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Benefits from the implementation of project tasks with the use of virtual team

1. Introduction

The necessity of customer orientation, the ability to quickly adapt to changing demand conditions and the expectations of reducing project costs have recently resulted in a strong development of cooperation between various organizations implementing joint ventures. The idea of combining the individual potentials of these organizations, in particular the knowledge and qualifications of employees, comes down to the joint implementation of specific undertakings (projects) as part of sharing the capabilities that are at the disposal of individual team members necessary to carry out a common task. Therefore, the partnership of combining competences and the exchange of knowledge and skills for better fulfilment of client's expectations becomes a chance for the development of modern organizations. As K. Perechuda (2005, p. 14) points out, breaking the dual, one-way knowledge sharing is the network perspective, where we deal with virtual teams. A common solution that companies use to implement projects is to build virtual project teams by engaging additional personnel only for the duration of the project. The popularity of this solution

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results from a number of measurable benefits achieved by enterprises, which compensate for the risk related to the change in the structure of enterprises. Minimization of threats and problems resulting from virtualization, requires the use of new management methods, as well as a well-thought-out valuation system, which will take into account both the costs of negative factors, as well as profits generated by entrepreneurs using this organizational form. The aim of the article is to try to calculate the benefits that companies can get when implementing projects by replacing traditional project teams with virtual project teams (*ceteris paribus*).

The article presents the results of research in the field of comparison of project implementation costs in many units with a large geographic dispersion in Poland in a traditional project team, and the cost of its implementation in a virtual project team. The research covered the cost and time of commuting to individual units in which the analysed project was implemented. The results motivated authors to develop the concept of the design methodology for virtual project teams, which was presented in the last part of the article.

2. Benefits and threats from the implementation of projects using virtual project teams

Due to the modern requirements of implemented projects, in many organizations managed in a modern way, a team has become a basic unit. All team members combine their efforts, knowledge and skills to achieve their goals together. Innovative organizations require innovative teams (West 2000, p. 9), hence we are increasingly dealing with virtual project teams, which are called the latest generation teams (Grajewski 2007, pp. 90-91). According to Goodbody (2005, p. 23) virtual project teams are becoming an indispensable element of the global economy, and Michalczyk (2013, pp. 40-45) indicates that thanks to the opportunities created by the Internet, eliminating geographical difficulties in obtaining a specialized work resource with the desired competencies, virtual teams can become an organizational system for project management in the future.

The virtual team understood by Kutzenbach and Smith (Wąsowicz 2008, p. 618) is a small group of people whose relationships are related to the implementation of a specific goal, which does not function in direct physical proximity, and its communication takes place using information technology. Similarly, Lipnack and Stamps (2000, p. 38) define a virtual team as a group consisting of two or more people who interact with each other and communicate with each other mainly

using ICT tools and also distinguish the fact of separating team members in time or space as a criterion defining a virtual team. The factor that distinguishes a virtual team from other teams is not the degree to which the communication technology itself is used, but the degree to which communication and collaboration in these teams is determined by technology. The traditional team can at any moment opt out of ICT tools, while the virtual team is completely dependent on these tools. It is assumed that virtual teams can work despite distance, time differences and organizational constraints (Curseu et al. 2008, p. 629).

For the purpose of this study, based on the presented definitions of the virtual team and the definition of the project team according to Rosiński (2003, p. 196), the following definition of a virtual project team was adopted: an organizational unit consisting of a group of people, separated in time or space, established on the basis of subject specialization for the duration of the project to carry out project tasks that uses ICT tools for mutual communication. The virtual project team understood in this way is built by searching for new employees who will meet the project's requirements in terms of knowledge, skills, experience and the number of employees.

Mikuła and Stefaniuk (2013, p. 102) draw attention to a number of benefits that are the cause of the increasingly common use of virtual project teams, which include: the lack of geographical limitation, when engaging specialists for cooperation, the possibility of significant cost reduction, both on the side of the organization creating virtual project teams, as well as members of these teams, a significant increase in productivity, supporting the creativity and originality of the entire team, which directly translates into the level of innovation and increased flexibility. In addition, they also indicate threats resulting from the use of this organizational form, including threats to information security, resulting from the limitation of its protection, the risk of conflict situations resulting from the limited trust between members of a virtual project team, fewer tools for solving them, the need for a very accurate planning of work schedules that often results from performing on-line tasks by various team members at the same time, the need to constantly measure the effectiveness of the team's work, which will allow for a quick response to increase the standard of work and the need to design a team knowledge management system that will allow for quick access to knowledge during the team's work.

