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Approaches to Project Management in the Process of Digital Transformation in the Company

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Abstract

As digital technologies evolve, proven business practices are disrupted and companies need to respond to the benefits of digitization. Most often it is said to have a great impact on the traditional business model and its change. Based on the analysis of the current situation and experience in the practice of changes caused by digitization, the aim of the paper will be to compare and point out the possibilities of different approaches to project management in the process of digital transformation in the company. Especially waterfall and agile approaches will be tested. The aim of the proposal is to find a link between the waterfall and agile model of project management in systematic response in the digital transformation process. The classic framework is maintained externally, other techniques that ensure continuous creation in a shorter time frame will be used to find a solution to the problem. If a company wants to change its business model, first of all, it must start inside, without the momentum and potential that it has in its employees, it is not able to easily and correctly in the given conditions to handle. According to the World Economic Forum (2016), waterfall project management no longer meets the requirements of digitization and the company should focus on management that is agile.

Keywords: digital transformation, project management, waterfall approach, agile approach, design thinking

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Introduction

Every company that has decided to face digital transformation looks at it in its own way. It also defines it according to the effort it exerts within and outside the company, which means that the characteristic of this concept can be a thorny point. Generally, we can define digital transformation as the need to integrate digital technologies into many or all business areas that extensively interfere with how customer value is created and delivered (Gregor et al., 2006). Digital technology brings a cultural change to an organization that has to face change and endure it constantly. Employees should be committed to working with their company to define the importance of digital transformation (Bloomberg, 2018; I-Scoop, 2019).

Bilefield (2016) outlines the key steps to be successful in the transformation process and what to think about when a business approaches it. Awareness of the need for change must begin with the mindset of employees who must be aware during the course of the fact that companies are facing a problem that we may face in the near future. One example is to raise the profile of senior managers inside the company and give junior positions the opportunity to become part of decision-making processes. Not only the digital leader and his team are important in the transformation, but in the meantime, they themselves are responsible for the future of the business (Hellard, 2018). According to McQuivey (2013), any company that wants to prepare sufficiently for digital market disruption in its favour should answer three basic questions: (i) RQ1: How can we adapt our company to change?; (ii) RQ2: Who are we doing this for?; and (iii) RQ3: What should the digital disruption of our society look like?

First, each company should identify the essential needs of its customer (McQuivey, 2013). Digital market disruption brings change within supply chains with all the consequences. Digital market distortions bring about changes in industry classifications, product markets, competitors and many other areas. This situation not only brings new companies as new competitors, but there are companies in the traditional markets that have never done business in those markets before (Štofková et al., 2015).

Implementing changes in companies or institutions as a result of digital disruption is associated with managing these changes and managing individual projects. At the same time, the projects set ways of reacting individual parts of the company, management and employees themselves to digital disruption. The changes associated with digital disruption and especially digital transformation are extensive. They evoke questions related to managing transformation. Is it possible to use classic project management, or does it need to be changed, combined with other procedures and methods? The following parts of the paper will be devoted to the comparison of approaches to project management in the processes of the digital transformation of the business model as well as pointing out a suitable combination of approaches.

Theoretical background

Different procedures are defined and characterized in the literature on project management and change management. From the point of view of the institution and the possibility of its use in the process of managing the changes brought about by the digital transformation, it is possible to use the models that were formulated in the area of information and communication technology or for software development processes. These include the waterfall model, the agile model and the elements associated with design thinking and customer experience etc. In the

beginning, each project has a lot of planning, a lot of work and tasks to be done at the right time and in the right order. The project manager must ensure that all project steps create a structure of logical and manageable steps.

The waterfall model is a linear, sequential product life cycle model. The model is based on a logical sequence of steps and as the waterfall flows gradually over the rocks, the software development goes from one phase to the next phase of the project (Chari & Agrawal, 2018). The formulation of requirements begins the whole process and is recorded and analysed in the technical documentation, which serves as a basis for future development. The direct result of this phase is a document containing specific requirements, functionalities, interface and so on.

The waterfall model is not the only method used to develop software or solve projects. Royce (1970) published an article on large-scale development management where he first described a new methodology for managing large-scale software projects so that all steps were as effective as possible. This publication outlined the idea of gradual development because he considered the greatest problem to be the lack of developers in the early stages where they could evaluate the most logical and useful solution.

The Manifesto for Agile Software Development was published in 2013 (Beck et al., 2013). Agility based on this idea is the ability to create changes and then react. Agile methodology argues that it is best to deal with an unknown and uncertain environment by preparing for it from the beginning. The authors describe the whole methodology as agile because its task is to play with and respond to the idea. The methodology was initially based on an open basis and the ecosystem that emerged began to spread very easily (Wade, 2015). Several adopters of this idea have begun to insist that some practices have to be carried out in a specific way (Mahadevan et al., 2015).

