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Agile Transformation in IT Organisations

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ABSTRACT

The aim of the research is to compare different project management methodologies, especially agile and traditional linear models, with a special focus on their organisational and project methodological performance and effectiveness. At the beginning of the research process, three main hypotheses were formulated: agile methodologies increase organisational performance and efficiency, are more effective in IT projects compared to the traditional waterfall model, and may pose a risk to organisational design in the long run. The primary research involved questionnaires and interviews with ICT leaders and managers with experience in agile transformation. The questionnaire survey was designed to collect qualitative and quantitative data, while the interviews provided deeper insights into the experiences of managers and the implications of adopting agile methods in their companies. The data analysis phase involved statistical and qualitative analyses of the data, which highlighted the benefits and risks of adopting agile methods. The results helped to test the research hypotheses and contributed to a deeper understanding of the differences between methodologies and the organisational impact of agile transformation, thus supporting the research objectives and contributing to the scientific discourse.

Keywords: Project Management Methodologies, Agile, Organisational Performance, Agile Transformation, ICT Project Effectiveness

INTRODUCTION

As technology and IT are advancing at breakneck speed, interest in IT management methodologies is becoming increasingly important for both professionals and organisations (Alkhlaifat & Koloszár, 2023). The changing environment and constantly evolving technological opportunities raise the need for effective management methodologies to enable organisations to adapt and take advantage of the technological benefits available (Pankotay & Koloszár, 2019). This is why I chose this topic as the focus of my research.

In choosing this topic, I was mainly driven by professional curiosity when I set out to analyse modern IT management methodologies, to gain a deeper understanding of how these methodologies can be applied in practice and what benefits and challenges they bring (Koloszár et al., 2024). I was also motivated by the relatively extensive literature on the subject, the processing of which helped me to develop my analytical work and broaden my professional knowledge (Erdős et al., 2025).

My professional background and interests have therefore clearly led me towards IT management methodologies, and I believe that my research will provide me with valuable and applicable knowledge in this area (Qian et al., 2025).

MATERIALS AND METHODS

The main objective of the chapter is to present in detail the research methodology and research strategy used to conduct the research. Research strategy in this case can be defined as the process of carrying out the planned research, study work in order to achieve the related results. The chapter provides a comprehensive discussion of the steps and structure of the learning process and the progress of the research, including the scope of the research and the constraints that affect it. The research process was carried out as a series of carefully structured steps, ensuring that the focus of the research was on a topic based on my area of interest.

The first step was the selection of the research topic, which I decided on the basis of my own professional background and interests, as detailed in the introduction. I then formulated hypotheses that guided the further research process.

Hypotheses

At the outset of the research, I formulated three basic hypotheses, each of which focuses on the differences between traditional linear and agile project management methodologies, with a particular focus on organisational and project methodological performance and effectiveness, and long-term risks. In testing the hypotheses, I sought to explore these differences in depth and to understand how these different methodologies affect the project management practices and performance of organisations, with a particular focus on the large enterprise sector.

Based on the above, I have developed the following hypotheses:

1. The implementation of agile methodologies improves the performance and efficiency of organisations.
2. Agile methodology is more effective in project management in IT organisations than the traditional waterfall model.
3. The introduction of agile methodologies can pose a risk to the long-term planning capability of the organisation.

LITERATURE REVIEW

In the next stage, I carried out an in-depth literature analysis and review in order to fully understand and acquire the necessary knowledge on all relevant aspects of the topic. Reviewing, examining and summarising the literature that has been published so far on the topic under study is an essential step in the research process, with a particular focus on comparing agile methodologies with traditional project management.

Understanding the literature is also key to gaining a comprehensive overview of the subject, so that I can draw sound, scientifically credible conclusions. A broad review of the books and academic articles and studies published so far on the topic under study will allow me to gain an in-depth understanding of the fundamental differences in approach and perspective between the two project methodologies, as well as the essential aspects and steps involved in migration processes.

A thorough knowledge of the literature is essential for a relevant and scientifically sound analysis of the research questions, thus ensuring the integrity and credibility of the research on the topic under study. A systematic review and synthesis of the literature provides a basis for the precise definition of research questions and the design of empirical research phases, as well as enabling participation in the scientific discourse and the interpretation of research findings in the wider scientific and practical context.

Comparative Analysis

In addition to the literature review, I conducted a comparative analysis between agile and traditional project management methodologies to thoroughly examine their advantages, disadvantages, and applicability in different project environments.

In my comparative analysis of agile and traditional project management methodologies, I have placed great emphasis on carefully analysing both the theoretical frameworks and practical implementation strategies presented in the literature. An understanding of the basic steps of migration and the differences between methodologies was essential in order to understand the complexity of the field under study and to draw well-founded conclusions for subsequent research phases.

Research Process

Examining and formulating the research questions required an iterative process. As I progressively delved deeper into the topic, and as my theoretical background expanded, I worked in parallel to refine the questions and rethink the research focus. The iterative approach allowed the research to be continuously refined and developed further from the original hypotheses, enriching the final results and conclusions.

Secondary Research

During the data collection process, I analysed data collected in previous secondary research, where data collection and analysis covered the performance and effectiveness of agile organisations before and after the implementation of agile methodologies.

The aim of analysing secondary research is to identify new relationships, patterns or conclusions based on original data from previous research by other researchers. These data and findings are intended to support my research objectives, to help me to deepen my understanding of the research topic and questions, and of course to answer the questions raised by my hypotheses.

In analysing the data, I also paid considerable attention to analysing and comparing several previous case studies. These case studies analyse the operations of companies that have already applied agile methodologies in their project management or organisational operations. The analysis of the results provides an opportunity to explore in depth the effectiveness and efficiency of different agile approaches, techniques and tools, and to further understand the differences and impacts between traditional and agile project management methodologies.

Analysis based on existing data has contributed significantly to a more comprehensive understanding of the research area and the relevant context. The experiences and results presented in the different case studies in real business contexts are essential to gain a comprehensive picture of the potential benefits and challenges of applying agile methodologies and the relationship between their implementation and organisational effectiveness.