According to the authors, the most important factor directly affecting the reduction of project implementation costs include: the lack of geographical limitation when engaging specialists for cooperation and reduction of operating costs, hence the next part of the article will present an analysis of the case study taking into account the impact of these factors on the cost of its implementation.

3. Benefits analysis of using a virtual team - a case study.

The aim of the analyzed case study is to present the benefits resulting from the implementation of a task as a virtual project. The presented data apply to the pilot part of the project accomplished in the years 2014-2015. The project was directed to offices of government administration in Poland – ministries as well as central and province offices. The aim of the project was to support government administration in respect of implementation of modern management methods. In view of the broad spectrum of the project and limited access to data, only pilot part of the project performed in province offices was analyzed.

Initial assumption of the implementation of the analysed undertaking assumed that the analysts are located in Poznań and travel to selected places in Poland four days a week, in order to perform their tasks. In view of high cost of project realization, it was decided to accomplish the task by means of a virtual project team. The team selected for the purpose of project realization comprised eight analysts dispersed geographically throughout Poland, who travelled from the place of their residence to particular locations in order to perform their project tasks. The place of residence of particular analysts as well as their allocation to specific offices depended on time availability as well as predefined project schedule (dates of visits in particular offices were agreed in advance) The analysed stage of the project consisted in consultations with selected staff members (designated by offices) and followed by a report concerning current status in each of the offices. The realization of the tasks required electronic forms developed and provided by the principal, access to a portable computer, the Internet, mobile phone and MS Office software. All tools were made available by the principle for the purpose of project accomplishment.

The realisation of the purpose of the hereby work encouraged the authors to perform calculations concerning the comparison of the costs and time of travelling in both variants of the project (*ceteris paribus*). Table 1 shows the distances covered in both analysed variants, considering the assumption that the analyst performs his job 4 days a week and on each day commutes and returns to the place of task realization. The distance between particular locations was determined on the basis of data presented by Google Maps (including the towns without precise data of location of offices or analysts). Additionally, the subsequent column shows the total distance covered by the analysts performing their tasks in offices during the entire four day cycle.

Table 1. Comparison of the distance traveled by analysts in the variant of a traditional team and a virtual project team

		Variant I A traditional team located in Poznań		Variant II A virtual project team.		
Institution	City	Distance from Poznan (km)	The total distance traveled by an analyst from Poznań (km)	City of analytics location	Distance between cities (km)	The total distance traveled by the analyst (km)
Podlasie Voivodeship Office	Białystok	505	4040	Białystok	0	0
Kuyavian-Pomeranian Voivodeship Office	Bydgoszcz	140	1120	Gdańsk	167	1336
Pomeranian Voivodeship Office	Gdańsk	328	2624	Gdańsk	0	0
Lubuskie Voivodeship Office	Gorzów Wlkp.	136	1088	Poznań	136	1088
Silesian Voivodship Office	Katowice	408	3264	Katowice	0	0
Świętokrzyski Voivodship Office	Kielce	362	2896	Lublin	193	1544
Lesser Poland Voivodship Office	Kraków	461	3688	Lublin	335	2680
Lublin Voivodship Office	Lublin	468	3744	Lublin	0	0
Lodz Voivodship Office	Łódź	218	1744	Gdańsk	337	2696
Warmia and Mazury Provincial Office	Olsztyn	343	2744	Warszawa	215	1720
Opole Voivodship Office	Opole	277	2216	Katowice	113	904
Greater Poland Voivodship Office	Poznań	0	0	Poznań	0	0

Podkarpackie Voivodship Office	Rzeszów	617	4936	Lublin	246	1968
West Pomeranian Voivodship Office	Szczecin	270	2160	Zielona Góra	221	1768
Masovian Voivodship Office	Warszawa	309	2472	Gdańsk	417	3336
Lower Silesian Voivodship Office	Wrocław	174	1392	Poznań	174	1392
Sum			40128			20432

