Using lean principles in IT project management as a response to market needs – case study of Croatian IT companies

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Abstract. *The dynamic and challenging market in which IT companies are operating requires continuous improvements in processes, in order to adequately respond to market needs. When it comes to IT projects, traditional project management methods are being rapidly changed with lean and agile methods that enables more flexible and customer-oriented approach to project management.*
This paper brings overview of main characteristics of traditional and lean project management methods, with the emphasis on using lean methods to respond to market needs. Theoretical assumptions are then applied to a case study of two Croatian IT companies that applies lean methods in their project management practices. Finally, the paper summarizes main benefits of applying lean principles in IT project management and stresses the main challenges companies are facing.

Keywords. IT project management, lean principles, market needs

1 Introduction

In today's business and project environment, companies face a number of obstacles. Turbulent environment, high speed of technology change, time limits are becoming shorter, budgets are becoming more complex and other external factors pose daunting challenges to businesses. (Wysocki, 2009, p. Xli; PMBoK, 2013, p. 10). Project management enables companies to implement a specific project in an efficient and effective way in order to meet the set goals. With the help of appropriate project management methods and techniques, companies can create added value for their customers or clients, achieve various benefits, but also become more competitive in the market. Therefore, it can be said that projects and project management are one of the important assets to a company's success (PMBoK, 2017, p. 10).

The project environment is becoming more dynamic. New technologies are emerging, customer requirements are more numerous and demanding, companies are under constant pressure to deliver final results, taking into account the highest possible level of quality with minimal use of resources, competition is growing etc. (Salameh, 2014, pp. 52 and 71). In such a dynamic and turbulent environment, IT project management practices are experiencing a shift from traditional to agile and lean.

Agile project management (hereinafter: APM) is a dynamic approach to project management, software development and implementation. This approach has gained in popularity due to its adaptive nature and orientation to all participants in the project cycle. APM allows changes and modifications to be incorporated into the overall project plan at multiple points. (SCRUMstudy, 2013a) In APM, project features are formed according to its requirements using numerous iterations in the form of reducing and removing uncertainty. Therefore, this approach to project management is more prone to higher risk compared to traditional projects. However, the agile approach has more flexibility, so it is easier to adapt to all project changes (Fernandez, Fernandez, 2008, p. 15).

This paper put focus on a specific form of modern approaches to project management called lean management. Lean project management characteristics, principles and ecosystem elements are explained in chapter 2. Chapter 3 brings case study on the implementation of lean project management practices in two Croatian IT companies, followed with the discussion and conclusion.

2 Lean project management

There are numerous projects that were not implemented on time or within the budget or according to client requirements, which required additional investment of various resources. Furthermore, the oscillations resulting from the constant changes in the

requirements of clients and other project participants also have a significant impact on the project process. Additional costs are created, deliveries of final results are delayed, which greatly affects the quality and safety of the project (Locatelli, Mancini, Gastaldo, Mazza, 2013, p. 776; van Assen, 2018, p. 1312-1314). To avoid the aforementioned problems, the lean methodology is used in practice.

When it comes to the lean methodology, it describes a synchronized system that contains key elements for providing products and services, at minimal cost, in order to meet precisely defined customer wishes. When it comes to customer wishes, it includes high quality products and services, a specific quantity of the same with delivery at the time and place that the customer wants (Slack, Brandon-Jones, Johnston, 2013, p. 465). According to the previous definition, lean management is defined as a just-in-time philosophy. In other words, the customer is delivered the required quantity of product or service at the required time and the required location. The main feature of the just-in-time philosophy is that it is based on reducing everything that does not create added value for the client for which he is willing to pay (Reid. Sanders, 2013, p. 231)

2.1 Lean management characteristics

To avoid the aforementioned potential problems, the lean methodology is used in practice. The main feature of lean is to identify and minimize obstacles through the four main elements (Locatelli et al., 2013, p. 776):

- A focus on quality in a way that minimizes alterations by creating a good business plan

- Customer focus which is achieved by eliminating those activities that do not create added value for the customer.

- Reducing waiting times, as an element, takes into account the involvement of suppliers in planning and delivery. Specifically, this approach makes great efforts to involve suppliers in project planning and process in order to minimize variability. According to lean reasoning, supplier involvement is crucial to deliver materials on time with minimum cost and maximum value to the customer.

- The last element, the creation of a continuous flow, refers to the availability of the necessary resources and components, when and where they are needed.

According to Žvorc (2013, p. 697) lean methodology, compared to the traditional one, is more dynamic, its procedures are simplified and more adaptable. Its most important feature is that quality is sought to be ensured from the very beginning, i.e. in advance in every process and design of a product or service in accordance with the needs of customers. Furthermore, the foundation of this method is teamwork. According to lean thinking, employees are the greatest value of a company that is not guided by a strict hierarchical structure or a rigid division of tasks but their potential is stimulated in a number of ways. It is also interesting that any mistakes are not seen as a problem but as the next step towards finding possible solutions. Lean management is project-oriented, which means that new solutions can be realized by forming a new team by implementing a new project.