Primary Research

The research process included, in addition to the examination and analysis of the secondary research, a primary data collection phase using questionnaire and interview methods. The questionnaires and interviews allowed me to obtain direct feedback and information from the people involved in the topic and to gain deeper insights into the issues under study.

In defining the research methodology, two methods were chosen to optimally support the objectives set, using structured questionnaires and interviews to collect relevant information. The questionnaires allowed me to collect qualitative information in addition to quantitative data, while the interviews allowed me to obtain more in-depth qualitative information. Both methods provided direct information on aspects of the topic under study and the perspectives of the different stakeholders.

During the data collection process, I conducted surveys and interviews with IT leaders and managers who had experience in some stage of agile transformation in the past or in their current workplace.

- ***Questionnaire Survey:*** using a pre-designed questionnaire, I collected answers to the research questions from the participants. The questionnaire survey included both qualitative and quantitative elements, thus providing an opportunity to collect quantitative information and data to answer the research questions.
- ***Interview:*** based on the responses to the questionnaire survey, I selected two managers for personal interviews. During the interviews, in addition to the survey questions, I also asked more detailed questions in order to gather more in-depth information on the topic. This qualitative method allowed me to gain an overview of the context and depth of the research area.

Data Analysis and Conclusions

After the data collection, the data analysis phase followed, in which I processed the collected data using statistical and other analysis methods.

Through the analysis of the data, I determined the support for the research hypotheses, while the analysis of the qualitative data gave me a deeper understanding of the background and context of the phenomena under study.

The data collected and analysed during the primary and secondary research allowed me to answer the research questions, achieve the research objectives and test the hypotheses. The findings and conclusions drawn from the data analysis contributed to a deeper understanding of the differences between agile and traditional project management methodologies, the role and essence of agility, and the organisational impact of agile transformation, which were key to the successful completion of my research.

RESULTS AND DEBATE

Literature Summary

Development and Presentation of Methodologies

Information technology developments and globalisation are rapidly bringing new challenges and opportunities for businesses and development teams alike. Keeping pace with change, meeting customer needs and minimising time to market have become critical. In addition, maintaining and continuously improving the quality of the

product or service is essential. In this environment, the use of agile, waterfall and hybrid project management methodologies is inevitably at the forefront.

In the next chapter, I will introduce agile and waterfall methodologies, starting with an understanding of the basics, and then moving step-by-step to the more essential aspects of project management. In evaluating agile and waterfall methodologies, I will focus on the challenges they face during implementation and the main aspects of their usefulness.

Renewal efforts

The history of project management goes back thousands of years, but the modern approach to project management emerged in the mid-20th century. Ancient civilisations such as the Egyptians and Romans used project-based approaches for large-scale construction projects, such as the pyramids and aqueducts. However, the foundations of modern project management were laid in the industrialised world in the 1950s, when complex projects had to be managed, particularly in the military and space fields.

Before agility principles appeared in project management, many attempts were made in the second half of the 20th century to manage and control projects more effectively. In the 1950s, for example, the military and aerospace industries pioneered the CPM (Critical Path Method) and PERT (Program Evaluation and Review Technique). These methodologies helped projects to optimise time and costs, better allocate resources, and analyse and minimise potential risks (Kerzner, 1987).

In the 1970s, the project management toolbox was expanded to include risk management, quality management and resource planning techniques, partly motivated by increasing complexity and higher expectations of projects (Munns and Bjeirmi, 1996). All these innovations were driven by a common goal: to increase the success rate of projects and reduce the failure rate. Before the emergence of agility, project management therefore already had a set of tools and methodologies that had been developed in response to new challenges.

In a rapidly changing market environment, however, it has become increasingly apparent that a more flexible and adaptive approach is needed (Morris, 1994). In the 1990s, the explosion of information technology brought with it an increasing number and complexity of IT projects, which presented new methodological challenges to practitioners.

The emergence of agile methodologies is therefore not the result of a single event or movement, but the product of decades of innovation in the IT and project management industries. The notion of agility has become increasingly popular in recent decades, especially in the corporate environment, where the ability to adapt and react quickly has become a value driver.

In the 1970s, the software development industry first began to look for methodologies that could more effectively manage project changes and customer expectations. During this period, traditional development methodologies based on a waterfall model proved slow and inflexible compared to rapidly changing market requirements (Boehm, 1988).

The main milestones in the development of the agile approach were:

- ***Incremental and Iterative Development (IID):*** IID appeared as early as the 1980s and involved the incremental development and continuous revision of IT (Gilb, 1988).
- ***The Impact of Lean Manufacturing:*** the Toyota Production System (TPS) and the impact of the "lean" philosophy on IT projects. Its principles of waste reduction and continuous improvement were fundamental to the development of agile thinking (Womack et al., 1990).

In the early and mid-1990s, several new development methodologies emerged, such as Scrum and Extreme Programming, which focused on rapid response to changing market environments and customer needs, continuous feedback and rapid integration of changes.In 2001, at a meeting held at Snowbird, representatives of different software development methodologies formulated the Agile Manifesto, which set out the principles of agile software development. Since then, the principles of agility have been extended beyond software development and have become an important element in business management, product management and even HR.

SCRUM

Scrum is one of the best known and perhaps the most widely used agile methodologies. Its general characteristics are that, on the one hand, it is specifically designed to manage complex projects that are difficult to plan in the long term (Schwaber & Sutherland, 2017). On the other hand, Scrum is based on iterative and incremental development principles, where development cycles are called sprints, typically lasting 2-4 weeks. In addition, Scrum offers a structured yet highly adaptable framework for tackling complex problems, built on the principles of transparency, control and adaptation.

The benefits of Scrum include rapid response to changing business requirements, close communication with customers, high levels of transparency and auditability, and continuous evaluation and improvement cycles (Rubin, 2012). Scrum promotes collaboration between team and team members and encourages creativity.

