%),
- defining business requirements before implementing an IT system (10.23%),
- establishing rules and methods for all process initiatives in the organisation (10.23%).

Engaging the management support for the development of the entire organisation (8.52%) and establishing methods and principles of development of processes in the project (7.39%) appear to be least significant. It follows that these units are seldom engaged in direct project work: their role consists in performing the tasks which were previously carried out by Training and Organization Departments - focusing on the identification of processes, training or controlling the correct modelling of processes devised by the project team. Thus, these units still fall short of the role of Competence Centres.

4. Conclusions

The present study allows to draw the following general conclusions:

- project management should move away from the methods leading to formalisation, and in the opinion of respondents, management of innovative processes should move towards more agile, flexible and adaptive methodologies,
- the support of all IT processes across the company and their improvement is seen as one of the most important objectives and effects of organisation informatisation,
- more than half of the respondents are aware of the importance of information process management for the success of the IT project and the possibility of coordinating activities across the company,
- the company management strongly supporting or willing to support process management may be seen as one of the most significant determinants of the success of process management,

- the important factors associated with the knowledge required for the success of an IT enterprise, apart from change and risk management include the skills related to modelling processes in the project,
- according to respondents, modelling processes in the project should be carried out mainly in the case of the most complex project problems or should not take place at all (extreme responses in the evaluation),
- the main quality of the process modelling consultant should be an openness to change and commitment to the project,
- it demonstrates the need to take a flexible approach and possibility of dynamic control of project planning and implementation,
- planning and implementation of the project should have a clear business goal which is supported with the client's involvement and engagement of a competent project manager. However, project management methodology and technological tools supporting it take further positions in the ranking,
- among the most frequently listed positive effects of an IT project implementation, the respondents noted mainly customer satisfaction, achieving project goals and compliance with the requirements. This approach moves away from the previously mentioned assumptions concerning the time, budget and scope of the project,
- understanding of the phenomenon of project management among the practitioners is understood in two ways; on the one hand, as a strategy of minimising costs and increasing efficiency, on the other, a group of technologies which help to implement this strategy,
- one may observe a specific shift from traditional methods of IT project management in the direction of broadly defined modern methods (agile, user design, etc. methods). At times, however, the impression is that despite the ambitious slogans of Agile Manifesto, they are to be used mainly by IT companies and designers working for them,
- in the respondents' opinion, the most significant factor of IT project management is, however, good communication between contractors and recipients,
- this is caused mainly by the lack of common language and insufficient users' understanding of the importance of modelling and optimisation of processes in the project,
- it is to be applied to improve the coordination of project tasks, unification and standardisation of processes within the organisation and to reduce the relevant costs, the penetration of the project and process management results in the fact that among the methodologists and practitioners these notions are frequently used interchangeably,
- at present, the units dealing with information flow perform only tasks related to training, promotion or identification of processes, and they are not involved in the implementation of these projects.

Each field of science, which is based in practice, is dynamically changing all the time, and it needs to adapt to economic reality. Project management is seen as such a field. The changes in the approach to the implementation of IT projects and treating process modelling as the basis to design software in response to these changes necessitate the modifications in the implementation of these projects by project teams. The changes appear to be much deeper than the studies conducted so far may demonstrate. This results from the fact that there occur specific limitations of the research related to the selection of the sample. Expanding the sample to include also members of project teams involved in the implementation of large IT projects would enable the authors to identify the main discrepancies between theoretical assumptions and their practical implementation.

References

- [1] Appelo J. (2016), "Zarządzanie 3.0. Kierowanie zespołami z wykorzystaniem metodyk Agile", Helion, Gliwice,
- [2] Bitkowska A., (2016), "Zarządzanie procesami biznesowymi w przedsiębiorstwie", Vizja Press, Warsaw,
- [3] Chmielarz W., (2015), "Information Technology Project Management", Wydawnictwo Naukowe WZ UW, Warsaw,
- [4] Chrapko M., (2014), "Scrum - o zwinnym zarządzaniu projektami", Helion, Gliwice,
- [5] Engelbrecht J., Johnston K. A., Hooper V., (2017), "The influence of business managers' IT competence on IT project success", *International Journal of Project Management* 35, pp. 994-1005
- [6] Kandefer-Winterm K., Nadszakula O., (2016), "Komunikacja w zarządzaniu projektami", CeDeWu, Warsaw,
- [7] Pańkowska M. (2010), "Środowiska projektowe przedsięwzięć informatycznych", [in:] *Informatyka ekonomiczna, Informatyka w zarządzaniu*, edited by J. Sobieska-Karpińska, series: Prace naukowe UE we Wrocławiu no. 15, Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, pp. 238-252.

- [8] Standish Group (2016), <https://www.infoq.com/articles/standish-chaos-2015>], accessed November 2016,
- [9] Skrzypek E., Hoffman M., (2010), "Zarządzanie procesami w przedsiębiorstwie", Oficyna Wolters Kluwer Business, Warsaw,
- [10] Wolf H., (2014), "Zwinne projekty w klasycznej organizacji. Scrum, Kanban, XP", Helion, Gliwice,
- [11] Wyróżębski P., edited by Trocki M., (2015), "Planowanie przebiegu projektów", Oficyna Wydawnicza SGH, Warsaw,
- [12] "Zarządzanie projektami - wyzwania i wyniki badań", (2016), edited by M. Trocki; E. Bukłaha, Oficyna Wydawnicza SGH, Warsaw
[http://administracja.sgh.waw.pl/pl/OW/publikacje/Documents/Zarządzanie projektami - wyzwania i wyniki](http://administracja.sgh.waw.pl/pl/OW/publikacje/Documents/Zarządzanie%20projektami%20-%20wyzwania%20i%20wyniki); accessed May, 2017.