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The Use of Design Thinking in IT Project Management

Wykorzystanie *Design Thinking*

w zarządzaniu projektami informatycznymi

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Abstract: Faced with many challenges related to product competitiveness, companies are constantly looking for new ways to solve problems and provide innovative solutions. Problems in IT projects, which are characterised by a higher degree of complexity, may be particularly difficult to solve. The Design Thinking (DT) concept can be a response to the challenges of an organization. The aim of the article is to discuss the application of the Design Thinking method in IT project management. The article examines content related to the creative approach of DT, the basics of project management and the application of Design Thinking in two IT organizations – Apple and IBM. Research methods such as literature analysis and case study will be used. Based on the conducted research, it can be concluded that the use of the Design Thinking concept in IT project management can generate many benefits for companies.

Keywords: *Design Thinking*, IT project management, Apple, IBM.

Streszczenie: W obliczu wielu wyzwań związanych z konkurencyjnością produktów przedsiębiorstwa nieustannie poszukują nowych sposobów radzenia sobie z problemami i dostarczenia innowacyjnych rozwiązań. Problemy w projektach IT, które charakteryzują się wyższym stopniem złożoności, mogą być szczególnie trudne do rozwiązania. Koncepcja *Design Thinking* (DT) może być odpowiedzią na wyzwania stawiane przed organizacją. Celem arty-

kułu jest omówienie zastosowania metody DT w zarządzaniu projektami informatycznymi. W artykule omówione zostaną treści związane z kreatywnym podejściem *Design Thinking*, podstawami zarządzania projektami oraz zastosowaniem *Design Thinking* w organizacjach IT – Apple i IBM. Zostaną wykorzystane takie metody badawcze, jak analiza literatury i studium przypadku. Na podstawie przeprowadzonych badań można stwierdzić, że zastosowanie koncepcji DT w zarządzaniu projektami IT może generować wiele korzyści dla firm.

Słowa kluczowe: *Design Thinking*, zarządzanie projektami informatycznymi, Apple, IBM.

1. Introduction

The concept of Design Thinking can be considered as a response to increasingly complex technology and the desire to build a “modern” business (Kolko, 2015, p. 4). The complexity that companies face daily can take many forms – for example, when considering software, it should be integrated with the appropriate hardware, as well as ensuring that its use is pleasant for the user and responds to their needs. This is a very difficult task to perform, which is why IT companies are looking for ever-newer tools that could help solve their numerous problems, one of which is Design Thinking. Among well-known organizations that have already implemented the DT concept into their activities, we can name: Samsung, Apple, IBM, Microsoft, Philips, and Hewlett-Packard Inc.

The aim of the article was to discuss the application of the Design Thinking method in IT project management. To achieve the set goal, the following research methods were used: literature analysis and case study based on the Apple and IBM organizations. The authors’ contribution was to identify a research gap in the area in question as a result of literature analysis and case study.

The structure of the article is as follows – the next section presents the history of the Design Thinking concept and the stages of the DT process. The following section focuses on the basics of IT project management as well as IT project management methodologies. The final section presents a case study based on two well-known IT organizations – Apple and IBM. The article ends with a summary.

2. The essence of the Design Thinking concept

Design Thinking is a creative approach to problem-solving designed to be used by organizations from various industries. DT will work well for complex problems that have more than one solution.

2.1. The history of Design Thinking

For many years, the DT approach has been developed by many scientists and philosophers. Figure 1 shows the history of the Design Thinking concept, including

the key years in which decisive progress has been made, which contributed to the subsequent definition of this approach.

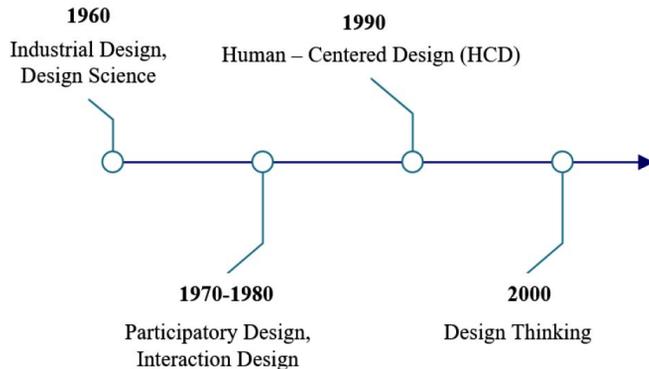


Fig. 1. Timeline presenting the genesis of Design Thinking

Source: own elaboration based on (Paul, 2019).