The drawbacks of Scrum include potential conflicts in organizational culture and team structure, as well as strict sprint timeframes and high-level customer buy-in, which can put pressure on the team (Cohn, 2009). Successful implementation of Scrum requires strong commitment and support from the organization as a whole.

Kanban

Kanban is another popular agile methodology. Its general characteristic is that it focuses on transparency and continuous improvement of workflows (Anderson, 2010). Kanban uses a visual whiteboard to track work items, allowing teams to see what is in progress and where the bottlenecks are.

Kanban has the advantage of being flexible and easily adaptable to changing circumstances, increasing efficiency and reducing time wastage (Kniberg & Skarin, 2010). It helps to understand priorities and minimise unnecessary work.

Its disadvantages, however, include less strict management of work priorities, which can sometimes be confusing, and the lack of performance indicators (Reinertsen, 2009).

Lean Software Development

Lean Software Development (LSD) is based on Toyota's production system, which is a form of agile development focused on minimizing waste and maximizing efficiency (Poppendieck & Poppendieck, 2003).

The benefits of Lean Software Development include a continuous flow of value, efficient use of resources and improved product quality (Womack & Jones, 2003). In addition, Lean encourages teams to continuously improve their processes and systems.

Difficulties with Lean include the lack of proper scaling and the right tools, which can affect success (Rother, 2010). Lean implementation can also be time-consuming and teams need to learn the right techniques and practices.

Extreme Programming (XP)

Extreme Programming (XP) is an agile methodology that focuses on people and quality of work (Beck, 2000). XP is the most "extreme" of all agile methodologies because it emphasises the importance of technical excellence and good design. It aims to deliver better quality software and a higher quality of life for the development team. XP is the most specific of the agile frameworks in terms of good engineering practice in software development.

The benefits of XP include high quality, customer involvement, short development cycles and rapid response to changing requirements (Jeffries et al., 2000). XP practices promote communication and collaboration within the team.

The disadvantages of XP include strict requirements for processes and practices, which can put pressure on the team (Abrahamsson et al., 2002). XP may be less effective in larger teams or organisations where strict adherence to practices can be challenging.

Scaled Agile Framework (SAFe)

The Scaled Agile Framework (SAFe) is an agile software or product design and development methodology that provides an agile solution for large enterprises and complex systems (Leffingwell, 2007). SAFe aims to enable organisations to scale agile principles and practices to multiple levels of the enterprise without sacrificing agility and responsiveness. SAFe is divided into three main levels: program, enterprise and portfolio.

The benefits of SAFe include adaptability to large organisations, the ability to simultaneously manage complex, interrelated projects, and the alignment of agile principles across multiple teams and departments (Scaled Agile Inc, 2021). It helps companies to reconcile agility and scalability, which can be particularly challenging in large organisations, thus providing a kind of planned agility through the framework.

The drawbacks of SAFe include complexity and difficulty in implementation, especially if the organisation is not familiar with agile principles and practices (Kruchten, 2013). In addition, the SAFe methodology requires a greater investment of resources and time to implement, and successful implementation requires expertise and a huge commitment.

Spotify Model

The Spotify Agile model provides a framework for software development and product management specifically designed to address the scaling challenges of large organisations.

The structure of the model:

- ***Squads:*** the basic units of the model are squads, which are small, autonomous teams responsible for their own product or functional area. Squads are self-directed and make autonomous decisions in their own areas.
- ***Tribes:*** several squads with similar objectives form a tribe. A tribe can help to share knowledge and better coordinate resources between squads.

- ***Chapters:*** within a squad, people working in a similar professional field (e.g. backend developers) can form a chapter to share knowledge and hold professional training sessions.
- ***Guilds:*** interest groups or communities made up of people from different squads and tribe. The purpose of a guild may be to share best practices or to introduce new technologies (Kniberg, 2012).

The advantage of the agile model is that Spotify is able to react quickly to market changes and innovate in product development. The autonomy of the squads facilitates rapid decision-making and innovation, as the teams are not dependent on central approval. Decentralised decision-making in squads leads to increased responsibility and commitment at the team level.

Among its drawbacks, it is worth noting that while the high degree of autonomy of squads promotes speed and adaptability, one of the challenges of the model is maintaining consistency and alignment within the organisation. Self-managed squads run the risk of moving in different directions, which may deviate from the company's central strategy. It is not a good fit for all companies and cannot be easily replicated, so customisation and advice is recommended. As with the matrix organisation, the Spotify model can lead to conflicts of interest if used inappropriately (usu.com, 2021)

These are the most common agile methodologies, each of which provides a unique approach to software development, but with different advantages and disadvantages that can appear depending on the size and needs of the organisation

Waterfall-Based, Linear Project Management

The traditional waterfall model has evolved in the manufacturing and construction sector, but can be applied virtually regardless of industry. The model is based on a linear, phase-by-phase flow of processes, where the completion of each phase is a prerequisite for the start of the next phase.

PMI (Project Management Institute) PMBOK (Project Management Body of Knowledge) is a comprehensive guide to best practices in project management. Although the PMBOK is not necessarily waterfall-based, it often contains methodological elements that can be identified with the waterfall model, so it is recommended that this body of knowledge is used as a basis for approaching this approach.