Source: own study

The total number of kilometres covered by the analysts in Variant I would amount at 40128 km, whereas in Variant II 20432 km. Assuming the rate of 0,8358 PLN per kilometre, the total cost of travelling amounts at 33514,91 PLN in Variant I and 17077,07 PLN in Variant II. The presented data show the scale of benefits resulting from the use of a virtual project team at the level of almost 50% (relative to the project realization by a traditional team). The graph below shows the total distances travelled by analysts reaching individual cities in both analyzed cases.

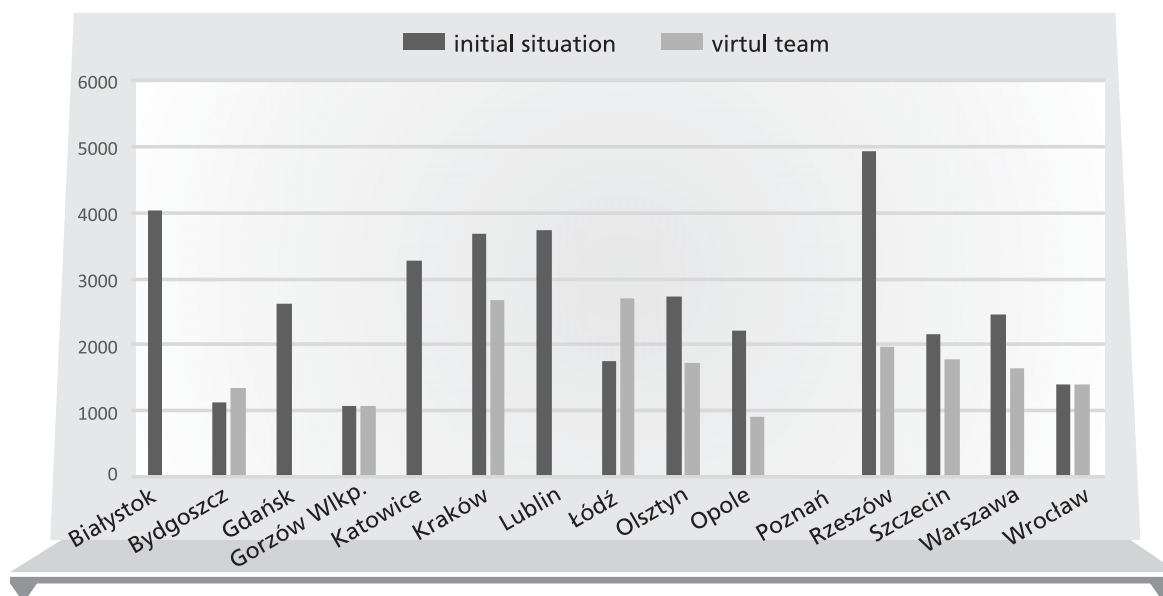


Figure 1. The total distance traveled by analysts

Source: own work

While analysing the discussed case, another benefit has to be noticed resulting from geographical dispersion of the virtual project team and consisting in economizing time spent on travelling by the virtual team relative to the traditional one. According to the Polish legislation the time of travelling during business trips is included in working time; hence limiting it translates into the amount of remuneration for the performed project tasks in the analysed project. In view of the lack of data concerning the remuneration in the analysed case, it was assumed that the remuneration of a member of a traditional project team and a virtual team for the presented tasks is equal.

Table 2 shows the time of travelling to particular towns (on the basis of Google Maps) for Variant I from Poznań and for Variant II from the places of residence of the members of the virtual team. Additionally subsequent columns show the total time of travelling of the analysts performing project tasks in both variants, considering the assumption, that analysts perform their work 4 days a week and commute and travel to the place of task realization on each day.