Divagations about the creation of the Design Thinking concept over the years should begin with the year 1960, in which industrial design and design science were particularly developed. It was noticed that the ‘design’ of the product depends on many elements including the production process, function, ease of use or even economy. A key factor that influenced the appearance of the product was the designer – the person who designs the product (Tjalve, 2015). On the other hand, ‘design science’ is defined as the creation of new tools, models, methods, and systems that will support people in developing, using, and maintaining IT solutions (Johannesson and Perjons, 2014). During this period, particular attention was paid to artifacts defined as objects created by humans that are intended to solve practical problems.

At the turn of the 1970-1980s, the concepts of participatory design and design interaction began to achieve popularity. Participatory design is defined as an approach aimed at creating computer systems in which their user plays a key role (Schuler and Namioka, 1993). Another of the concepts discussed is interaction design, which has its roots in the previously described approaches. Interaction designers are tasked with designing a functional system considering every aspect of the user’s interaction with the system, as well as the functioning of the product in each space (Löwgren and Stolterman, 2004).

Another key element in the history of creating the Design Thinking approach is the HCD concept – Human-Centred Design – based on the design of products in a continuous orientation towards people. The HCD philosophy can be defined as emphasising the role of humans in complex systems, which strengthens human abilities, helps overcome human limitations, and fosters acceptance and use (Rouse, 1991).

Using the concepts, around the year 2000 the Design Thinking method was created. Focusing on the beginnings of the DT approach, one should introduce the figure of David Kelley – an entrepreneur and professor at Stanford University in California. In 1991, Kelley and two other partners founded a consulting and design firm that would use the Design Thinking concept. In 2004, thanks to Kelley, the d.school was established at Stanford University, to allow people to develop their creativity using Design Thinking. Individuals solve various complex problems in teams that have their place in the present. The team can include students, university employees or business practitioners – it is important that the team is diverse. The aim of the d.school is to show that people are creative, they only need the right stimuli to trigger this creativity and use it in the real world (Official website of the d.school).

2.2. The five stages in the Design Thinking process

The Design Thinking process consists of five stages during which various tools are used to stimulate the team's creativity. It should be emphasised that in the DT process it is possible to return to each previous stage, and the team should think alternately – broadly and narrowly – to first determine the problem and then solve it.

Empathisation is the first phase of the Design Thinking approach, in which the team looks at the problem through the user's eyes. It is necessary to consider who will use the designed solution, focusing on the features, needs, and challenges of users, using techniques such as a survey, empathy map and creating a persona.

The second stage in the Design Thinking process is defining the problem. Here, all the information previously collected should be used to create a definition of the right problem. This is one of the most difficult stages of the Design Thinking process. It is worth discovering new directions that have not been known so far and try to design an innovative and creative solution for the client (Wolniak, 2017).

The next stage is the generation of ideas (ideation), which focuses on creating as many solutions as possible for the selected groups of users. At this stage, no limitations are distinguished, all the ideas that the team has created are included, and techniques such as the insight card or the "yes and yes, but" method are used.

The prototyping stage takes place when the team has already created a 'sketch' of the solution. It consists in developing an idea, trying to give it a tangible form through prototypes. The first prototypes should be cheap, simple, and fast. The purpose is to test the ideas, evaluate the proposed solution, and then improve it. There are various methods of prototyping, such as sketch, crazy eight, and storyboarding.

The final stage of Design Thinking is testing. The quality of the finished prototype is proven by presenting it to users. This is a very important phase in the Design Thinking process, as feedback is collected on previously invented concepts. Testers should be given adequate space to speak, not directed to the advantages and disadvantages of the solution. Among the techniques used, one can distinguish the 'silent expert' method and A/B tests.