According to the PMBOK, a waterfall-based project can be divided into the following main phases:

1. The initiation phase is a critical starting point in the project life cycle, where the project's justification and viability are determined. It is at this stage that the project purpose, stakeholders and primary project plan are identified. It is important to create a Project Preparation Document, which includes objectives, milestones, resources, and an initial risk assessment. A well-defined objective is essential to the success of the project. It is essential to identify, engage and maintain the commitment of stakeholders, which is key to achieving the project's objectives. Stakeholder feedback and support, as well as effective communication, will ensure a successful start to the work.
2. The planning phase is essential to any successful project, and is where the detailed project plan is drawn up. Tasks, resources, timeframe, budget and potential risks are identified. This project plan is the guiding document for the whole project. Timing, milestone scheduling and resource and cost planning help to manage time and costs. Resource allocation and the development of risk management strategies ensure the effectiveness of the project. Together, these planning activities ensure the successful achievement of project objectives.
3. In the implementation phase, the project plan is put into practice. The team carries out the planned tasks, solves any problems that arise and regularly updates stakeholders on progress. Quality management is crucial to ensure that the final product meets the planned specifications. This process not only ensures the quality of the product, but also increases stakeholder confidence in the project. Ongoing communication is necessary to ensure that everyone is aware of the status of the project and the results achieved. Transparent communication increases trust and understanding between team members and stakeholders.
4. During the monitoring and evaluation phase, continuous monitoring and evaluation is carried out to ensure that the project is progressing as planned. The results are compared with the project plan and corrections are made where necessary. Performance measurement and analysis helps to identify deviations and take effective action. Ongoing risk monitoring through risk management ensures project resilience in changing circumstances. In addition, rapid and effective decision-making is required to take corrective action. The decision-making process must be transparent to enable the team to respond effectively to challenges.
5. Project closure means formal completion, which is often underestimated but crucial. This is when the results are handed over to the client, the final accounts are settled and the project documentation is archived. Three main areas need attention: contract management, communication, and documentation. Closure of outstanding contracts, invoicing, and completion of financial tasks are essential. Effective

communication allows results, experiences and lessons learned during the project to be shared. Archiving ensures that project documentation is organised and can become a valuable resource for future projects.

Project management covers a wide range of knowledge areas and competences. Throughout each phase, project managers and teams draw on different knowledge areas and competencies to successfully navigate through the project, from initiation to closure.

Comparative Analysis

While the agile methodology offers flexibility and agility in adapting to changing business needs, the waterfall approach offers a linear, sequential approach that leads to project completion through well-defined steps. The next chapter aims to understand which methodology is most effective in different environments and circumstances and to analyse the differences between the two methodologies.

Iron triangle project management, as the name suggests, has elements that are considered to be bound, as you cannot change one element without affecting the others.

The original Iron Triangle project management, proposed by Dr Martin Barnes in 1969, follows a waterfall approach to product development: scope is fixed and resources and time are variable. In the case of a software team, this means that teams start a project by defining product requirements to determine the scope of the project (a list of work items). Resources and schedule are variable and can be estimated depending on the fixed scope. Unlike the waterfall model, agile projects have a fixed schedule and resources, while the scope is variable. While the scope of projects can vary during agile development, teams commit to fixed iterations of work: sprints if using a scrum framework and WIPs if using a kanban framework (atlassian.com, 2023)

The waterfall model has a fixed timeline. The starting point in this case is that the start and completion of the project is mapped and estimated from the beginning. The agile approach, by contrast, is more flexible and takes into account experimentation with different directions. Instead of a fixed timeline, the schedule is adapted to the progress of the project. According to the Agile Manifesto, an online document published by a group of software developers in 2001, team members are expected to deliver working software frequently, over a period of a few weeks to a few months, naturally favouring the shorter timeframe.

Projects using a waterfall-based (predictive) methodology usually have a fixed budget. As the project is fixed from start to finish, there is less scope for budget changes in the middle of the project.

In contrast, an agile approach is open to adaptation, encourages experimentation and welcomes changes of direction even in the later stages of a project. For this reason, budgets are more flexible.

Once the end goal has been defined, the predictive model does not involve the customer in the process, except for specific statuses or deliverables. The project process is outlined from the start, so incorporating customer feedback is not part of the process in the way agile approaches it.

An essential part of agility is involving customers in every step of project development. The Agile Manifesto states, "Our top priority is to ensure customer satisfaction through early and continuous delivery of valuable software." (Agile Manifesto, 2001) Therefore, they expect business owners to participate and provide feedback to the software development team as they progress through the various phases of the project.

The waterfall model is not as flexible as the agile model, because each phase has to be fully completed before moving on to the next phase. The project is also planned in advance, making this management system ideal for teams who have a clear vision of where they are going from start to finish.

The agile approach, on the other hand, values short workflows.The method welcomes the ability to adapt to different directions, to incorporate new information even at a later stage of the project, and thus offers considerable flexibility compared to the waterfall model.

There are several factors to consider when choosing between waterfall and agile. The waterfall model is better suited to projects with specifications or requirements, as the results of each phase and rigorous procedures ensure that these are met. For example, the military development and aerospace industries are some of the industries that would be more likely to use waterfall-based project management, as the requirements have many safety factors and are also challenged by pre-defined auditability criteria.

The choice between agile and linear should take into account the level of involvement of project sponsors or stakeholders in the project. Agile is better suited to projects where stakeholders can and want to be closely involved at every step. The traditional model is a more structured project management method and does not lend itself to the same flexibility.

Agile Implementation in Practice

In the life of companies, but especially in the case of large enterprises, the implementation of agile methodologies is a complex and challenging process that depends on the alignment of the company's leadership, culture, structure and the chosen methodology. In what follows, I will analyse these factors in detail, focusing specifically on agile transformation in medium and large enterprises.

There are many paths to enterprise agility. Some organisations have adopted an agile operating model from the outset, so an understanding of this is outside the scope of this paper.For organisations that originally adopted traditional project management, there are broadly three paths to agility. On the one hand, there is the "all-in" path, which entails organisation-wide engagement, agile transformation and waves of agile transformation. On the other hand, the "Step by Step" path, which involves a systematic approach. And thirdly, an essentially bottom-up path, where individual teams within the organisation start to adopt agile methodologies independently (McKinsey, 2019).

The first step towards agility is to get rid of the traditional hierarchical system. This speeds up decision-making and allows people to make more decisions autonomously. At the same time, it is important that the participants in the organisation are clear about the organisational goals, otherwise freedom of decision-making can lead to anarchy, where everyone is pursuing their own goals.

Reducing bureaucracy only increases agility if as many people as possible in the organisation know where they are going. Employees can only make the right decisions if they are clear about their role, their goals and the strategic vision of the organisation as a whole.