**Table 2. Comparison of analyst time
in the variant of a traditional team and a virtual project team**

		Variant I A traditional team located in Poznań		Variant II A virtual project team.		
Institution	City	Travel time form Poznan (min)	Total travel time form Poznan (min)	City of analytics location	Travel time (min)	Total travel time (min)
Podlasie Voivodeship Office	Białystok	306	2448	Białystok	0	0
Kuyavian-Pomeranian Voivodeship Office	Bydgoszcz	119	952	Gdańsk	120	960
Pomeranian Voivodeship Office	Gdańsk	226	1808	Gdańsk	0	0
Lubuskie Voivodeship Office	Gorzów Wlkp.	118	944	Poznań	118	944
Silesian Voivodship Office	Katowice	249	1992	Katowice	0	0
Świętokrzyski Voivodship Office	Kielce	245	1960	Lublin	155	1240

Lesser Poland Voivodship Office	Kraków	327	2616	Lublin	236	1888
Lublin Voivodship Office	Lublin	313	2504	Lublin	0	0
Lodz Voivodship Office	Łódź	138	1104	Gdańsk	185	1480
Warmia and Mazury Provincial Office	Olsztyn	233	1864	Warszawa	162	1296
Opole Voivodship Office	Opole	204	1632	Katowice	78	624
Greater Poland Voivodship Office	Poznań	0	0	Poznań	0	0
Podkarpackie Voivodship Office	Rzeszów	380	3040	Lublin	139	1112
West Pomeranian Voivodeship Office	Szczecin	152	1216	Zielona Góra	124	992
Masovian Voivodship Office	Warszawa	197	1576	Gdańsk	231	1848
Lower Silesian Voivodship Office	Wrocław	147	1176	Poznań	147	1176
Sum		26832 min		Sum		13560 min
		447,2 h				226 h

Source: own study

After summing up the average travel time of analysts in Variant I we get the total time, which is **447,2 hours**, while for a variant using a virtual project team, this time is **226 hours**. The individual total travel time in both analyzed cases is presented in the graph below.

While summarising the above considerations connected with the time of realisation of particular tasks, it can be observed that the use of the method of virtual project results in saving approximately 200 hours of working time, which in turn gives additional savings of approximately 130% of the full remuneration of the analysts. It has to be stressed, that only a limited scope of the project whose realization (without taking into account journeys) requires 512 hours, that is slightly above three monthly full time loads of one staff member. It has to be noticed that the above calculations are merely estimates and do not take into account factors other than time and cost of business trips.