Agile project management is based on iterative delivery over the project lifecycle. Agile project management aims to achieve the maximum value influenced by the company's business priorities, time and budget. Agile project management also requires team members to work together at a high level in short stages and face to face meetings. Basic principles of agile project management include: (i) response to customer requirements must be proactive and iterative; (ii) establishing a closer relationship between all stakeholders; (iii) the scope of the project is adaptable according to established rules; and (iv) the team decides together and is responsible for the success or failure of the project together (Rose, 2016; Rypak, 2018).

Kelley (2009) published a new design methodology that represents a different problem management process. Design Thinking is a design methodology that is based on problem-solving and not solution design. This methodology is particularly useful for solving complex problems that are difficult to define or unknown (Camacho, 2016). Thinking design begins with observation, it involves understanding the context and culture behind the problem, with an emphasis on what people need, more than just trying to name the problem.

The last, separate part of Design Thinking is implementation. In this step, it is important to find out whether the solution can assert itself in practice and bring the desired benefits for customers. It is therefore directly related to measuring user satisfaction with a new solution or application using User Experience Questionnaire or UEQ (Laugwitz et al., 2008). UEQ aims to provide a quick assessment by end-users, providing a comprehensive impression of the user's experience. This method was designed to allow users to express the feelings, impressions and attitudes that arise when researching a product.

Case study

The IT Unit and the Strategic and Business Unit, which represent the requirements of other departments, usually handle the application for creating a digital transformation project. Their cooperation must ensure consistency. Together, employees from both departments are in charge of prioritizing project requirements. Finally, the executive committee decides whether the project is feasible. As a basis for this decision, the business project manager will develop an Initial Project Charter, which must include the reason for starting on the part of the Project Client, i.e. a specific business case that includes return on investment, costs and benefits. Once the project is approved by the executive board, the IT Unit will create a technical solution based on the requirements collected and created by the strategy and business department. The Project Charter is updated by the project manager.

Based on observation and study of materials, the project life cycle can be summarized as follows. Each project has three phases. Each phase is divided into several activities (see Tables 1, 2, 3). Action is the result to be achieved at the end of a given cycle. Individual activities are characterized by contributors, i.e. employees, who contribute their activities to the process.

Table 1
Processing requests

Activity	Contributor	Activity description	Duration
Appointment of a Business Project Manager	Business program manager	Appointment of a project manager	It depends on the executive committee
Project charter	Business program manager	The business architect is working together to develop the Charter in order to provide guidance and consistency, taking into account its maturity and readiness for review by the executive committees.	1-2 months
IT Architecture	Data & IT architect	High-level technical solution proposal based on the project charter.	1 week
First evaluation of the project	Data & IT architect	Initial evaluation of the project with regard to the evaluation of the executive committees.	1 week
Prioritizing project activities		The prioritization of the project is based on the strategic importance and maturity of the project. Based on the initial project evaluation, an estimate of the required budget (Business & IT) for each project is provided. This estimate must be confirmed at the end of the conceptual solution phase.	1 month

Source: Genzorova, 2019.

Table 2
Concept creation

Activity	Contributor	Activity description	Duration
Analysis of business requirements	Business analyst Information Management Officer	The business project manager is responsible for the completeness and accuracy of this analysis and signs the final requirement document that is the basis for providing the IT solution.	3-18 months
Technical solution proposal	Architect solutions	The architect prepares the design of the technical solution and work packages based on the project charter, analysis of business and data requirements and data model.	1-2 months
Technical solution review	Business project manager (BPM)	The BPM will complement the project charter, taking into account the outcomes of the above steps. The Project Basic Charter sets out the final scope, benefits, ROI, project costs (both on the Agency and IT side), implementation approach, schedule and organization.	1 week
Approval by the executive committee	Executive committee	The executive committee reviews the project documentation and the technical solution proposal.	

Source: Genzorova, 2019.

Table 3
Product delivery phase

Activity	Contributor	Activity description	Duration
Preparation of project implementation and fundraising	Business project manager IT Business Partner	The IT Business Partner prepares a contract with the developing team and external providers based on work packages, technical solution design and analysis of business and data requirements and data model. Detailed project planning.	3-4 months
IT solution delivery	Developing team External providers	Delivery of IT solutions in accordance with documents.	3 – 18 months
Verification of IT solutions	IT Architects		2 weeks
Receipt of outputs	Project council		

Source: Genzorova, 2019.