The second step is to put customers at the heart of everything we do. Many large companies often focus inwards, ignoring the needs of their customers. The solution is to build a closer relationship with customers and to continually look at the value they add to the recipient. Testing new ideas on customers, even if it may seem risky, allows the company to maintain control over the process, minimizing the negative impact on customer satisfaction (Hayward, S. 2018)

The success of agile transformation often depends on a thorough prior assessment and preparation. In this step, companies need to take an in-depth look at the current state of the organisation, discovering the resources needed for transformation and their agility needs.

The assessment often includes an assessment of the company culture, the existing technology infrastructure and the skills and attitudes of internal teams. With this knowledge, companies are better able to design and implement an agile transformation strategy tailored to the specific needs of the company (Dikert, K., Paasivaara, M., & Lassenius, C. ,2016).

Leadership commitment is key to agile transformation. Corporate leaders must not only support agile principles, but also actively promote them throughout the organisation. This is because the culture and attitude that leaders develop will determine how employees react and adapt to change.

If managers understand and adopt Agile values and actively apply them in their decisions and behaviour, employees are more likely to adopt and apply them in their daily work. Agile leadership therefore plays a role not only in facilitating the success of transformation, but also in sustaining and developing a corporate culture over the long term (Appelo, J. ,2010)

In the strategic planning for agile transformation in large enterprises, the organisations involved need to be clear about their transformation goals, defining the path to agility.

This includes the setting of priorities and sequencing of implementation, as well as the metrics needed for continuous monitoring. Managing change on this scale can be challenging, especially in a large and complex organisation, so success requires well-structured planning and clearly defined objectives.

In developing the strategy, managers should consider the current state of the company, the desired future state, and identify the gaps between the two, as well as the appropriate action plan to close the gaps (Larman, C., & Vodde, B. ,2008).

Promoting agile skills and awareness among employees is crucial during the transformation process and later in the work lifecycle. At this point, companies need to design and deliver training programmes that help to increase employees' knowledge and attitudes towards agile methodologies and principles. In addition to training, workshops, mentoring and coaching tools can be used to increase agile knowledge and skills.

Raising agile awareness is not only important for technical teams, but for everyone in the company, including management, sales, marketing and support. In addition, continuous learning and practice in the application of agile principles is essential to consolidate an agile culture in the organisation (Sutherland, J. ,2014)

Pilot projects are often a vital part of the agile transformation process, as they provide an opportunity to try out and test agile methodologies in a small, controlled environment before rolling them out to the whole organisation.

These projects not only test the adequacy of methodologies and tools, but also provide valuable feedback and lessons learned that help to identify and address challenges and barriers to subsequent larger-scale deployment. Based on the success and lessons learned, organisations can modify certain elements, adapting and refining agile methodologies to meet their specific needs.

In addition, the success of pilot projects can increase employee commitment and confidence in agile transformation by showing visible and tangible results (Leffingwell, D. , 2007).

Scaling is a critical stage of agile transformation, especially for large enterprises. Once agile methodologies have been successfully tested and applied in small teams or pilot projects, the next step is to scale up the

methodologies and practices to the enterprise as a whole. This does not simply mean applying the same methodologies at a larger scale; agile scaling needs to take into account organisational structures, collaboration between different teams and more complex value streams.

Certain methodologies, such as SAFe (Scaled Agile Framework), are specifically designed for agile scaling in large enterprise environments to help companies align their activities, maximise synergies and maintain agility at the broadest levels of the organisation (Leffingwell, D. ,2011).

The principle of continuous improvement within an agile framework illustrates that organisations need to continuously assess and adapt their activities to changing circumstances and lessons learned. Indeed, agile transformation is not a one-off event or project, but a continuous journey where organisations need to regularly revisit and review their methodologies, processes and tools to ensure they are best responding to business challenges and opportunities.

Retrospective meetings and agile reviews are tools that help teams and organisations to critically evaluate their own work and drive continuous improvement. In addition, continuous improvement also includes the continuous development of personal and team-level competencies and skills (Poppendieck, M., & Poppendieck, T. ,2003).

Problems of Introduction

Agile transformation in large enterprises is a complex and coordinated process that can present many challenges. Below, I summarise the major problems and challenges that have emerged in the literature on agile adoption in large enterprises in recent years.

The difficulty of implementing agile methods increases with the size of the organisation. The difficulty is partly related to size, which brings greater organizational inertia, which slows down organizational change Agile development is not based on the use of individual tools or practices, but on a holistic mindset. Adopting and embracing agility in an organization often requires a change in the entire organizational culture (Dikert, K., Paasivaara, M., & Lassenius, C. ,2016).

The success of agile transformation depends to a large extent on the organisational culture. Resistance to change often experienced in organisations can be one of the biggest barriers to agile transformation. (Smite et al., 2021) Agile methodology is based on the principles of collaboration, continuous learning and rapid response. Incorporating these values into an existing organisational culture can be challenging and employee resistance can make change difficult. Leaders must then play a supportive and guiding role in developing the culture and be flexible in managing resistance.

The success of an agile implementation depends to a large extent on the skills and qualifications of the staff. Adequate understanding and application of agile methodologies also poses skills gaps and educational challenges. Lack of expertise can limit the effectiveness of agile methodologies and project success. Education and mentoring, as well as ongoing support and feedback, are key to filling the skills gap and facilitating the success of agile transformation.

Without the commitment and support of leaders, agile transformation is unlikely to succeed. Agile transformation requires a continuous effort to support and facilitate change at the organisational level. Leaders must be proactive in this area, supporting employees and understanding the importance and application of agile principles. Lack of engagement can slow change, reduce team motivation and lead to implementation failure.

The lack of appropriate methods to measure and evaluate agile performance is a common challenge for large enterprises. Agile methodologies are much more flexible and less hierarchical than traditional methods, which makes it difficult to measure performance. The lack of reliable measurement methods hinders the monitoring of agile teams' performance and makes continuous improvement and the process of evaluating results more difficult.

The right choice and integration of tools and technologies can be a challenge during an agile implementation. Agile methodologies encourage rapid iterations and continuous feedback, requiring specific tools and technologies for both planning, monitoring and communication. Choosing inappropriate tools and platforms can limit the ability of agile teams to collaborate effectively and apply agile principles in a clean way.