Furthermore, Ballard and Howell (2003, p. 122) state that the characteristics of the lean approach are a focus on the production system, transformations, the flow of information, and the achievement of goals. It is important to mention that the lean approach is characterized by teamwork, but also the involvement of a larger number of people and the level of organization in the decision-making process. Likewise, the production process and the final result depend on each other and are therefore defined together just like all phases of the product life cycle. Activities are performed at the agreed time, systematic efforts are made to reduce delivery time in the chain, the emphasis is on continuous learning. In the end, stakeholder interests are aligned.

In essence, the lean methodology seeks to minimize the large variability that affects projects. Reducing variability using lean thinking is achieved through a pre-defined planning system to ensure the most reliable flow of work with materials, information, equipment and people. This reduces the overall risk, especially in the case of interconnected projects, where the delay of one project affects another. Furthermore, one of the features of lean thinking is the cooperation of all parties and quality control in the construction phase. In conclusion, the lean approach aims to optimize the overall project process taking into account how each individual activity affects the next. Using this approach, it is possible to achieve better projects (Locatelli et al., 2013, p. 776).

2.2 Lean management principles

The principles of lean thinking are closely related to the definition and characteristics of lean methodology itself. Accordingly, lean management is guided by five basic principles, which are (Thangarajoo, Smith, 2015, p. 2; O'Rourke, 2005, p. 9):

- Precisely defining the value of a particular product or service,

- Identifying the value flow of each product or service,

- Uniform and continuous flow of values (production, materials and information),

- "Pull" approach by customers, i.e. withdrawal of the value of the product or service throughout the production process and at the very end

- Striving for perfection through the elimination of "waste".

In the form of the principle of lean thinking, attention should also be paid to the approach of 8Ps.

The "8P's Lean Business System" approach should overcome the shortcomings of classical principles and mitigate or even eliminate the problems faced by each principle: purpose, people, process, pull, prevention, partnering, planet and perfection (Hinesu, 2010, p. 4).

2.3 Lean ecosystem elements

According to E. Gabriel (1997, p. 209), the basic elements of the lean approach to project management come from two sides, namely the clients and the project team. Clients represent a third-party sponsor or agent who expects the requirements or expectations to be met on the basis of the contract. The client should be present, along with the project team, throughout the project implementation process, and should have a certain level of power when deciding on future activities and steps. On the other hand, the project team consists of a group of professionals who define, plan, implement and control project processes in the form of meeting customer requirements at the lowest possible cost.

3. Case study of IT companies in Croatia

The research aimed to gain insight into the practice of lean project management and how its application affects the final result. In other words, the research aims to provide answers to how companies deal with the obstacles that project implementation brings, using lean approaches in IT companies. This chapter brings results of two case studies from Croatian IT companies.

3.1 Case study methodology

The participants in the research were project managers of two Croatian IT companies. The case study was conducted using a semi-structured interview where all questions were open-ended (Brinkmann, Kvale, 2015). The interviews were conducted during July 2020. Before the interview, participants were presented with a "Research Participation Consent Form" which included all information about the research.

The interview consisted of three blocks of questions:

- The first block were questions related to basic information about the respondents' companies and their position,
- The second block included questions related to project management in these companies, and
- The third block were questions related to the realized and/or actual project according to the selection of respondents with the purpose of a more detailed understanding of the agile and lean principles.

3.2 Project management in IT companies

In the companies that participated in this study, project manager (further: PM) was the one who was at the head of the project. For a project to be realised successfully, the PM needs to work with the project team. From the interviews with PMs, the structure of the project team is almost the same in all cases. Basically, the main roles are chief consultant/PM and lead developer. Other roles depend on the type of the project at hand. Accordingly, there could be designers, testers, system architects, etc. In one company PM explained that cooperation depends on strategic importance of the project and its impact on the organization. In practice, that means there are situations in which PM works more with a technical account manager (TAM), key account manager (KAM) and a sponsor in the case there are more active projects for a strategic partner.

In project management, most used methods are hybrid methods. Specifically, the method used depends on the project. When it's the small or core projects/solutions in question, where all or almost all requirements are known, then traditional methods such as the waterfall method are used. In projects/solutions that are more creative, innovative and custom, the agile methods are mostly used.