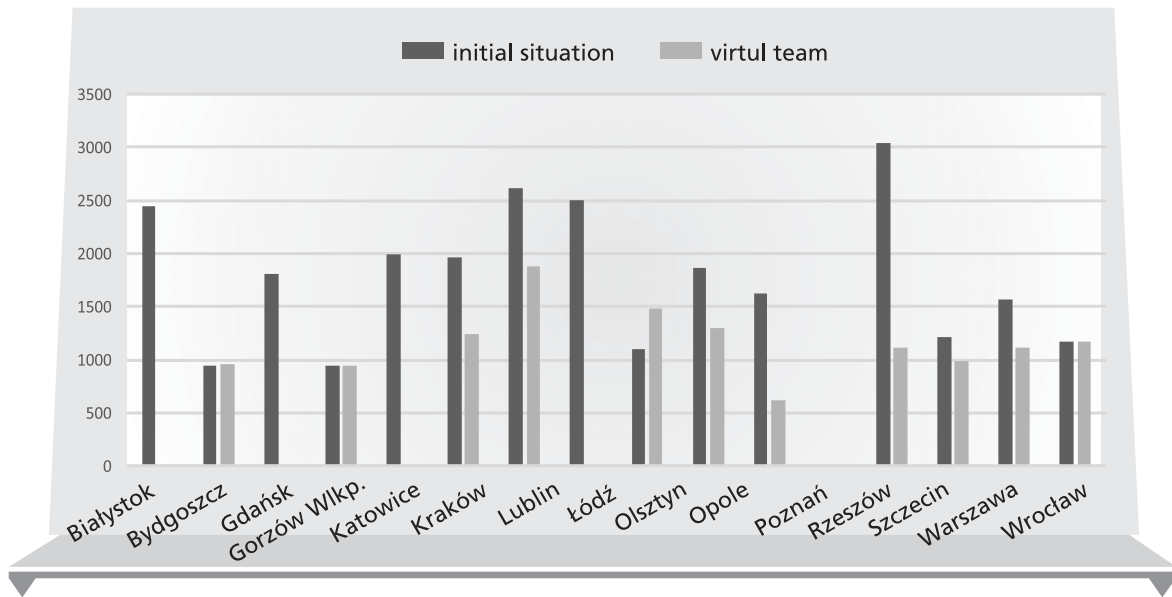


Figure 2. The total travel time of analysts

Source: own work

The presented results show significant benefits resulting from the realization of projects with the use of virtual project teams. It has been observed, that the allocation of resources in the analysed project did not guarantee minimization of the costs of project realization, which can be exemplified by realization of project tasks in Warsaw by an analyst from Gdańsk, although another analyst from the same city was engaged in the project.

4. Proposal of a methodology for selecting members of virtual project teams

Economic practice indicates the lack of adequate tools for designing of virtual project teams, the use of which enables searching for solutions that will meet the necessary project conditions and will aim to minimize the implementation costs of the entire project, prompting the authors to further considerations and developing the concept of methodology for designing of virtual project teams.

The proposed concept is based on a sequence of checks of sufficient conditions, the fulfillment of which will ensure finding a set of acceptable solutions, characterized by different variants of virtual project teams capable of timely project implementation, while maintaining the criterion of the limited cost of the project implementation.

It is assumed that initiator - integrator is the structure of virtual project team who coordinates the work and selects other participants according to the needs. The initiator produces a specific service for the needs of an individual customer, implementing the project with the help of created virtual project team. It is also assumed that the company has a network of available specialists who are in a waiting condition for the contract and are only employed for the implementation of the project or its fragments, further referred to as tasks. The proposed concept is dedicated to projects implemented in a sequential model (each project phase has specific results and must be completed before the next one starts).

Presented concept focuses on the initial stages of creating a task team, such as setting goals, necessary resources and requirements within the task, defining requirements for candidates for positions (the basis is the time and cost of the operation) and searching for and selecting members of the virtual project team. The proposal of a workflow can be found in the figure below.

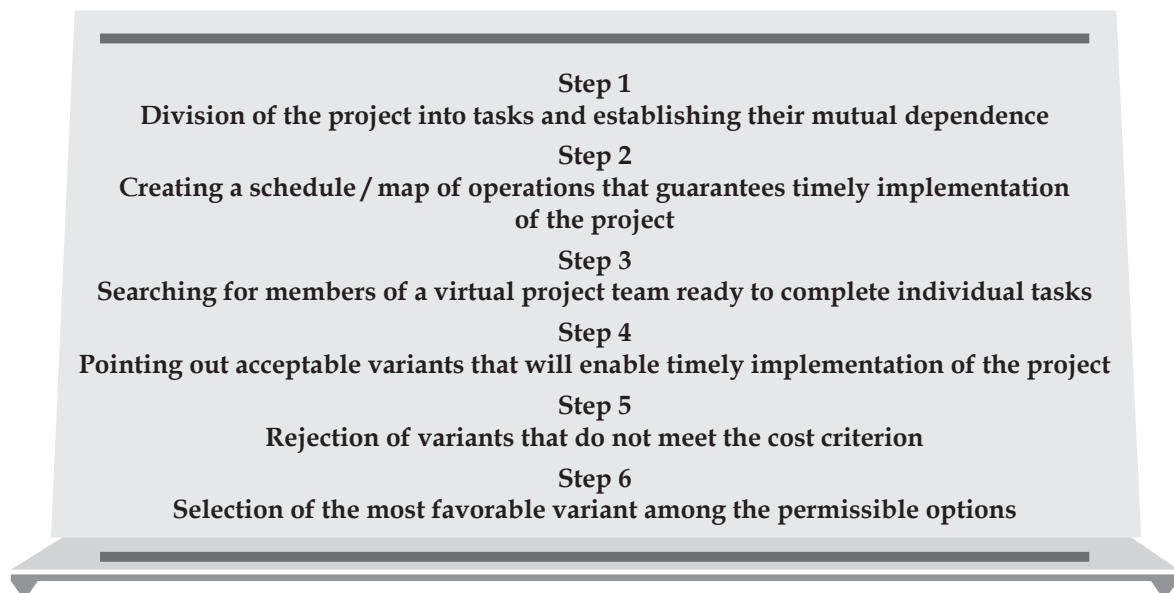


Figure. 3 The diagram of the proposed concept of selecting employees for virtual project teams