Based on the given description, we have determined the research prerequisites related to the efficiency of project management within the institution. We assume two research assumptions: (i) RA1: The cost of an agile method is not significantly different from the cost of using a waterfall model; (ii) RA2: Agile-driven projects are less time-consuming to process requests than waterfall model projects.

We verified these research assumptions by comparing two indicators, time and financial resources, spent on two independent projects A and B in the selected company (Fabuš et al., 2015). Project A is managed using a waterfall model based on the description recorded in Tab. 1, 2, 3. Project B is the first project managed using elements of the agile method. FTE are hours worked by one full-time employee. It is a unit that expresses the employee's capacity. The FTE represents the employee's annual capacity, which we have received as working days per year times 8 hours per day. By converting to FTE we want to express the time spent on each phase. We have multiplied the costs spent on each phase of the project by a set coefficient. The costs include the salaries of the employees, but also the costs incurred by external consultants in both cases. Projects A and B have similar characteristics. In the waterfall model (Table 4), we see the phases described above, in the agile model we have phases such as preparation, design and implementation, which in a way correspond to the phases of the waterfall project.

Table 4

Waterfall model - project A

Phase	FTE	Phase costs
Processing requests	0,09025	1 395,70
Concept creation	1,3119	18 088,70
Product delivery	0,6699	13 879,00
Project management and coordination	0,58	7 441,00
The total duration of the project	2,65205	40 804,40
	Day costs	76,93

Source: Genzorova, 2019.

The first research prerequisite is to verify whether the costs vary between models and to what extent. We consider the cost to be a significant difference, with a difference of more than 10%, because we also have to take into account that the projects were solved within different teams. The total cost of the agile model is 64% lower than the waterfall model. Even in the individual phases of the project, there is a significant decrease in costs. The most significant difference is the time and cost of the second phase. The difference is particularly significant because the second project used an agile method, ie the second and third phases started at the same time. Individual application requirements were collected at the design and implementation stages. An agile model requires system experts right from the start. Team turnover is higher to keep costs unnecessary. The cost per day of the agile model is 34.8% lower than the waterfall model (see Table 4, 5).

The second research assumption was that if agile-driven projects are less time-consuming to process requirements than waterfall model projects. We can also confirm this assumption because the entire team met with users on a regular basis, which means that individual requests have also changed over time. The aim was to shorten the request processing phase to a shorter time, even in an environment where the remuneration is based on a predetermined grade. The overall duration of the project decreased by approximately 45% compared to the classic model. The number of hours spent on project coordination also saw a significant decrease in time and cost. The use of the agile method and its principles is suitable not only in the private but also in the public sector. Regular reassessment of the results assures both sides that progress is taking place.

Table 5
Agile model - project B

Phase	FTE	Phase costs
Preparation	0,06625	505,88
Design	0,11125	1 335,00
Implementation	0,93875	8 899,40
Project management and coordination	0,32945	3 755,87
Total duration of the project	1,4457	14 496,15
	Day costs	50,14

Source: Genzorova, 2019.

Discussion and conclusions

Traditional management models do not fully meet the requirements of the company's digital transformation. If a company wants to change its business model, first of all, it must start inside, without the momentum and potential that it has in its employees, it is not able to easily and correctly in the given conditions to handle. According to the World Economic Forum (2016), waterfall project management no longer meets the requirements of digitization and the company should focus on management that is agile. Based on the results of primary research, we decided to use agile techniques, not only in the process of software development, respectively, at the product delivery stage, but throughout the project lifecycle.

Many companies have a time problem in developing a project charter and analysing business requirements for extensive time delays, where we can see in a practical example that the time horizon of creation can climb to 18 months. The main reason for such a limitation is the absence of employees in the creation of requirements for the system or the resulting application, therefore an agile management approach that guarantees the presence of the user/customer daily is the most suitable way of solution. Of course, this represents a higher time requirement for the employee's participation in the creation, which the employee is not always able and willing to handle in his / her work duties (DeNisco, 2018). One way to enhance digital thinking is to create an appropriate environment within the enterprise, to provide conditions that create room for employee education and to create a working system that suits both the employee and the company.

The change must take place so that it does not cause discomfort in the employees (Sapho, 2018.) i.e. gradually outwardly but radically inside. Based on the results of primary research, we know that new techniques are welcome and the outcome has been positively evaluated. Based on observations and interviews with the team, we know that during the first agile project the steps that individual participants should follow were missing. To put it simply, the life cycle of a project has three phases: processing requirements, creating a concept, and finally delivering a solution. Each of these parts is performed separately and only when the previous one is finished, if an error occurs, the delivery of the solution is prolonged, which significantly affects the project financially and time.