Agile transformation in large enterprises also brings challenges of lack of alignment. Without collaboration and communication between different departments and teams, agile transformation can be less effective. In large enterprises, alignment challenges can also be complicated by the fact that different teams may be at different levels of maturity in implementing agility. This lack of alignment can prevent effective collaboration between different teams and hinder the overall agile transformation of the company.

Essistance

The success or failure of an enterprise agile implementation depends to a large extent on the alignment of the enterprise leadership, culture, structure and the chosen methodology. If these factors are not in sync, the implementation process can be hampered. Agile transformation is a complex and time-consuming process that

involves the whole organisation and requires profound changes. Successful transformation requires commitment from leaders, the right corporate culture, a flexible structure and the right methodology.

Primary Research

The present study was a comprehensive research study among representatives of medium and large enterprises operating in the Hungarian market and of companies providing services to their large corporate partners. The aim of the survey was to provide an in-depth analysis of the experiences of managers at different levels of the company with agile transformation and to review the values and outcomes that emerge from the adoption of an agile approach.

The questionnaire survey was divided into two main segments. The first segment aimed to explore the experiences of agile transformation, in particular in different aspects of the management levels. Within this segment, the questions focused on the experiences of implementing agile project management methodologies and approaches and agile corporate culture, the challenges of implementing effective agile project management techniques, and the experiences of agile project management technologies versus traditional project management technologies.

The second segment of the survey focused on the outcomes resulting from the adoption of an agile approach, which allowed participants to assess the value created by agility and the resulting experiences. In addition, the managers of the companies participating in the survey were able to express their views on the effectiveness of the agile methodologies and techniques adopted in relation to organisational goals.

During the research, I took particular care to respect ethical standards and did not ask participants for personal or sensitive data. The survey questions were designed to understand leadership experiences and agile transformation processes, and provided a basis for the formulation of further questions used in the interviews. The data collection and analysis enabled a deeper understanding of the agile transformation processes of companies and an assessment of the adoption and application of agile methodologies among companies operating in the Hungarian market.

Participants in the Research

The information gathered from the data collection conducted will give us insights into the respondents' organisational position and their professional experience with agile methodologies. This allowed us to gain insight into the positions respondents hold within their organisations and how they use agile methodologies in their professional activities.

The survey of participants shows that all of them work in some level of management or analytical position, such as team leader or project manager. The experience of the participants' professional position is of particular relevance for the study of the organisational application of agile methodologies and agile transformation processes. Professionals in leadership and analytical roles will have critical insights into project management and the application of agile practices, and will directly influence the success of projects and the agile development of organisations. Respondents' position enables them to directly perceive and evaluate the impact of the introduction and application of agile methodologies in their organisations.

The data shows that respondents are likely to have significant experience in agile project management and agile methodologies, which allows them to provide valuable feedback and insights on the organisational impact and outcomes of agile transformation.

A significant proportion of the participants, around 80%, are currently working in four main positions, each of which is represented by 20%: project manager, business unit manager, team leader and Scrum Master or Agile Coach. In addition, respondents include one person working as a Lead Developer, CEO or Senior Consultant. These data suggest that the majority of respondents are working in positions directly related to the use and possible implementation of Agile methodology at a management level.

It can be seen that Scrum and Kanban are the most commonly used agile frameworks among the respondents. Scrum was used by 14 respondents, while Kanban was chosen by 10 respondents. The XP framework is the third most popular according to the data, with 4 respondents. The other agile frameworks and methodologies - SAFe, Lean, FDD, NEXUS, DA and Scaled scrum - are relatively less represented among the respondents with one person indicating usage each. This may suggest that Scrum and Kanban are dominant among the respondents, while the other methodologies are less widespread or are associated with specific projects or situations.

In terms of the maturity of the organisations concerned, the results show that most respondents (50%) put their organisation in the middle, or medium, category in terms of agility, while the second largest group (25%) considered it to be quite agile. Only a smaller percentage (6%) think that their organisation's agility is very mature. 19% of respondents think their organisation is less agile.

This shows that the agility of respondents' organisations is somewhere between the medium and high level according to respondents' perceptions, but there is still room for improvement in terms of deepening agility.

Flexibility

The adoption of agile methodologies brings significant benefits to software design and product development, such as faster value delivery and higher customer satisfaction. An agile approach enables development teams to have short development cycles, ensuring faster response times and early delivery of products. Iterative development facilitates continuous customer feedback, enabling timely corrections and product optimisation. Active customer involvement, transparency and predictability are key to successful project management. Agile methodologies help development teams to adapt to changes, get feedback faster and manage bugs effectively.

The survey assessed agile flexibility: 56% of respondents were "completely satisfied" and 31% "satisfied". The satisfaction rate confirms that agile methodologies are working effectively in a changing business environment. However, some respondents believe that further improvements are needed to optimise agile flexibility. A challenge mentioned was the constant change in project scope, leading to uncertainty in timelines and cost planning. Respondents reported difficult to predict deadlines, which weakens project management.

The benefits of an agile migration include the ability to adapt to the rhythm of sprints, allowing the team to deliver new features efficiently. However, it has been a challenge to precisely define acceptance criteria, which is key to tracking the progress of the project. The corporate mapping of roles suggested by the methodology increased the awareness of staff responsibilities. Appropriate ceremonies helped to estimate time and resources and deliver results quickly.

Agile methodology allows continuous performance evaluation and rapid response to unforeseen problems. Rapid testing and forecasting during sprints helped to track development, which also facilitated project planning and budget decisions. The storypoint system was also useful in improving transparency in cost planning and error management.

Corporate Implementation, Methodological Introduction

Several challenges have been identified in the implementation of agile methodologies in enterprises. 31% of survey respondents described the implementation as "challenging", while 50% described it as "moderately challenging", suggesting that the process had problems but that they were manageable. Based on the responses, a deeper analysis of the challenges is needed to apply the methodology more effectively.