3. IT project management process

Project management is defined as a set of activities performed to meet the requirements of a particular project using relevant knowledge, techniques, tools, and skills. The subject of project management has been considered for many years by PMI – an association of project managers from around the world. In 1996, they defined a project management standard called the PMBOK (Project Management Body of Knowledge) Guide (Targiel, 2017), which contains a collection of techniques useful for effective project management.

3.1. Basics of IT project management

The goal of project management is to complete the project successfully thanks to the effective conduct of project activities, including choosing the right methodology, meeting the requirements of stakeholders, as well as not exceeding the budget and deadline for project implementation (Wyrozębski, 2011). In project management there are five groups of processes as shown in Figure 2.



Fig. 2. Groups of processes in IT project management

Source: own elaboration based on (Targiel, 2017).

The first group of processes is called initiating. Its purpose is to approve the project in the organization, which will enable its implementation. As part of this phase, the project card is created, namely a document containing information on such topics as the reason for the implementation, its purpose, stakeholders, determination of risk and benefits of the project.

If the project is accepted, the second stage, which is planning, can begin. This is a very important stage, in which devoting too little time can result in failure in the implementation of the project. Its main purpose is to determine the scope of the project, as well as the product or service being created.

The next step goes to the implementation stage called executing, in which a project team is created and tasks are distributed among the team members. Then,

the tasks allocated within the work division structure are performed and the progress of the work is reported.

The controlling stage is the monitoring of submitted reports on the project tasks, in order control the schedule, budget, and the scope of the project. Quality control is also carried out and the risks are monitored.

Closing is the final stage in IT project management. Its purpose is to make sure that all tasks have been completed so that the board can officially close the project. Finally, a report on the course of the project is prepared.

3.2. IT project management methodologies

A methodology is defined as a set of rules and principles leading to the achievement of the set goals (Liebert, 2017). The methodology for managing IT projects is a systematic procedure used to manage an IT project. Figure 3 shows groups of IT project management methodologies.

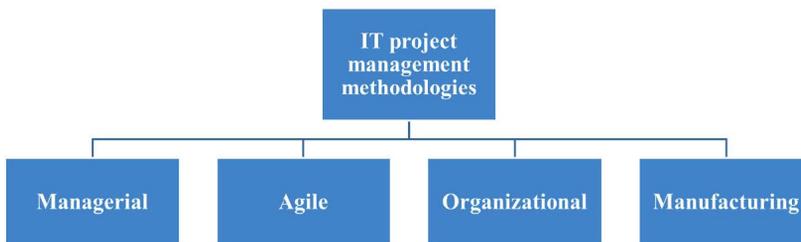


Fig. 3. Groups of IT project management methodologies

Source: own elaboration based on (Dereń, 2014).

The first group concerns managerial methodologies, which are characterised by a high degree of formalisation and the possibility of being used in all types of projects. Organizations using managerial methodologies should work according to strictly defined rules in IT projects. Among the most popular managerial methodologies, Prince2, PMBOK, TenStep and IPMA stand out.

The second group is agile methodologies, which are currently very popular and used in organizations around the world. Their main assumption is to work in small teams and involve the client in the project. The beginnings of agile methodologies were seen in 2001 with the creation of the Agile Manifesto, containing twelve principles that relate to project management using agile methodologies. Among the agile approaches there are Scrum, eXtreme Programming, Nexus, and Kanban methodologies.

The third group consists in organizational methodologies. Their task is to support the organization in managing the processes currently carried out in each company. Leveraging these approaches can also help an organization leverage its resources. Organizational methodologies include ITIL, COBIT, and Six Sigma.

The last group are manufacturing methodologies, the purpose of which is to produce software. This area also includes making decisions regarding the scope, start and closure of the entire project. Among the manufacturing methodologies, one can name MSF and RUP.

4. Case study: application of Design Thinking in Apple and IBM¹

The first company to be analysed is Apple Inc. – the American IT company. According to Brand Finance, the world's leading consulting firm, Apple was the most valuable brand in the world in 2021, and undoubtedly, Steve Jobs' incredible sense of aesthetics contributed to this. The second organization is the International Business Machines Corporation (IBM), considered to be one of the first IT companies in the world. Currently, IBM focuses on consulting services based on its hardware and software.