Considering the project management ecosystem, fulfilling the project purpose and achieving partnership are the most considered elements. It is extremely important to have a purpose that is found by answering the questions like "why is this solution being developed" and "in which way will it fulfil clients and company's needs". Partnership is another interesting aspect to which great consideration is given, because companies are not looking to provide a one-time solution, rather they aim to become a reliable partner in which the client can have confidence for future cooperation. Beyond these two elements, during project management it is important to keep track of human resources, i.e. the project team as well as preventing redundant tools and processes.

The biggest obstacle to adequate project management is a fast-paced environment. For a company to stay competitive on the market, top management needs to ensure either online or internal employee education. Additionally, planning resources with limited budgets and project specifications make project management more challenging. To mitigate the impact that these things have on business, companies use many different tools such as Azure DevOps, Jira, DataStudio etc.

Furthermore, it is important to point out how crucial the transparency in project management really is. Top management have to be informed all the time and oversee all project activities on the organizational level from the commercial or internal project aspect, as well as provide support and inspire initiative for the collective benefit. Besides top management, clients also need to be informed about all processes at all times

so there aren't any unnecessary expenses and resource usage.

3.3 Project implementation according to agile and lean approach

During project initiation, economic, legal, operative and technical aspects of the project are first considered. In the pre-sales phase, all named aspects are considered and graded, and a decision about further steps is made (ideal solution, work assessment, offer). In the project planning phase, it is important to define the way in which the project will be managed and its sustainability. Project scope combines defining project scale, length and depth. Project length and scale are decided with regard to deadlines and resource availability, while project depth depends on many different parameters, what makes it the most challenging part in the first phase. In the next phase, companies define and identify project goals and participants. It is of the essence to define the project team, stakeholders, specifications, activities and deadlines, which are the prerequisites for a successful project realisation.

In practice, it is important for project goals to be specific, measurable, achievable, relevant and timely (SMART). Additionally, goals need to be formed in a way so that they encourage collaboration. In other words, project goal needs to be formed in a way that benefits not only clients, but all participants. After the project goals are set, the project plan can be created. It contains details on all important parts of the project - goals, linked documents, project organization (roles, change, quality and risk management, communication, resource planning, metrics for success measurement ...), project phases, activities etc. PMs have said that employee suggestions on processes, tasks and activities during project realisation are always welcome and that cooperation is very important.

During project development, companies stand by the idea that the project must be aligned with company strategies. Most important factors in project development are control, oversight, communication, reporting and timely interventions.

Progress oversight and control of project performance is a key step in every project. It encompasses employee schedule monitoring, capacity availability and time constraints. By usage of many different tools and metrics (such as MS Project, Azure DevOps, DataStudio) that work is greatly diminished. Also, the project lead must inform all superiors about projects progress during the entire project lifecycle. This phase spans the entire project, so if there should be some obstacle, it can be eliminated with no unnecessary overhead.

By the end of the project, the project's *post mortem* recapitulation is done, with the goal of recognising the mistakes that were made and learning from them as well as promoting the opportunities that were shown as impactful on the project realisation and have impacted its efficiency and quality. The results are presented to all participants. After the presentation, user satisfaction is measured, because it is the basis for further decision-making with the goal of continuous product or service improvement. One of the most important steps in the end is creating the historic data database, with the goal of keeping track of mistakes, so that they aren't repeated in the future.

4 Discussion

Project-oriented companies face numerous obstacles - the specificity of the project, unrealistic customer requests, redundant processes ... In this case, lean management, more precisely lean thinking is often used in companies. To meet customer requirements, the focus is on minimizing alterations by creating a detailed business plan. Also, great emphasis is placed on the continuity of the process and the minimization of the unnecessary ones. An important element are project teams whose task is not only to do a good job and create added value for the client but also to propose changes to processes and activities in case they are irrelevant.

The principles of a lean approach are present in practice although most companies are not aware of it. Continuity related to the detailed definition of the final result through value or processes is the foundation of everyday business. Likewise, companies pay great attention to removing unnecessary processes and tools that do not create added value.

Considering the lean project management ecosystem, the case study shows that third parties are an important element of project management. To meet the expected requirements and make appropriate decisions, their presence throughout the process is greatly required.

5 Conclusion

This paper presents the idea that lean methodologies are used in practice as more of a philosophy then a set of rules. It is in companies' interest to satisfy the needs of their clients as well as preventing additional costs that can emerge from redundant processes. In the interview with the PMs, it can be discerned that lean thinking is very much present in today's business. Great measures are taken to satisfy all participants, and aspiration for perfectionism is seen in usage of special tools, metrics and techniques to reduce redundant processes that bring no value to the client. Although tools are important, the main factor is considered to be partnership, as one of the principles of lean thinking which is not represented as much in other methodologies. Finally, lean methodology is a philosophy through which companies get a good

foothold for satisfying the market's needs. Because of its simple structure, lean methodology can be made to fit any project.

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