To find possible solutions, it is advisable to create one team consisting of two units:

- Initial team (solving team) whose task is to ensure the technical solution of the product, i.e. it consists of a project manager, scrum ointment and team members who are deeply specialized in the field. This part of the team also provides the project part.

- The work team (extended team) represents selected solution designers who are employees from individual departments, future system or application users. Their participation will ensure a direct response to all steps taken by the research team.

Within the company, we should understand these two units as one team working together to solve the problem, not to suggest a result. The workflow is then divided into a preparatory phase, a creative workshop and a feedback workshop.

The pre-preparation phase represents the pre-preparation of the project, where the initiation team collects the relevant information, proceeding classic as a waterfall model. This phase aims to understand the underlying problem, which is solved continuously throughout the process along with an extended team based on agile methodology. The initiation team tries to understand the needs and requirements that will be placed on the resulting solution before the first meeting with the extended team. The pre-treatment phase should be based on:

- Intra-team brainstorming (strengths and weaknesses analysis),
- Interviews and discussions with experts (administrators of the existing system, website, application, workflow etc.).

The outcome of these steps should lead to an understanding of who will be part of the work team, i.e. who will use the outcome in the future. To make it easier for the team to identify possible problems, it is advisable to create fictitious users called proto personas (Caddick & Cable, 2011). Protopersona needs to be defined what needs the solution to meet its requirements, what motivates it to use the solution and what needs to be done.

If the initiation team is required in the pre-preparation phase, they apply these principles of Design Thinking:

- The empathy that helps the research team understand the needs through interviews with a narrower circle of experts and also with each other.
- Definition by which the team should summarize everything they learned in the pre-preparation phase and result in protopersonas.

In the creative workshop phase, the project manager provides a list of workshop participants or a work team list. Each participant must be briefly acquainted with the project in order not to be influenced in advance by other factors or opinions. The Project Manager selects those participants who are willing to cooperate and attend all meetings on a regular basis, based on the recommendations of the employee's manager. Above all, it takes into account the logic outlined by the protopersona-based team, and if there are more, each should be represented in the working team. The work team should not be large in order to work in more detail, so the choice of individual members must be consistent. This phase represents the first phase of the waterfall model, the processing of requirements, and the second, the concept creation. The project manager should prepare the first meeting with the work team. Create an outline of the whole meeting, secure content, decide which techniques will be used to generate team ideas. Of course, the project manager can assign any member of the initiation team if they are trained in the design thinking method.

The creative workshop is focused on creating requirements and its task is to minimize the creation of the Project Charter and analysis of business requirements to a minimum. In a waterfall model, a business analyst usually works on creating requests himself and does not have the necessary input from real users. This workshop should prevent real requirements from being incorporated into the resulting solution, as it is carried out right from the start.

The creative workshop uses three principles of Design Thinking: empathy, problem definition and generating ideas. The result is a list of requirements and concrete suggestions using real users. Team members should not enter into the process of generating ideas in order not to affect the work team's ideas with possible technical contraindications, their ideas and opinions. The project manager or workshop leader chooses a technique to lead the workshop to capture the most important requirements of the work team. Part of this part is also acquainting and subsequently verifying protoperson with the work team, where they identify with their role in the following meetings. Based on the collected requirements, experience and ideas, the team can start working. It is the responsibility of the research team to divide the ideas into individual protopersons and, based on the requirements, reallocate the work that must be done to the next meeting with the work team.

Activities after the first workshop represent parallel processing of requirements, concept creation and delivery of the waterfall model project. Of course, based on requirements, the team expands and works together on the prototype, which must verify with the work team. Here, the principle of agility is applied, where the regular team sprints meet the team and the working team. Both teams will agree on the time period for the processing of comments and requests and subsequent verification of the solution. The time period should not change during creation. After a period of time, when the research team was supposed to incorporate all the requirements, a meeting with the work team is next. In particular, the principles of design thinking apply during this meeting: prototyping and testing.

The aim of the feedback workshop is to present the ideas of the team that they created following the first meeting. Part of this meeting is the opinion of the working team. Agility ensures that the whole process is repeated when additional requirements can be added to solve the problem. This process is repeated until the whole team is satisfied with the result. The team's response to MVPs must be continuously integrated. This process can be repeated as long as the work team is satisfied with the outcome within the schedule.

In companies with a large number of employees and a wide range of businesses, not all departments are directly affected by the changes brought about by digital transformation, and therefore are unable to understand the substance and meaning. Employee collaboration to create new processes is essential to create the right solutions within the enterprise. In the process of digital transformation, it should be the responsibility of the enterprise to develop appropriate programs that encourage employees to digital mindsets. That is why an internal product delivery system should be set up within the company to respond as soon as possible to employees' requirements (Reznicek, 2020).

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