Both companies have been using the Design Thinking concept for many years. However, the ways in which they use design thinking varies. . In the case of Apple, it can be said that DT values were used in the organization even before the formalisation of this concept, while IBM – due to the large number of employees – created a dedicated approach Design Thinking called Enterprise Design Thinking.

Apple uses the entire DT design stage in its organization, starting with building a team that consists of employees who are specialists in various fields. The empathisation stage is the basis for Apple's further work, because knowing customers and meeting their needs is a basic task for the company. The idea-defining phase at Apple brings together specialists to find the basis of the problem, when it is defined, move to generating ideas. Apple often brainstorms with both employees and users, which take place spontaneously, on the initiative of the person who formulates a concept and wants to share it with others. When creating many concepts, ultimately one should choose the right one; Steve Jobs stopped about 70% of his projects in the 1990s to concentrate on an all-in-one computer – the iMac that was a huge success (Yan, 2016). The next stage is prototyping, which at Apple is carried out using graphics programs. Prototypes are created taking care to keep in mind the initial design, attracting customers for many years. Finally, internal tests and tests with the participation of users are carried out. It is worth emphasising that people who want to test Apple software must have their own devices of this brand. In summary, it can be noted that the Apple organization has been using Design Thinking elements for many years and is therefore a leader in its industry.

In its proprietary Enterprise Design Thinking framework, IBM applies the methods traditionally used in the DT concept, such as empathy maps, personas, scenarios, brainstorming, and sketching. In addition to familiar techniques, IBM also

¹ Due to space limitations in the journal, the use of the Design Thinking method in Apple and IBM organizations will be described in more detail in the next article entitled *Design Thinking as a supporting method in the management of ICT projects. A case study.*

proposes new element, which can be defined as keyways to keep the DT concept at a high level in the company. IBM's innovative elements in the Design Thinking approach are real users (sponsor users), regular meetings (playbacks) and the most important goals (hills). Real users are selected people from outside the organization gathered into one group. The term 'Playbacks' refers to regular meetings attended by users, stakeholders, and members of project teams. The last element is the most important goals (hills). These are statements from the user's side that allow the team to carry out tasks as planned, despite the various problems that occur along the way. In addition, the key aspects of Enterprise Design Thinking, include: diverse teams, constant formulation of new ideas and customer focus (IBM Design, n.d.). By implementing Enterprise Design Thinking in an organization, teams can operate more than 75% more efficiently, thus releasing products twice as fast as groups that do not use this approach (HR Polska, 2019).

To conclude, both organizations – Apple Inc. and IBM – use Design Thinking in their activities. Apple is considered one of the forerunners of DT, thanks to its passion for the high level of design of the products it produces. IBM has built the Enterprise Design Thinking framework based on traditional Design Thinking used by many companies, e.g. Whirlpool, one of the largest manufacturers of household appliances.

5. Conclusion

Creative approach to problem solving i.e. Design Thinking is an interesting way to improve the work carried out as a part of IT project management. By stimulating the creativity of employees, there is a greater chance to create an innovative product that will meet with the positive market recognition. In addition, IT organizations using Design Thinking can benefit greatly. In the case of Apple, it is the unique design of its products, constant contact with the user and a fewer repairs required, thanks to the refinement of the key product. On its part, IBM has gained the opportunity to collaborate, becoming a user-centric company, and has seen significant improvements in the organization's tool production and testing times.

Despite using the same approach, the use of Design Thinking at Apple and IBM differed significantly. A literature review and a case study made it possible to identify the use of DT in organizations managing IT ventures. Among the abovementioned benefits that both organizations have noted, one can distinguish the improvement of interpersonal relations in their enterprise. The concept of Design Thinking encourages team members to cooperate, exchange ideas, views and accept criticism. Thanks to this, employees can learn the necessary interpersonal skills, which can also make it easier to look at the problem through the user's eyes, and thus find the real causes of the problems.

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