Agile ceremonies, such as sprint planning, have had a positive impact on the functioning of teams, but misinterpretation and inappropriate application of the methodology have caused problems. The lack of a proper breakdown of tickets and development tasks led to "ticket environments", and the implementation at the enterprise level was not smooth due to internal conflicts. Applying the principles of agility takes time, which has been a challenge.

While applying the methodology, it was found that they do not respond effectively to obstacles and the people involved do not always understand the agile approach. Bad practices and misunderstandings led to a lack of planning, resulting in the misapplication of agile methodologies. Proper application of the methodology requires expertise, the lack of which has hampered full implementation.

The role of management is critical in the application of agile methodologies; weak management support has made optimal progress difficult. Excessive pressure and time-wasting meetings have affected the agile approach. Members of the organisation were generally positive about agile methodologies, with 50% indicating 'high openness' and 19% indicating lower openness. Some employees and managers appreciated the flexibility but perceived limitations in full implementation.

In many cases, company managers have not been actively involved in the transformation, which has reduced enthusiasm. Employee reactions were mixed; many were positive about the change, while others found it difficult to understand its benefits. In summary, the implementation of the Agile methodology presents many challenges, but with a positive attitude and continuous training, it can be successfully implemented. Ongoing communication between managers and employees is essential for success, while proper management and analysis of challenges is key.

Organisational Culture and Communication

Agile frameworks foster better team communication, flexibility in the allocation of tasks and increased team unity, which creates a more motivating and efficient working environment. However, using Scrum can be challenging, especially when there are multiple customers or stakeholders. One of the main difficulties is defining the objectives of the sprint, which is key to managing the project. Managing multiple customers at the same time can be complicated and lead to inefficiencies, worsening progress and work quality.

The involvement of customers in agile processes is also problematic, especially for customer-specific projects, which highlights the importance of communication. Retrospective evaluation and addressing issues that arise during a sprint is also a challenge, as often there is inadequate narrowing down of issues. Positive experiences in

terms of organisational culture have led to teams becoming more results-oriented and improved project management efficiency.

Agility should be treated as an approach, not just a methodology. For the companies that follow it, the transformation is smoother and has a greater impact on corporate culture. Adopting agility as a mindset improves organisational commitment to agile principles, which enhances collaboration and responsiveness. Understanding agile methodology positively impacts employee motivation, satisfaction and creates a more productive work environment.

Based on these observations, it may be worthwhile for companies to invest in training and support of agile methodologies to ensure that teams understand and apply them properly. Supporting and educating employees can help reduce stress and burnout, increase job satisfaction, and improve project effectiveness through corporate culture. The findings also suggest that the proper application of agile methodologies can have a positive impact on employees' attitudes towards work and their overall well-being.

RESULTS AND EFFECTIVENESS

Participants also rated their satisfaction with the effectiveness of the agile methodology on a five-point scale. The possible responses ranged from complete dissatisfaction (score 1) to complete satisfaction (score 5). The data show the following distribution: 69% of respondents (11) rated themselves as 4, i.e. "satisfied", while 13% (2) rated themselves as 5, i.e. "very satisfied". In addition, 19% (3 people) selected category 3, "neutral".

The data shows that a significant proportion of respondents gave very similar responses in terms of both satisfaction and effectiveness, with a total of 82% (13 respondents) giving a positive rating for the effectiveness of the Agile methodology, as indicated by the combined number of 4 and 5 ratings. This high percentage suggests that agile methodologies are well integrated in the organisation and bring significant efficiencies to the way work is done. However, the 19% neutral response rate should not be overlooked, suggesting that further optimisation of agile practices may be needed.

The results suggest that the organisation may want to collect deeper analysis and feedback in order to identify areas where agile methodologies can work more effectively and act accordingly towards further improvements.

The study shows that the quality of products and services has improved as a result of the use of agile methodologies. Reasons for this include the detailed breakdown of tasks in sprints, which allows for a more precise definition of development tasks, and the fact that products and services are tested at the end of each sprint rather than at the end of the development process. This continuous testing allows early detection and immediate correction of defects. In addition, frequent feedback collection and customer-centric development also contribute to quality improvement. The frequent collection of feedback from stakeholders and the increased focus on customer needs has further enhanced quality improvements.

More accurate estimation of tasks and a better definition of the number of tasks that can be organised in sprints has allowed companies to offer their customers more predictable deadlines and results, which has increased customer satisfaction and company profitability.

The results of the study show that the use of agile methodologies has a variable impact on productivity. While some respondents did not experience a significant change or could not provide specific figures, others reported an increase in productivity with the introduction of agile methodologies. This is indicated, among other things, by more frequent software releases, reduced administrative burden and shorter lead times.

Agile methodologies have made projects more predictable, allowing the company to allocate resources more efficiently and thus achieve higher productivity at lower costs. However, it is worth noting that productivity gains are not automatic with the introduction of agile methodologies. According to some respondents, the effectiveness of agile methodologies depends to a large extent on a cohesive team and customer involvement. Indeed, productivity improves when teams are well-coordinated, the customer is involved in the development process and the company does not give in to random priorities. However, if not applied correctly, the use of agile methodologies can even reduce productivity.

Overall, the agile methodology can increase productivity, but the actual rate of increase depends on many factors, such as the involvement of teams and customers, and the correct management of priorities.

Based on the survey, participants gave very different answers as to whether the implementation of the agile methodology had reduced their costs. Some confirmed that they had experienced cost reductions, but the results varied. Another response highlighted that they had experienced significant cost reductions of up to 80% due to unsuccessful projects prior to the introduction of the agile methodology. However, several respondents indicated that they did not have information on cost reductions or that no such statement had been made.

Some argued that the aim of the agile methodology is not necessarily to reduce costs, but rather to optimise workflows, and therefore did not answer the question. Overall, it is not possible to draw an overall conclusion based on the responses, as there was considerable variation among respondents in terms of cost reduction.