Source: own study

As part of the first step, it is necessary to divide the project into operations / tasks and determining their interdependence, i.e. whether performing the

operation / task 1 is necessary to start the operation / task 2, etc. Then it is required to create a schedule / map of operation that guarantees the timely execution of the project. The next step is to look for the virtual project members that are ready to execute specific tasks. The proposed concept assumes that the search for candidates takes place in the offer mode. The next step is to determine a combination of acceptable variants that will allow timely implementation of the project and take into account the sequence of events. Of the permissible combinations, the project costs should be calculated and reject those that do not meet the cost criterion. Among the variants meeting the criterion of time and cost, the decision-maker selects the most favorable option taking into account the quality criterion.

5. Conclusion

The presented article shows the benefits resulting from the implementation of tasks with the use of a virtual project team. The study presents the definition of a virtual project team and the most important benefits of using them while the implementation of projects. The last part of the article contains a case study in which authors present the potential benefits related to total working time savings and shortening the distance traveled by team members involved in the realization of a specific task, which are directly reflected in financial settlements. Both presented analyzes clearly indicate the benefits of using the virtual project method. The last part of the article proposes a methodology for the selection of members of virtual project teams, which eventually aims to provide a quick answer to the question about the possibility of building a virtual team capable of implementing a given project at a given time while maintaining the criterion of limited cost. It should be noted that the concept is at the initial stage of development and will be developed in the course of further research. The proposed concept will be based on a sequence of checks of sufficient conditions, the fulfillment of which will ensure finding a set of acceptable solutions characterized by different variants of virtual project teams capable of project implementation.

Summary

Benefits from the implementation of project tasks with the use of virtual team

The necessity of customer oriented approach, the ability of quick adapting to changing demand and the expectations of reducing project costs have recently resulted in a strong development of

cooperation between various organizations implementing joint ventures. Projects-oriented organizations, creating virtual project teams, have become more and more popular. Dissemination of this organizational form has induced the authors to consider the real benefits achieved by enterprises using virtual project teams to implement projects. The purpose of the article was to try to calculate the benefits that companies can obtain when implementing projects, by replacing traditional project teams with virtual project teams (*ceteris paribus*). The presented research results show the possibility of achieving significant financial benefits due to the use of virtual project teams to carry out the projects implemented in many units with a large geographical dispersion.

Keywords: *virtual team, project management, virtual project team.*

Streszczenie

Korzyści z realizacji zadań projektowych z wykorzystaniem zespołu wirtualnego

Konieczność orientacji na klienta, umiejętność szybkiego dostosowania się do zmieniających się warunków popytowych oraz oczekiwania redukcji kosztów projektów, powodują w ostatnim okresie silny rozwój kooperacji różnych organizacji realizujących wspólne przedsięwzięcia. Coraz popularniejsze stały się organizacje zorientowane projektowo, które tworzą wirtualne zespoły projektowe. Rozpowszechnienie tej formy organizacyjnej skłoniło autorów do rozważań nad realnymi korzyściami osiąganymi przez przedsiębiorstwa wykorzystujące wirtualne zespoły projektowe do realizacji przedsięwzięć. Celem artykułu była próba kalkulacji osiąganych korzyści, jakie przedsiębiorstwa mogą uzyskać przy realizacji projektów, poprzez zastąpienie tradycyjnych zespołów projektowych przez wirtualne zespoły projektowe (*ceteris paribus*). Zaprezentowane wyniki badań wykazują możliwość osiągnięcia znacznych korzyści finansowych dzięki wykorzystaniu wirtualnych zespołów projektowych do realizacji przedsięwzięć realizowanych w wielu jednostkach o dużym rozproszeniu geograficznym.

Słowa

kluczowe: zespół wirtualny, zarządzanie projektami, wirtualny zespół projektowy.

JEL

Classification: O22

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