Finally, the level of satisfaction with the effectiveness of the use of agile methodologies in the organisations studied was rated on a five-point scale by senior employees. The possible responses ranged from a score of 1 (not at all satisfied) to a score of 5 (very satisfied). The data were presented both as a percentage and as an absolute number, as follows: 63% of respondents (10) selected a category 4, i.e. "satisfied", while 19% (3) selected a category 5, i.e. "very satisfied" and 19% (also 3) selected a category 3, i.e. "neutral".

When analysing the data, it is worth pointing out that the vast majority of respondents, 82% (13 people) in total, rated the results of the agile methodologies positively (a total of 4 and 5 ratings), which may be an indicative sign of the effectiveness of the methodologies. However, it is also an important observation that the proportion of "neutral" evaluations is significant at 19%, which may suggest that there are areas where further improvements and fine-tuning of agile practices may be needed.

Further research and in-depth analysis may be directed towards identifying areas where satisfaction with the implementation of agile methodologies may be below expectations, and considering the introduction of appropriate improvement measures to improve the organisation.

The dominant view in the responses on the future of agile is that organisations want to continue using this methodology. They stress that the use of agile operations allows organisations to adapt to an ever-changing environment, thus providing flexibility to internal or external customers. They aim to apply as many elements of agile methodologies as possible.

However, there is also a need to find a balance between agile operations and long-term planning. Some respondents believe that the strict application of agile as a methodology may be risky, but the future of agile thinking seems secure. Overall, the responses suggest that agile will play an important role in the future of organisations, but its application and integration in practice requires a differentiated approach.

CONCLUSION

Agile methodologies are based on the principles of adaptive design, frequent feedback and flexible response. These methodologies enable organisations to respond quickly to changing business environments and requirements, which is particularly important in today's fast-changing marketplace.

Adaptive design helps projects to be completed faster, while continuous feedback ensures customer satisfaction and that project goals are met. Performance and efficiency are critical to the success of organisations. Adopting agile methodologies enables organisations to increase productivity, reduce project delays and better respond to customer needs.

Agile projects often result in higher customer value and better product quality. Implementing agile methodologies involves the challenges of organisational change and adaptation. Change management and organisational culture change are critical for a successful transition. These changes can have a positive impact on organisational performance and efficiency if managed appropriately.

Based on the surveys, respondents at different levels of management assessed their experience of implementing agile project management methodologies and approaches. The values and results presented by the respondents suggest that the adoption of agile methodologies has a positive impact on the performance and effectiveness of organisations, especially in a changing business environment.

However, there are challenges in implementing and applying agile methodologies. Without the challenges of organisational culture and change management, and without the proper application of agile practices and tools, organisations will not experience the full benefits of agile transformation. If these challenges are not properly addressed, organisations will not achieve the desired performance and efficiency gains.

Overall, the adoption of agile methodologies seems to improve the performance and efficiency of organisations, but the extent of the results depends on appropriate implementation and application practices. Agile transformation helps organisations to adapt to a changing business environment, increases project management efficiency and promotes value creation. All this suggests that the hypothesis that the adoption of agile methodologies improves the performance and efficiency of organisations seems to be true based on the information from the study.

The second hypothesis is that the agile methodology is more effective for project management in an IT organization than the traditional waterfall model.

The agile and waterfall models are two widely used methodologies for project management. While the waterfall model adopts a sequential, phase-oriented approach, where one step is fully completed before moving on to the

next; the agile methodology follows an iterative and incremental approach that allows for flexible response to change. IT projects are typically characterised by rapid change, complexity and uncertainty.

Agile methodologies, such as Scrum or Kanban, allow teams to respond quickly to changing customer needs, priorities and continuously deliver value through short iterations. Frequent feedback and the ability to adapt are central to agile methodologies, which are particularly suited to IT projects.

In the waterfall model, project phases follow a strict sequence, from requirements definition to implementation and maintenance. Although this approach works well for projects where requirements are well defined and unchanging, IT projects often face changing circumstances that make it difficult to apply the waterfall model effectively.

The surveys showed that respondents at different levels of management evaluated their experience of implementing agile project management methodologies and approaches. A review of the values and findings from the adoption of the agile approach suggests that agile methodologies increase the effectiveness of project management in IT organizations, especially in a changing environment.

In addition, there are of course advantages to the waterfall model, especially for projects where requirements are stable and changes can be minimised. In addition, the waterfall model offers clear phases and milestones, which can be beneficial for planning and budgeting. However, due to the volatility and uncertainty of IT projects, these benefits are often insufficient to offset the benefits of agile methodologies.

For the third hypothesis - The adoption of agile methodologies may pose a risk to the long-term planning capability of the organisation - agile methodologies are designed to be flexible in response to changing business requirements and environments. At the core of these methodologies are rapid iteration, frequent feedback and adaptive design, enabling organisations to respond quickly to change and increase customer value.

Long-term planning is traditionally based on predictable, stable and unchanging environments and requirements. The flexible and changing nature of agile approaches can clash with these expectations of long-term planning. Rapid iterations and changing priorities can make it difficult to anticipate more distant future commitments, resources and budgets. While the introduction of agile methodologies provides flexibility and adaptability to projects, this flexibility can also pose risks to long-term planning. Striking a balance between traditional planning methods and agile approaches is vital for organisations to maximise the benefits of agile while maintaining long-term strategic control.

Overall, the results of the study suggest that the introduction and use of agile methodologies pose challenges to the long-term planning capabilities of organisations. The agile approach focuses on short-term, rapid-response planning, which can pose risks to longer-term, strategic planning. Frequent changes and flexible priorities can make it difficult for organisations to anticipate future resources, budgets and timeframes.

However, agile methodologies do not exclude long-term planning. Many organisations use agile approaches at the project level, while long-term, strategic planning is used at the organisational or business unit level. Agile frameworks, such as SAFe (Scaled Agile Framework), explicitly include methodologies that combine agile and long-term planning.

Overall, although the introduction of agile methodologies may pose risks to long-term planning, these risks can be managed through good practices and methods. The key lies in finding a balance between agile and traditional design methodologies.

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